

STANDS FOR CONTROLLED-ANGLE SHARPENING ON GRINDER

PART 1 – DESCRIPTION OF THE STAND

PART 2 – [MOUNTING THE STANDS](#)

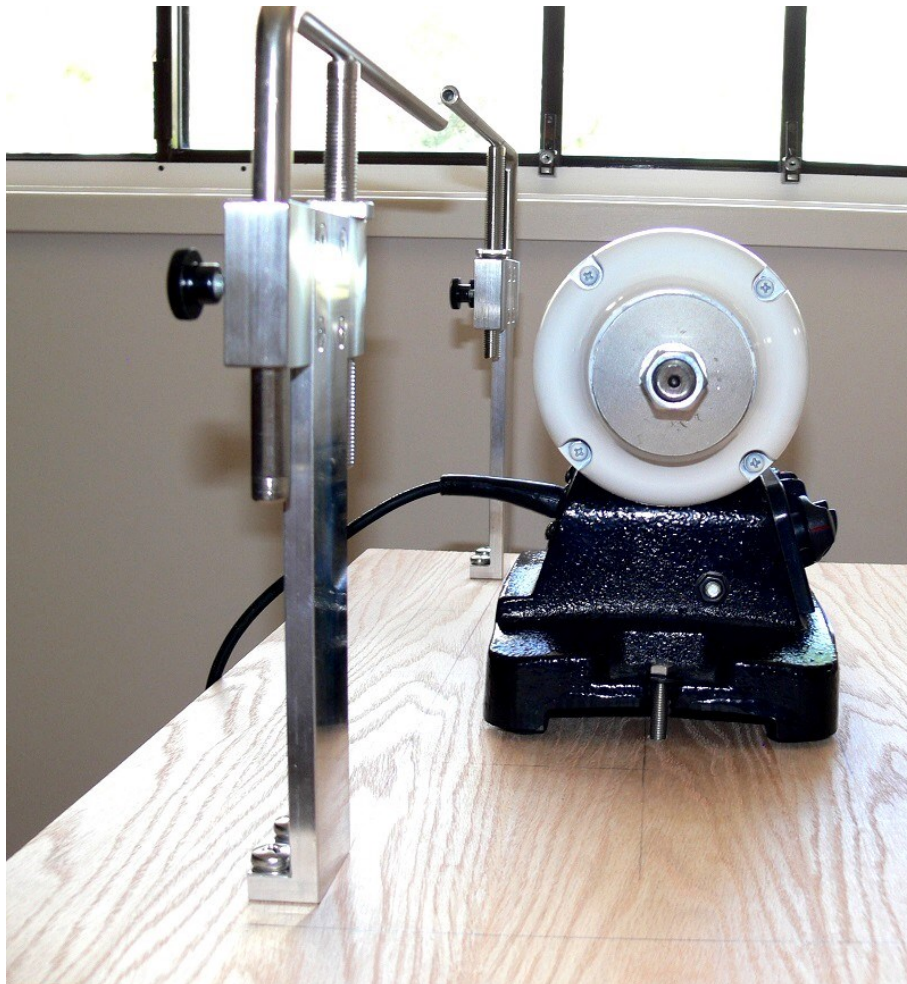
PART 3 – [USING THE SOFTWARE](#)

PART 4 – [KNIFE SHARPENING](#)

PART 5 – [PRACTICAL COMBINATIONS](#)

PART 1

DESCRIPTION OF THE STAND



Our controlled-angle stands for grinder are used for sharpening woodworking tools and knives, using the same jigs that people use on Tormek.

Our controlled-angle stands are for 250mm wheel, and work well with wheels from 240 to 260mm in diameter (9-10”).

Compatible only with Tormek Universal Supports like US-105, US-400, US-430.

Stand height is 230mm.

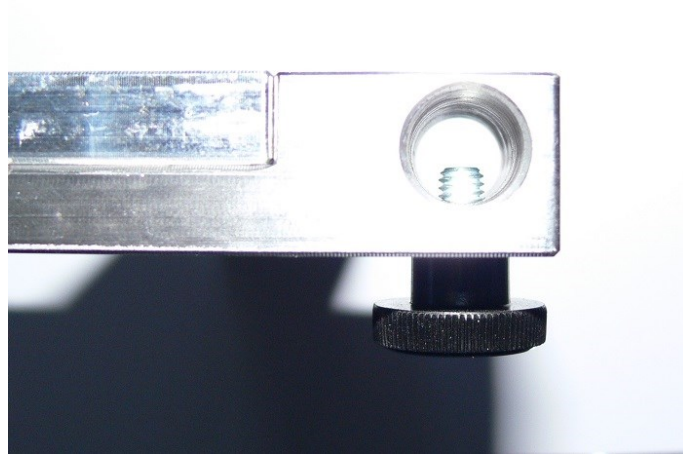
The stand is 10mm thick, made of one piece of metal.

These stands are industrial grade, made to last for hundreds of sharpenings a day for many years.

The support bar holder is made of high grade stainless steel for prevention of the fastener thread stripping, so that multiple uses cannot strip it. If made of aluminium or plastic, the thread will strip sooner or later.

The hole for the support goes off-center – we do this on purpose, to give more steel to the fastener thread.

These two features ensure that the thread will never strip.



We make these stands for industrial use at meat/poultry plants and abattoirs. They have mill finish and may have cosmetic imperfections. Do not expect a polished presentation finish.

Our controlled-angle stands will last for hundreds of thousands of sharpenings, for your lifetime and beyond.

PART 2

MOUNTING THE STANDS

For proper installation it is important to understand the **mounting footprint** of the setup, and several important distances.

The rectangle you see drawn on the bench top is the inner perimeter of the bench frame.





You need only this line, I've marked all the perimeter for better visual of the layout.

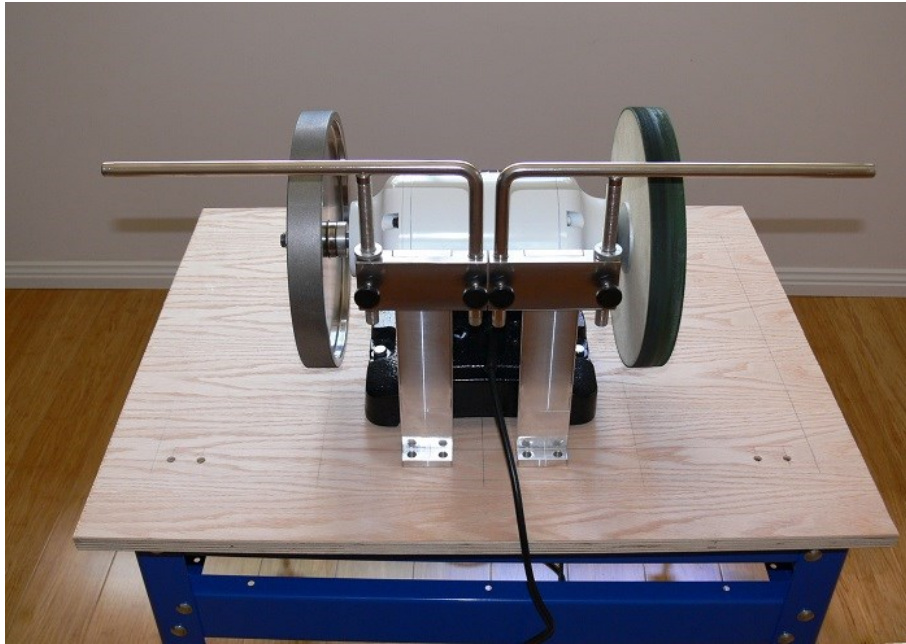
This dimension is the grinder mounting footprint length, and that dimension is the grinder mounting footprint depth or width. The mounting footprint of the grinder is not the same as the mounting footprint of the whole setup.



MOUNTING FOOTPRINT LENGTH

The setup mounting footprint length depends on how we position stands at the grinder.

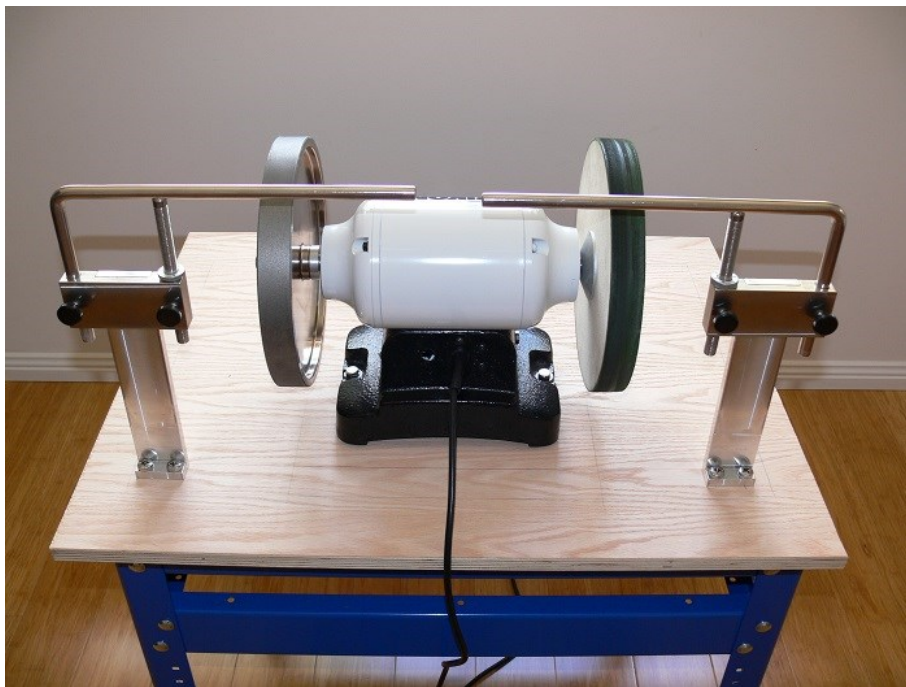
The minimal setup length is when we place stands inside the wheels.



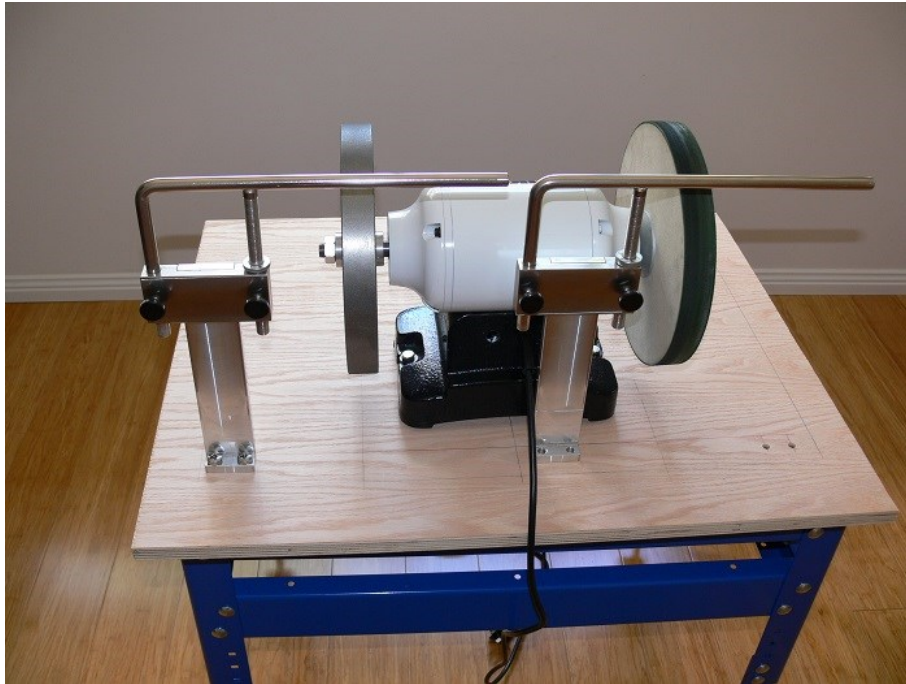
In this case you can use a smaller bench.

The other two options of placing the stands are:

- when both stands are outside the wheels



- and with one stand is inside the wheel and the other stand outside the wheel



What are pros and cons of each of these combinations?

Having both stands inside the wheel gives the smallest mounting footprint.

Good for mounting on a smaller bench, and for mobile sharpeners, easy to transport to a farmers' market etc. Another plus is an easy access to mounting the wheels; when you change wheels often, this may be important.

However, in regular grinders distance between the wheels is too short for placing both stands between them.

We place both stands inside the wheels only with long shaft buffers or some special long shaft grinders.

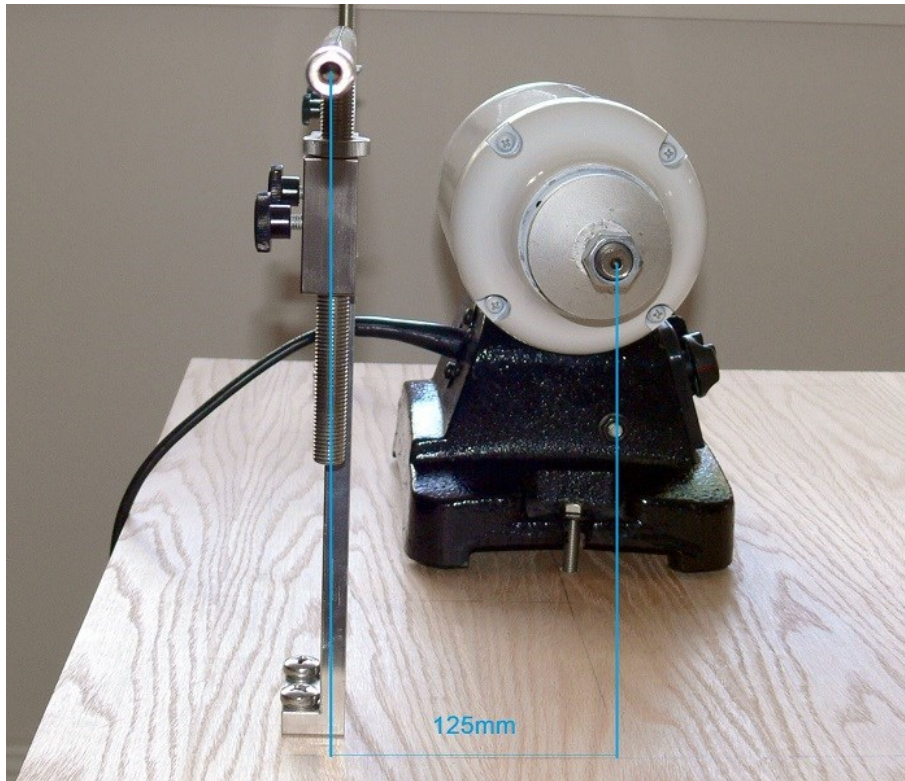
With 2 stands placed outside the wheels we have unrestricted operations, but the 2 minuses are the largest mounting footprint (you need a larger bench), and the stands are in the way of mounting the wheels. Not that it is impossible to mount the wheels, just not as easy, and if for whatever reason you have to change wheels frequently you better use a different combination.

With one stand inside the wheel and the other stand outside the wheel, you have unrestricted operations, and need a medium size bench. You can place one stand inside the wheel on the side of the grinder where you think you will be frequently changing wheels.

Finally, if you think of doing with a single stand in the middle and using some long custom-made support bar for both wheels – do not. You need a separate support for each wheel because even in quality grinders/buffers the shaft is not parallel to the ground, and is higher on one side. Because of that, to grind and hone at the same angle, you need to set the support differently for each side, i.e. for the left and right wheel.

MOUNTING FOOTPRINT DEPTH (WIDTH)

Important distance: distance between centrelines of the grinder shaft and the support bar must be **125 mm**. This is an experimental value, established by trial and error.



The setup footprint depth is calculated as:

125mm +
half the depth (width) of your grinder base +
25mm of the foot of our stand

The 8" Rikon grinder in the example has base width 173mm, so the mounting footprint is $125\text{mm} + (173/2) + 25\text{mm} = 236\text{mm}$



Its base length is 238mm



So we take the mounting footprint for the 8" Rikon grinder as approximately 240x240mm.



240x240mm is the mounting footprint, but the whole setup footprint on your workbench is more than that because of the support bars and wheels.

STEP-BY-STEP LAYOUT

The following step-by-step layout is explained for a grinder with 16mm shaft (5/8") and our stands placed outside the wheels.

Draw a line parallel to the end of your workbench at **minimum** the FOOTPRINT DEPTH (width) - for the 8" Rikon in the example it is at 240mm from the inner perimeter of the bench frame, and mark its middle.

Place and align your grinder along this 240mm footprint depth line, with the middle of the grinder at the middle of the line.

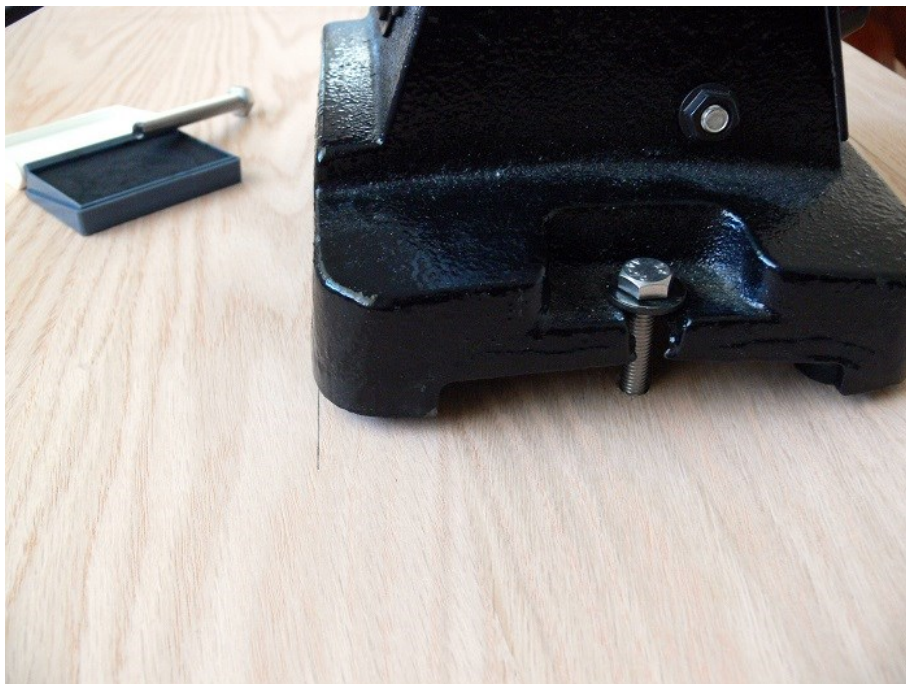
Important: Orient the grinder to work **with the wheel rotation, edge-trailing**. Many grinders are symmetric and have the same distance to the shaft from the front and back, but not all.



Mark the 1st hole for mounting the grinder, using the bolt you will mount with.
Mark by our method with the stamp pad, or a pencil.



Drill and insert the 1st mounting bolt.



Align your grinder base along the 240mm footprint depth line, and mark the 2nd hole for mounting the grinder.



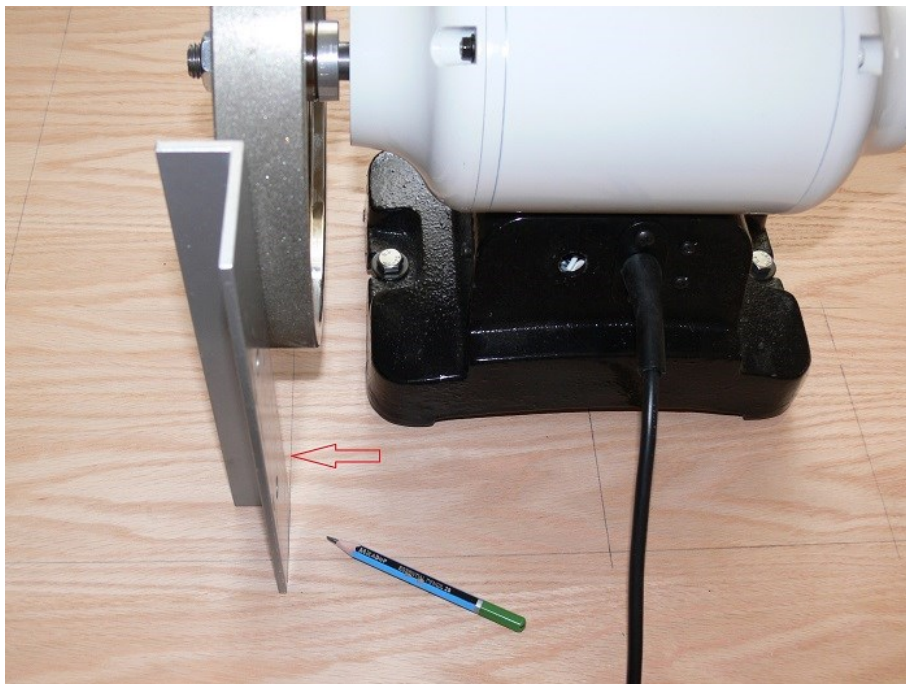
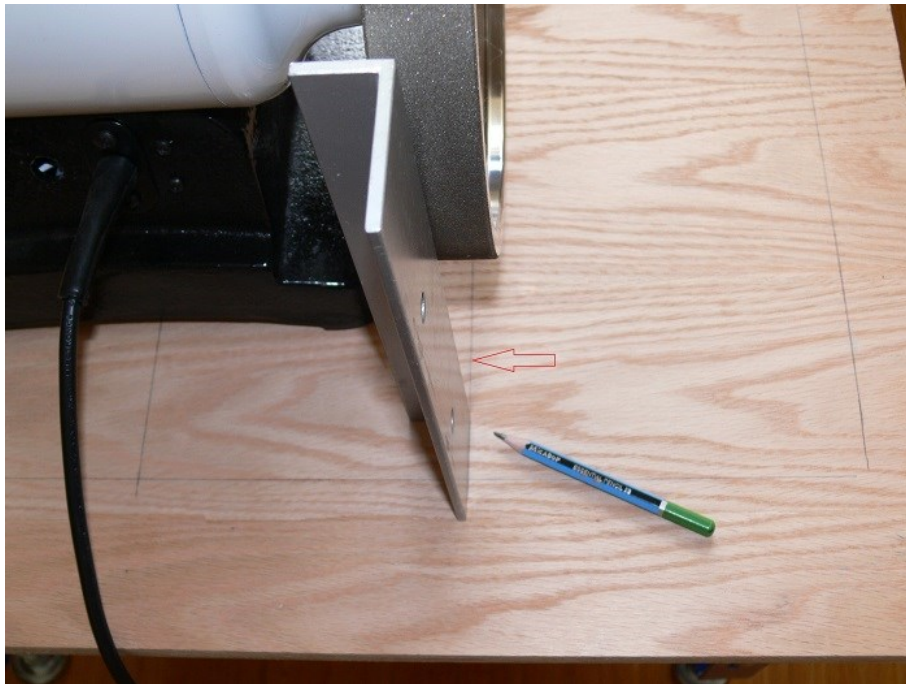
Drill and insert the 2nd mounting bolt to keep the grinder in place. Do not tighten the bolts yet.



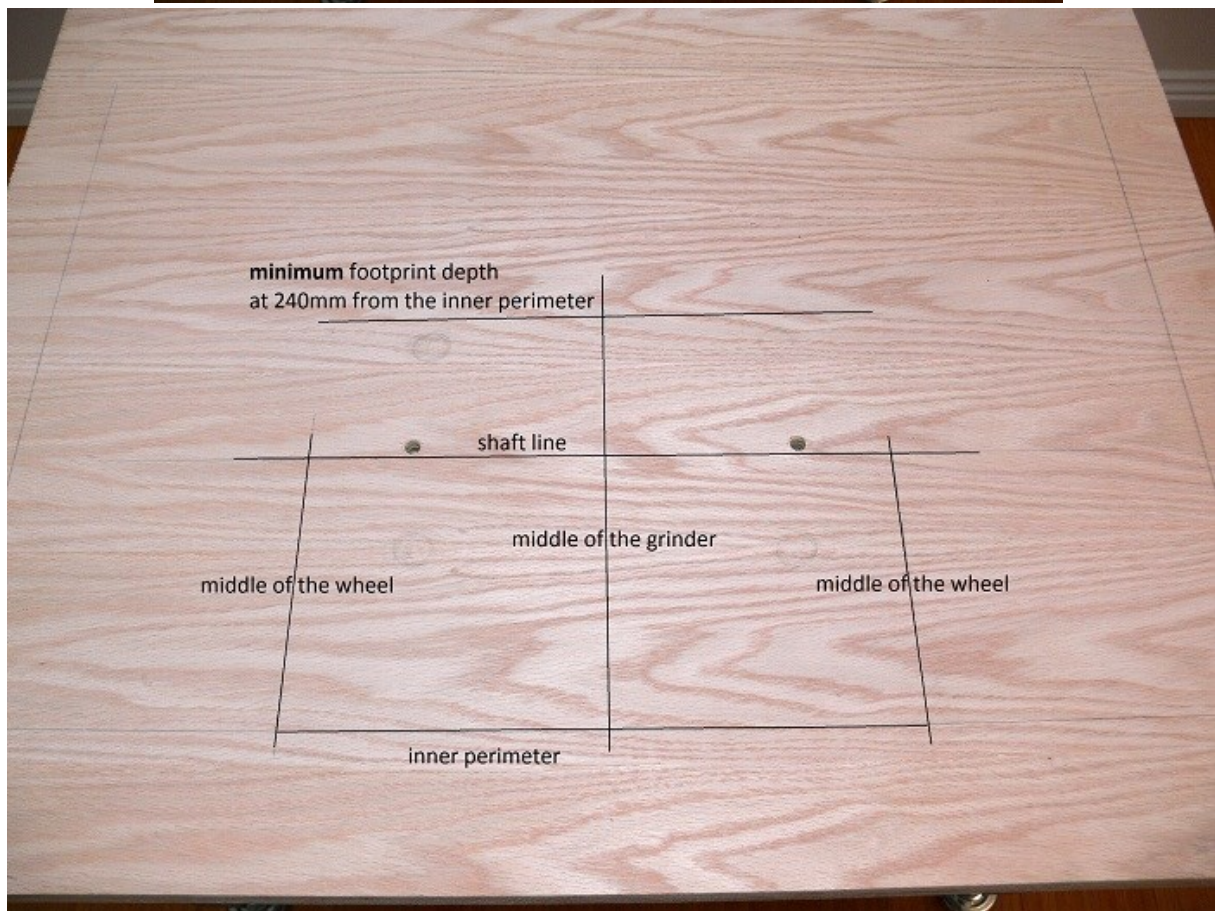
Mark the grinder shaft on the stand side, on both sides of the grinder. For this, drop a vertical perpendicular to the bench.



Mount wheels on the grinder, and mark the middle of each wheel.



Put the grinder aside, and draw lines across the marks: the shaft line and the wheel lines. You can mark the middle of the grinder for better visual of the layout, but we will not be using it in determining position of the stands.



Draw the next line at **108mm** from the shaft line – this is the stand line, we align the stands along this line.

Distance for the stand line is calculated as:

125mm *minus*

distance from the stand end to the support bar centreline, in our stand it is 9mm *minus*
distance from the grinder shaft line to the shaft centreline. In case of the Rikon 5/8" shaft it is 7.94mm – we can round it to 8mm.

So, we draw the stand line at $(125 - 9 - 8) = \mathbf{108mm}$ from the shaft line.



In our stands, holes in the stand foot are at **17.5mm** from the stand end, and distance between the 2 holes is **30mm**.

Distance from the wheel middle line to the stand depends on the Tormek support bar you use, the US-105 or US-400/430, because we position middle of the support bar against the middle of the wheel. In our stands distance from the support bar hole in the support holder to the hole in the stand foot is 30mm.

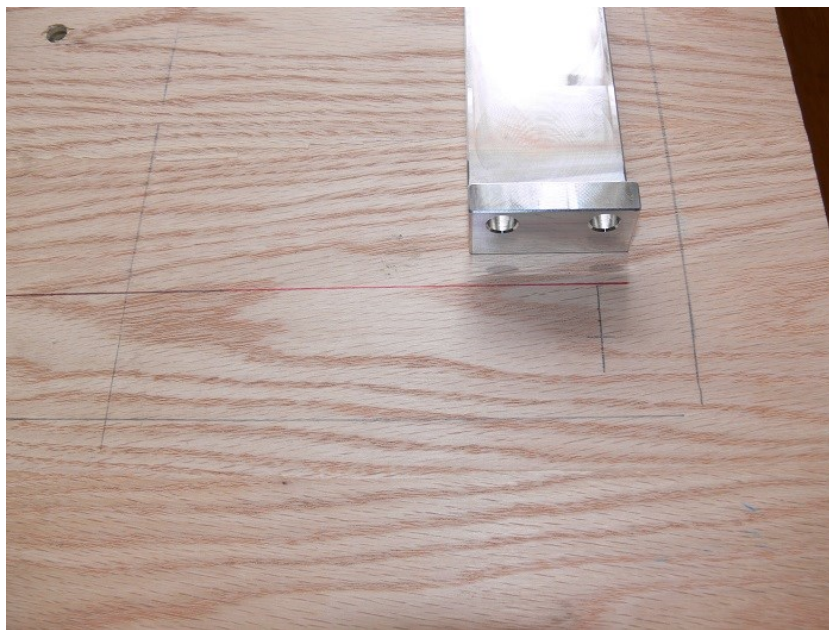
Middle in the support bar is at the half of its useful length. Half of the useful length of the Tormek US-105 is $294\text{mm}/2 = 147\text{ mm}$. For the US-105 the hole of the stand foot should be at **117mm** ($147 - 30$) from the wheel middle line.

Half of the useful length of the Tormek US-400 & 430 is $430\text{mm}/2 = 215\text{ mm}$. The US-400 & 430 have a short arm of 61mm. For the US-400 & 430 the hole of the stand foot should be at **124mm** ($215 - 61 - 30$) from the wheel middle line.

When mounting a support inside the wheel, we measure this distance from the wheel middle line towards the middle of the grinder. But when mounting a support outside the wheel, we measure this distance outwards from the wheel line.

We mark this distance to the hole in the stand foot that is furthest from the wheel. When we position the stands inside the wheels, we mark this distance to the inner hole, and when we position the stands outside the wheels, we mark this distance to the outer hole.

Mark position of the hole of the stand foot at the distance for the Tormek Universal Support you use. In the example shown here we use US-105 support bar, and mark a short vertical line at **117mm** from the wheel middle line. We cross it at **17.5mm** from the stand line. Since in this example we position the stands outside the wheels, this is position of the outer hole of the stand foot.



The 2nd stand hole is **30mm** from the 1st.



Mark holes this way for the left and right stands.

Holes in the foot of our stand are 8mm, so drill the marked holes with an 8mm drill.



Mount your grinder, align along the footprint depth line and tighten the nuts.

Insert the M8 bolts in the stand foot, align the stand along the stand line and tighten the bolts with the flange nuts. The bolts and flange nuts are included with the stand.

Insert the Universal Support in the stands.

This completes the mounting.



PART 3

USING THE SOFTWARE

While the controlled-angle stand is for sharpening any tool, this software is for sharpening knives using a Tormek knife jig.

SOFTWARE TUNING

Angle Setter for Bench Grinder (Official)

About

Dimensions

Grinder #1

Left Wheel

Constant Vertical in mm:

Constant Horizontal in mm:

Right Wheel

Constant Vertical in mm:

Constant Horizontal in mm:

Grinder #2

Left Wheel

Constant Vertical in mm:

Constant Horizontal in mm:

Right Wheel

Constant Vertical in mm:

Constant Horizontal in mm:

Grinder #1

Left Wheel **Right Wheel**

Enter the wheel diameter in mm:

Enter distance between the knife jig adjustable stop and the edge in mm:

Enter the target honing/grinding angle:

(For double-bevel blades, the Angle is half of the edge angle)

Blade

Blade thickness behind the edge in mm:

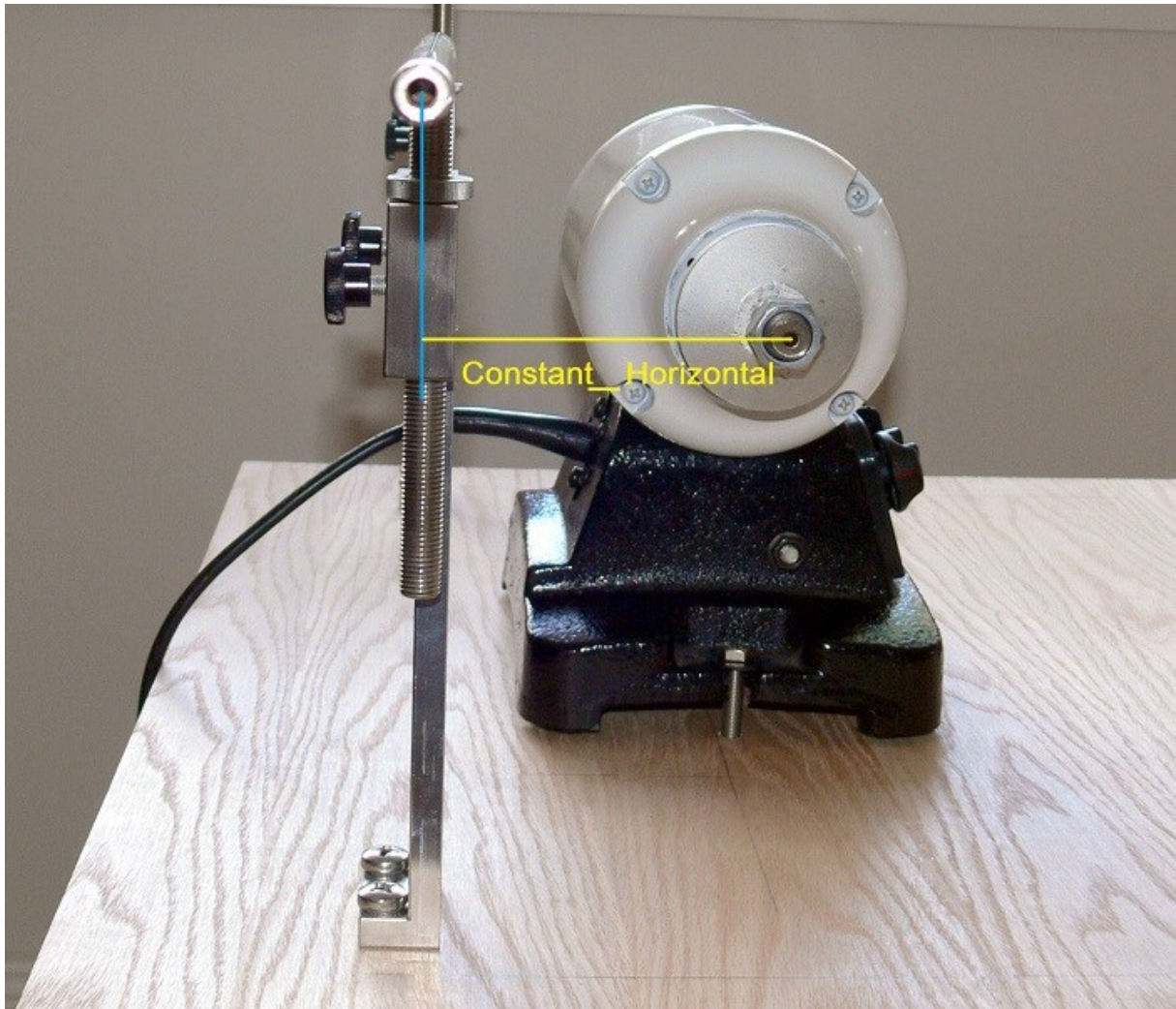
Check if the blade is single-bevel

Universal Support height in mm:

(Vertical distance from the top of the bar to the support)

To tune out software, you need to know Constant Horizontal and Constant Vertical for each side of your grinder.

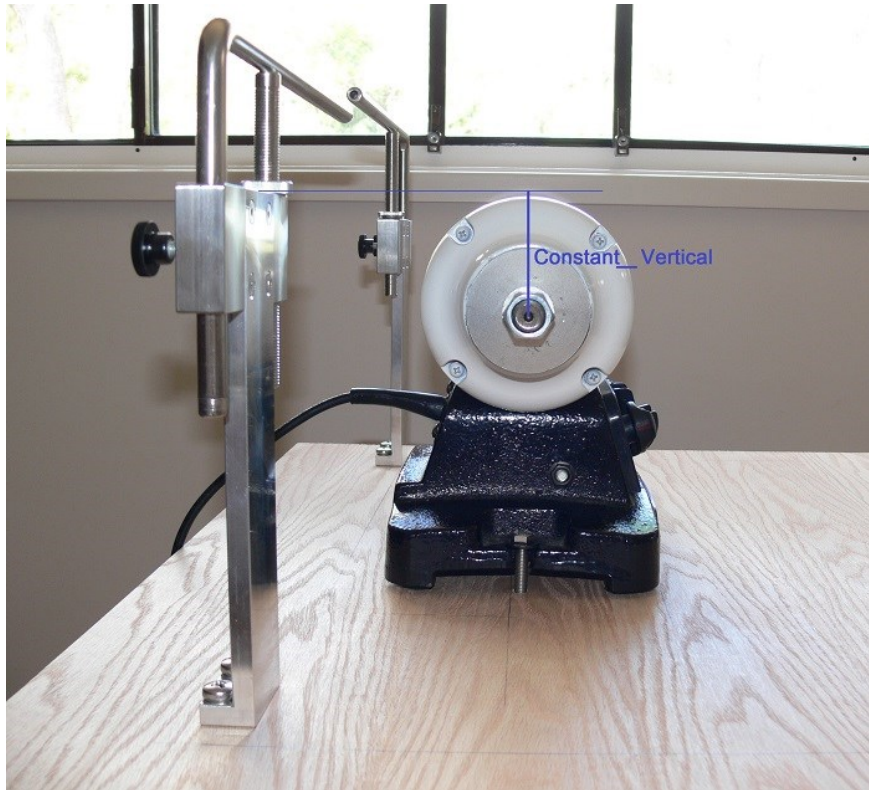
Constant_Horizontal – horizontal distance between the grinder shaft centerline and the bar centerline.



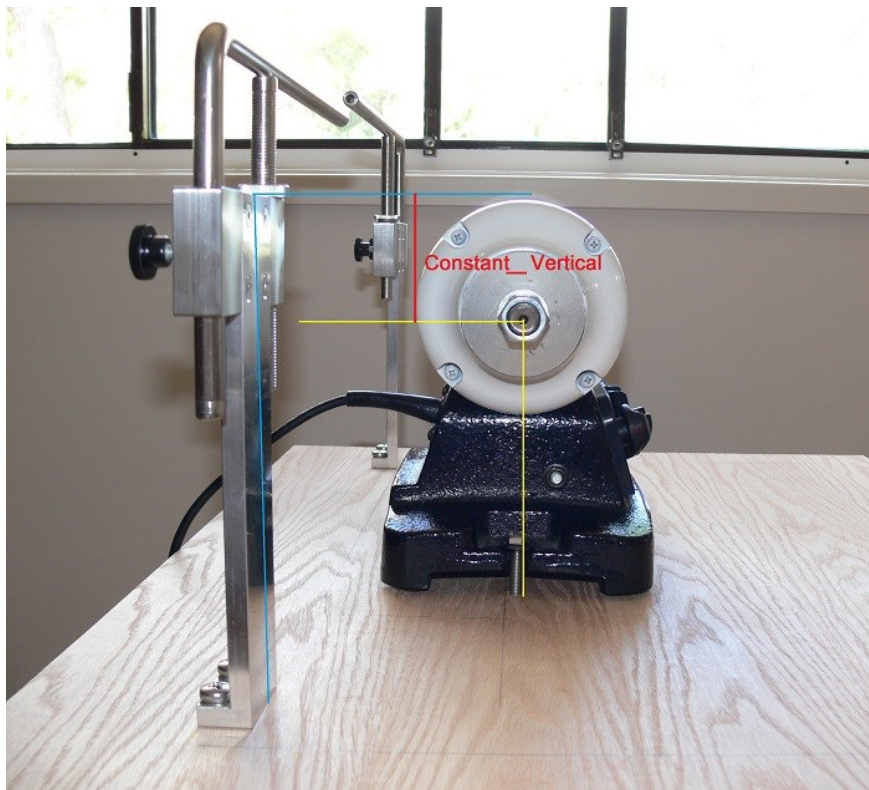
If you followed our mounting instructions, Constant_Horizontal is the same on both sides and = **125mm**

Constant Vertical is never the same, because even in better quality grinders/buffers the shaft is not parallel to the ground, and is higher on one side.

Constant_Vertical – vertical distance between the center of the grinder shaft, and the top of the stand.

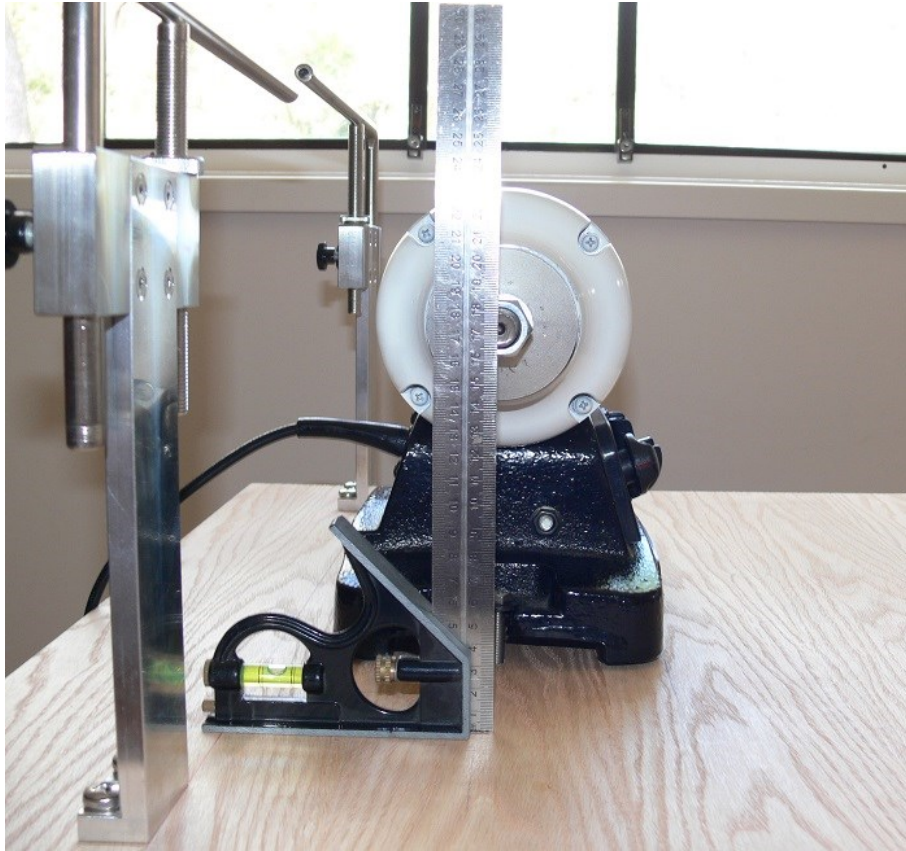


It is the same as the difference between the stand height, and the vertical distance from the centre of the grinder shaft down to the bench.



Our stand height is **230mm**.

So, the Constant_Vertical = 230 *minus*
vertical distance from the centre of your grinder shaft down to the bench



Remember to measure both sides, and calculate the Constant_Vertical value for the right side and for the left side – you will get two separate values.

Click the **Edit** button, enter your measured values of the constants in the applet, and click the same button to save – you have to do it just once.

SETTING THE GRINDING/HONING ANGLE

Measure the actual **Wheel Diameter** in mm.

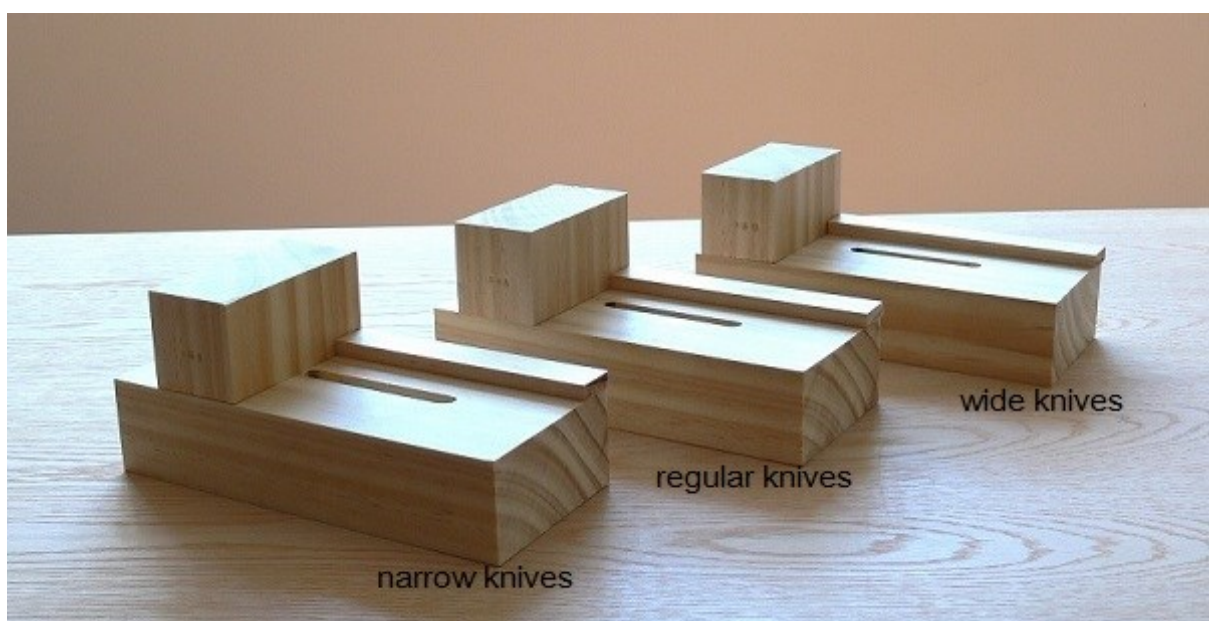
Working with CBN, felt or paper wheels, you do it just once, as this value does not change.

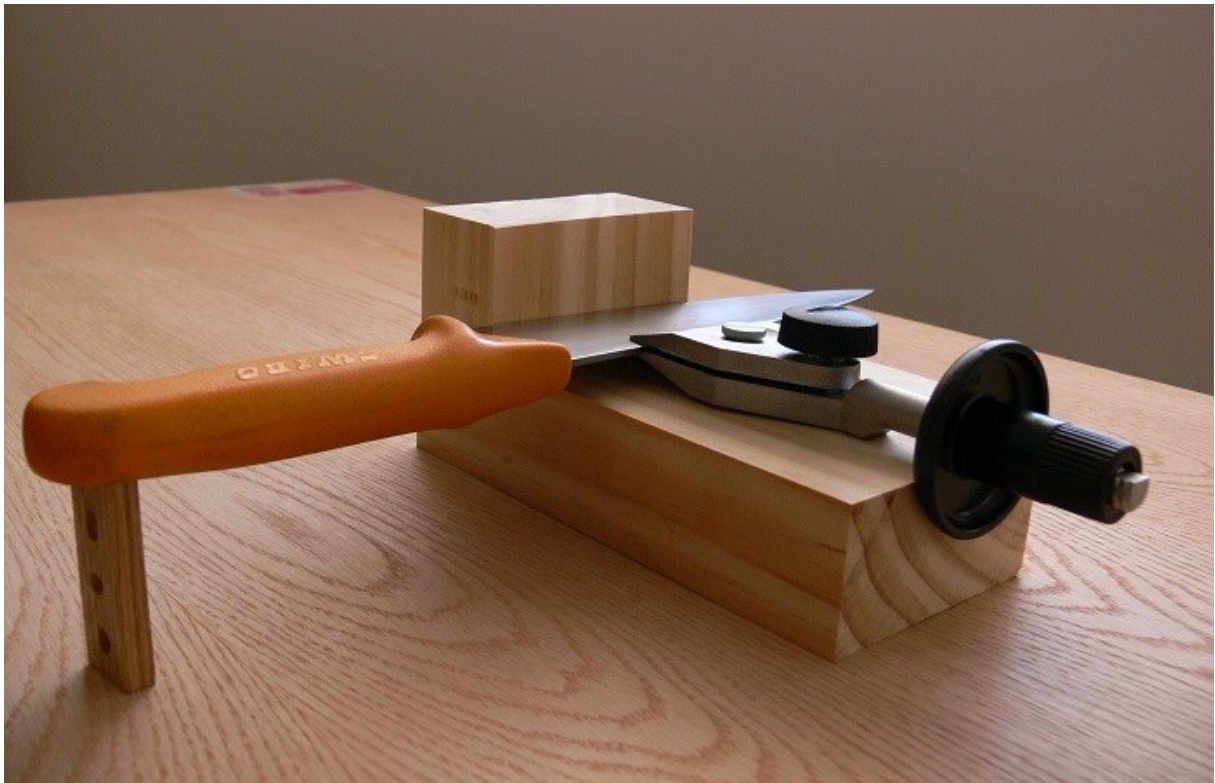
Jig Distance (jig projection)

Having mounted the knife in the knife jig, measure distance between the knife jig adjustable stop (the flat black plastic part) and the knife edge in mm.



In volume sharpening we want each next knife to be set to the same jig distance. For this we use our Jig-setting block. Shown on the photo are 3 Jig-setting blocks for narrow, regular, and wide knives. The block for narrow knives sets jig distance to 130mm, the block for regular knives sets jig distance to 140mm, and the block for wide blades sets jig distance to 155mm. The block is 90x45mm, the border plank is 20x8mm, and the 7mm slot is at 19mm from the border plank. Use of Jig-setting blocks significantly shortens time of this operation, and ensures that the edge is clamped parallel to the jig adjustable stop.





Blade thickness behind the edge

For honing

Measure at the edge bevel to a fraction of mm, using callipers or micrometre.



Entering an accurate value for thickness behind the edge assures you will grind the edge to the target angle.

However, if accuracy of the edge angle is not your concern, and you only want to match the ground angle to the honing angle for clean deburring, you can use this simplified method:

For thin knives that measure behind the edge from 0.2 to 1.5 mm enter "0.5";

For thicker knives that measure behind the edge from 1.5 to 2.5 mm, enter "2"; and

For really thick knives that measure behind the edge 3+ mm enter "3".

For Grinding

How to measure depends on the sharpening plan for this blade:

- when re-sharpening close to the original edge angle – measure at the edge bevel;
- when re-profiling to a lower angle or sharpening a grossly dull knife - within 3-5 mm from the edge bevel.

Re-sharpening close to the original edge angle –
measure at the edge bevel

Re-profiling to a lower angle –within 3-5 mm
from the edge bevel



Select your grinder (if you set up more than one grinder), left or right wheel, enter the wheel diameter, jig distance and the target grinding/honing angle, and press the Calculate button. For your target grinding/honing angle, the applet will give you the support bar height as a vertical distance from the top of the bar to the top of the stand.

Using the Universal Support micro-adjust wheel, set the bar height with the help of a calliper depth probe as shown below, and lock position with the black locking fasteners.



PART 4

KNIFE SHARPENING

Make sure to press your thumb on the knife jig so that the jig is always pressed against the support bar during operation.

Ensure the jig slides on the Universal Support perpendicular to the wheel and the blade is not shifting forward/backwards.

Move the knife over the wheel with light pressure just enough to maintain firm contact of the blade with the wheel. Ensure that the blade is in contact with the entire width of the wheel; near the tip raise the knife handle following the taper.

Pull the blade across the wheel at a feed rate of approx. 10cm per 1 second.

Pull continuously, as pausing may cause notching in the bevel.



High RPM grinding is for sharpening common boning, butcher and kitchen knives. The selection of grits comes from years of our experience with meat plants and sharpening for commercial kitchens on CBN wheels. For sharpening boning, butcher and kitchen knives we do not need CBN grit finer than #400. Many of these knives can be done on #400 alone. When the edge is grossly dull or chipped and needs repair, start sharpening on the CBN wheel #160. Also start on the #160 when re-profiling the edge to a lower angle.

For thinning worn knives use CBN #80. Thinning can also be done on the CBN wheel #160 but takes more time and wears the #160 wheel sooner.

How we thin worn knives to prolong their life:

Grind on CBN #80 at 8 dps.

Continue with CBN #400 to smooth away scratches.

Polish on a felt wheel with Green Rouge.

Then regrind the edge to the target angle the regular way.

PART 5

PRACTICAL COMBINATIONS

Choose the grinder thoughtfully.

Our controlled-angle stands work well with wheels from 240 to 260mm in diameter (9-10"). For our 250mm CBN wheels, as well as for 10" paper and felt wheels use an 8" grinder or buffer. Must be a low-speed 8" grinder running at half the regular speed (1425 or 1750 RPM), and at least 3/4 HP (550 WATT).

The most important is, however, distance between the wheels. Distance between the wheels determines whether we can use a long support bar or only the short one, and eventually whether we will be able to sharpen long knives and cleavers.

Our stands are compatible with Tormek Universal Supports like US-105, US-400 and US-430. The support bar in the US-105 is shorter than in the US-400 and US-430. Useful length of the US-105 bar is 294mm, and of the US-400 and US-430 bar is 430mm.

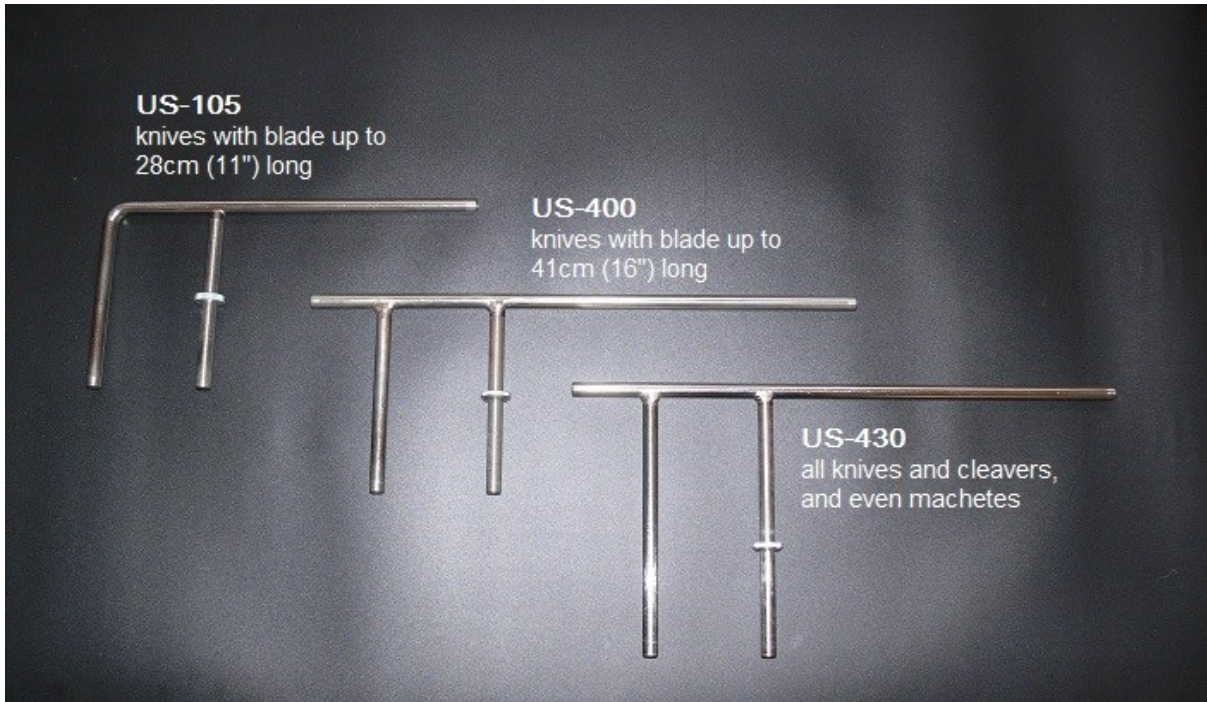
Which support to use does not matter as much for woodworking tools as it matters for knives. On the US-105 we can sharpen knives with blade up to 28cm (11") long: useful length of 294mm *minus* 12mm of the knife jig shaft. We cannot sharpen longer knives on them.

On the US-400 and US-430 we can sharpen knives with blade up to 42cm (16.5") long, practically all knives and even some machetes.

The support bar must be positioned so that its middle is against the middle of the wheel. Regular grinders take only Tormek Universal Support US-105, they do not have enough room between wheels for the longer US-400 and US-430 supports.

Certain grinders and buffers that have long shaft can take the US-400 or US-430.

The support bar in the US-400 and US-430 has the same length of 430mm. But compared to the US-400, the support US-430 not only has a long bar, but also has extra-long legs, and this allows to also sharpen wide knives and cleavers.



In regular grinders distance between the wheels is too short for placing both stands between the wheels. We place both stands inside the wheels only with long shaft buffers or some special long shaft grinders.

The mounting footprint depth depends on your grinder, but usually is 24 cm. While the setup footprint length depends on position of the stands.

Paradoxically, but because in regular grinders we have to place the stands outside the wheels, not only they can take only the shorter US-105 support, but also require a longer workbench for mounting the stands - the mounting footprint is 60x24cm.



While a long shaft grinder or buffer can take the extra-long support US-400 or US-430, and with stands placed between the wheels can be mounted on a smaller workbench. For example, for a buffer/grinder with 50cm shaft and extra-long US-430 support, a workbench or pedestal as small as 30x30cm will do. It is possible because the mounting footprint is only 29x24cm.



So, the most versatile is setup with a long-shaft grinder or buffer and US-430 supports with extra-long legs - on them we can sharpen all sorts of knives, cleavers and even machetes. But grinders with long shaft and low RPM are hard to find.

While the most common are regular grinders that we can use only with the US-105 supports - and on them we can sharpen only regular knives.

We've been living with this dilemma for years, but one morning I suddenly slapped my forehead saying, "but who is stopping me from making the grinder I need?" I looked around and there was nobody trying to hammer me, so I found a factory that started making for us long-shaft low-RPM grinders. It is the same factory that makes grinders for the WEN, BUCKTOOLS and other reliable brands, very good quality.

Our grinder is optimized for running 250mm wheels, has copper wiring (not aluminium used in cheap makes) giving it enough power to run heavy CBN wheels, runs at half the regular RPM, and has an extra-long 600mm shaft to work with the extra-long US-430 supports - can sharpen all sorts of knives and cleavers, and even machetes.