WATER COOLED SHARPENING OF EDGE TOOLS

Changes in Edition 10.5

SVD-186 R is introduced, which is a further development of SVD-186. A new locking knob allows you to now lock the jig's rotary motion. This makes it easier to get full control when sharpening woodcarving tools, such as bent V-tools. The locking knob also enables sharpening with a completely flat bevel on violin making knives when using Tormek's Multi Base MB-100 and Tormek's diamond wheels.

Tormek Universal Support US-430 is introduced, which is both longer and higher than the original universal support. The universal support is designed for sharpening long tools, such as long knives, cleavers and machetes.

Previous Editions

Edition 10.4 Three new diamond wheels are introduced: Diamond Wheel Coarse DC-250, Diamond Wheel Fine DF-250 and Diamond Wheel Extra Fine DE-250, see page 155. MB-100 Multi Base which enables sharpening on the sides of the Tormek Diamond Wheels is introduced, see page 150. ACC-150 Anti Corrosion Concentrate is introduced. WM-200 is updated with new scale for MB-100.

Edition 10.5

Tormek AB
Torphyttevägen 40
SE-711 34 Lindesberg
Sweden

HB-10 EN-2104

MILJÖMÄRKT
341732
TRYCKSAK

I would like to thank Tormek users around the world for their tips and advice in the preparation of this handbook. The close contact with the many skilled craftsmen at exhibitions and by correspondence has been most inspiring and beneficial in the development of our water cooled grinding and sharpening system.

Torgny Jansson
Founder of Tormek

Contents

ACCESSORIES

MAINTENANCE AND TIPS

THE TORMEK PROGRAMME

General About Edge Tool Sharpening

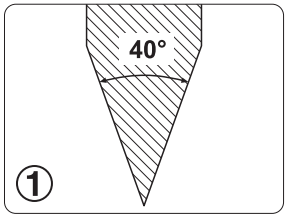
Shaping and Sharpening

Edge tools need to be sharp to work efficiently. The bevels of a sharp edge tool end in a uniform tip. After a period of use the tip becomes rounded and the edge is no longer sharp. You can sharpen tools with a bench stone or, in the case of knives, with a sharpening steel. This means that you work on the very tip of the bevel and the tool is sharp again. However, every time you hone the tool, you increase the edge angle.

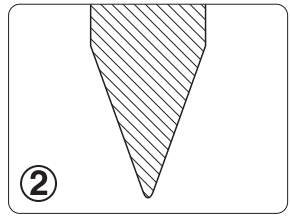
When sharpening with a steel or a bench stone, a very limited amount of steel is removed. After several sharpenings or honings, the edge angle becomes too wide and the tool must be re-shaped. Sooner or later all edge tools need to be re-shaped and this is done by grinding on a grindstone or a grinding wheel. When only a limited amount of steel is removed this operation is also called sharpening.

Grinding means that so much steel is removed from the tool that the edge is restored to the original angle or altered on purpose to a new angle. The *shape* of the tool can also be changed according to your requirements.

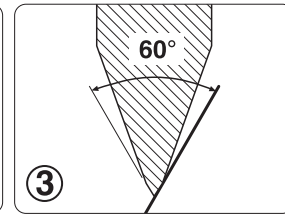
Various stages of a knife edge. In principle, this is the case for all edge tools.



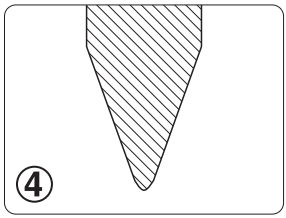
A sharp edge.



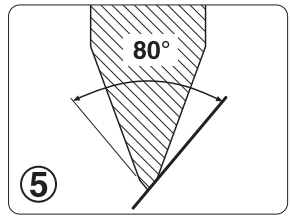
The edge is worn and blunt.



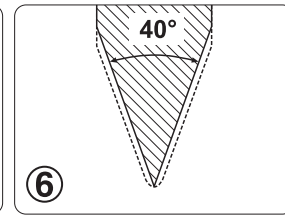
After honing on a bench stone the edge is sharp again, but with an increased edge angle.



After another period of use the edge is blunt again.



Another honing sharpens the edge to a still larger angle.

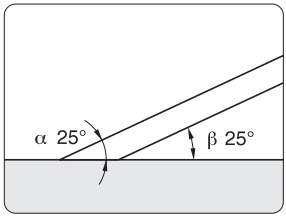


The edge is now re-ground with Tormek to its original shape.

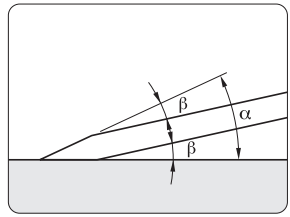
Edge Angle and Bevel Angle

The *edge angle* is the angle of the steel and dictates the cutting and durability characteristics of the edge. It can be narrow and weak for light cutting, or steep and strong for heavy cutting. Carving tools have narrow edge angles (approx. 20°). Turning bowl gouges have wide edge angles (45–60°).

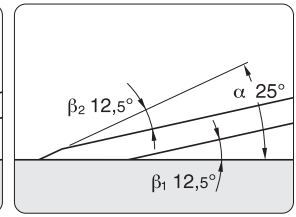
The *bevel angle* is the angle between the bevel and the longitudinal axis of the tool. For tools with the bevel on one side, the edge angle is the same as the bevel angle. For tools with symmetrical bevels on both sides – e.g. knives, axes and skew chisels – the bevel angle is half that of the edge angle. Woodcarving tools can also have an inner bevel and here the edge angle is the sum of the outer and inner bevel angles.



On tools with the bevel on one side, the edge angle (α) is the same as the bevel angle (β).



On tools with symmetrical bevels on both sides, the edge angle (α) is twice the bevel angle (β).



On tools with an outer and an inner bevel, the edge angle (α) is the sum of the two bevel angles (β_1 and β_2).

The size of the edge angle is critical for the efficient functioning of the tool. The edge angle should be as narrow as possible without being too weak to withstand the stresses when working with the wood. The optimal edge angle for each tool is a compromise between the need for the tool to cut as easily as possible and stay sharp as long as possible. A basic requirement is that the edge is strong enough to do the work without being damaged or bent.

A specific tool can be ground at various edge angles depending on how it is to be used. You can of course also have more than one tool of the same type and grind them with various edge angles – each optimal for its application. Recommendations for edge angles are given with the grinding instructions for each tool. With the Tormek AngleMaster you can *set* the desired edge angle before you start grinding. You can also *measure* the existing edge angle on a tool, see page 142.

Denominations

In the literature on this subject, there are various denominations for the edge angle. It is called *bevel angle*, *cutting angle* or *sharpening angle*. The edge angle on a tool with bevels on both sides is called the *included bevel angle*, *the effective bevel angle, profile angle, total cutting angle* or the *combined bevel angle*. Also the length of the bevel is sometimes used to express the size of the edge angle. Then the bevel length must be related to the thickness of the tool as a thicker tool has a longer bevel than a thinner tool – both with the same edge angle. By consistently using the denominations *edge angle* and *bevel angle* as explained above, you know what we mean and this avoids further explanation and confusion.

Dry Grinding and Wet Grinding

Edge tools can be ground dry either on high speed bench grinders or belt grinders or ground wet on a slow turning grinding wheel running in a water bath.

Dry Grinding

Bench grinders and belt grinders have a high cutting ability and they grind quickly. Bench grinders have the grinding wheel mounted directly on the motor shaft, thus the grinding wheel runs with the same speed as the motor (usually 2,850 rpm at 50 Hz and 3,400 rpm at 60 Hz). As there is no reduction gear between the motor and the grinding wheel, bench grinders are comparatively cheap. The belt on a belt grinder also runs with the same high rpm as its motor.

A disadvantage of high-speed grinders is that the tool edge is heated up by the friction, with the risk that the temper is drawn from the steel. The edge then loses its hardness and the tool soon needs to be ground again.

You can reduce the risk of overheating by regularly placing the tool in water during the grinding. However, it is very difficult to prevent the extreme edge from becoming too hot as it is very thin and very sensitive to heat. It is very easy to reach 230–240 °C (446–464 °F) which is the annealing temperature for carbon steel. If the tip is overheated, the tool has to be re-ground (without overheating!) until you reach material which has not been affected by the heat. This is the case not only for hardened carbon steel and stainless steel, but also for high speed steel (HSS), although the margins for overheating here are larger.

When grinding with a bench grinder, sparks occur and you need either protection goggles or a face-guard. Alternatively, the machine must be equipped with transparent protection shields. Because of the high rpm the wheels must have guards, which cover ¾ of the circumference. This limits the accessibility during some grinding operations. When dry grinding, the surface of the bevel becomes rather rough and it needs to be smoothed with a fine grain honing stone.

The fine dust from the grinding wheel and steel particles from the tool can be a health hazard. It is best to use a dust extraction system, so the dust does not pollute the air. You must use a separate extraction system and not the same system as for your wood dust, since a spark could light a fire in the inflammable fine wood dust.

Wet Grinding

When grinding on a water cooled grinding wheel, the wheel runs in a bath of water. The wheel carries the water continuously to the grinding surface, thus cooling it and eliminating the risk of overheating.

The grinding wheel runs between 50–130 rpm, depending on its diameter. A larger wheel runs with a lower axle speed than a small one. The low peripheral speed ensures that the water is not thrown off by the centrifugal force.

The reduction of the high rpm of the motor (you cannot run a standard electric motor at a low rpm) can be achieved with a worm gear, gear belts or with a friction gear. Since you need a reduction gear, wet grinders are more expensive than bench grinders, which do not have a reduction gear.

It is desirable to be able to lower and remove the water trough for cleaning. Particles from the steel and the stone will form a hard mass unless they are cleaned away regularly. The surface finish after wet grinding is finer than with dry grinding. Often honing is not required after wet grinding.

The grinding operation on a wet grinding wheel is easy to control, as the stone runs slowly and the risk of accidents is minimal due to the low rpm. The wet grindstone does not produce sparks, which means that it can be operated in areas of high fire risk such as wood working shops. There is also no risk of the stone shattering and injuring people.

Wet grindstones were originally natural sandstone and gave a very finely ground surface. In recent years man-made stones have been developed. These are ceramically made and have abrasives of aluminum-oxide. Man-made stones grind much faster and usually have a coarser grinding surface.

Although the grinding time itself is longer on wet grinders compared to bench grinders, the total time for grinding and honing of a tool is much shorter. This is because the need for honing after grinding is greatly reduced or eliminated. Since wet grinding has obvious advantages compared to dry grinding, the Tormek grinding system is designed using this method.

Vertical and Horizontal Grinders

The most common type of wet grinder is vertical, which means that the sides of the grinding wheel run vertically and the horizontal circumference is used for grinding. There are also horizontal grinders, which means that the grinding wheel runs horizontally and the upper side of the wheel is used for grinding. Since the water cannot be lifted by the rotation of the wheel, there is a water reservoir on top of the machine.

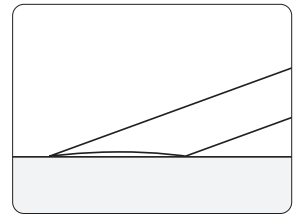
The horizontal wheel gives a truly flat bevel, while the vertical grinding wheel give the bevel a slightly hollow shape depending on the diameter of the wheel. The hollow shape is hardly noticeable and has no influence on the function of the tool, provided that you do not use a grinding wheel with a diameter which is too small. Please see next page.

A disadvantage with horizontal grinders is that the speed and the grinding effect vary with the distance from the centre of the stone. Furthermore, the area towards the centre will wear quicker than the area at the periphery, as the area is smaller towards the centre. It is also difficult to true the stone flat on a horizontal grinder while truing a vertical stone is easy.

Hollow Bevel

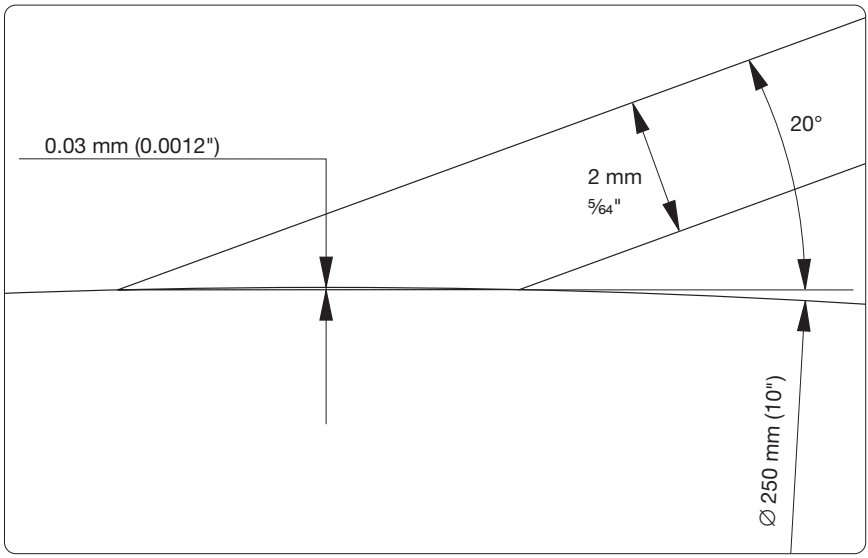
When grinding on a vertical grindstone the bevel has a slightly hollow shape due to the radius of the grindstone – the smaller the diameter of the wheel, the larger hollow grinding.

When you make a line drawing to explain the hollow bevel, you need to exaggerate the effect to be able to show it. This creates a wrong impression about the real size of the hollow.



Hollow grinding. Exaggerated.

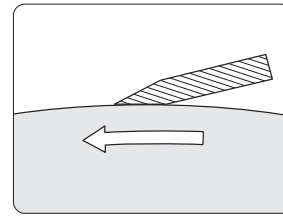
The hollow shape from a 250 mm (10") grindstone is minimal. When grinding a tool of 2 mm thickness (5⁄64") with a 20° edge angle the hollow is as small as 0.03 mm (0.0012"), which is hardly noticeable and has no practical influence on the function of the tool.



Ten times enlargement of a 2 mm thick tool ground with a 20° edge angle. In spite of the enlarged scale the hollow is hardly noticeable. It is only 0.03 mm (0.0012").

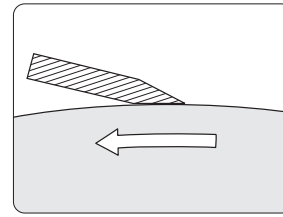
Grinding Direction

The question whether to grind away from or towards the edge is probably as old as the art of water cooled grinding. Many experienced and skilled craftsmen state that one should grind away from the edge whilst others, equally experienced, maintain that one should grind towards the edge. Conventionally dry grinding at a high rpm is always carried out towards the edge.



Grinding away from the edge.

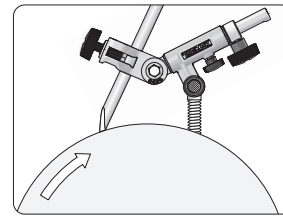
Our tests show no noticeable difference between the two methods in relation to the sharpness of the edge. There are however some practical and essential differences in the grinding operations.



Grinding towards the edge.

You achieve a higher grinding pressure and thus faster grinding when grinding towards the edge as the rotation of the grindstone helps to press the tool towards the stone. When grinding away from the edge the grindstone tends to lift the tool and decrease the grinding pressure.

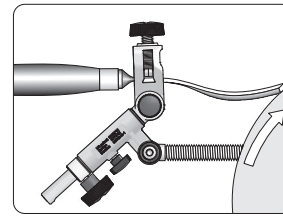
Grinding towards the edge tends to activate the grindstone and reduce the risk of a glazed stone surface. The burr developed during grinding is shorter and stiffer compared to grinding away from the edge, when it is longer and thinner.



Grinding towards the edge increases the grinding pressure.

A disadvantage when grinding towards the edge, is the risk that the tool can accidentally dig into the stone. This can be eliminated if the tool is mounted in a grinding jig. Vibration can also occur at steeper edge angles, which is not the case when grinding away from the edge.

Grinding away from the edge is preferable when you need a light grinding pressure, e.g. when grinding small and delicate woodcarving tools. In this direction you can easily control the grinding operation and observe the burr developing as no water flows over the edge.



Grinding away from the edge decreases the grinding pressure.

Free-hand grinding is best done with the stone running away from the edge. With the Tormek system you can grind both towards and away from the edge. In the chapter “Which Jig Should I Use?” there is a recommendation of the grinding direction for various types of tool.

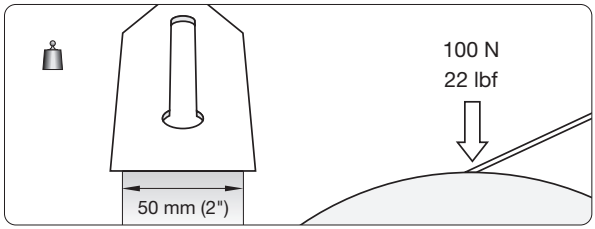
It should be noted that this question of grinding away from or towards the edge must not be mixed up with the question whether the grindstone should rotate away from you or towards you. This depends on how you position the machine. The Tormek machines can be positioned either way.

Grinding Pressure

Wet Grinding

If during the grinding you apply a certain force with your hands on a tool, the grinding pressure will vary depending on the area which is in contact with the grindstone. A smaller contact area gives a larger grinding pressure. This is an important factor to be taken into consideration, since this grinding pressure decides the grinding rate and the extent of wear on the grindstone.

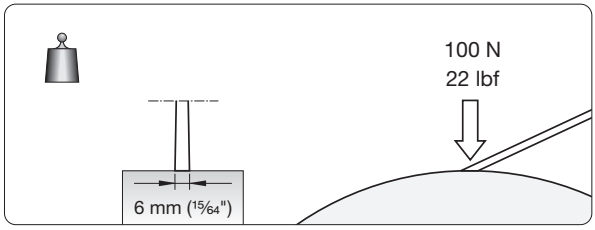
For example, if you push with the same force on a wide plane iron as on a narrow wood chisel, the grinding pressure can be 10 times higher on the wood chisel. On a carving gouge, which has a very small contact area on the grindstone, the grinding pressure can be as much as 50 times higher. The following examples illustrate how the grinding pressure varies on three typical tools ground with a 25° edge angle. The force applied with your hands to each tool is 100 N or approx. 10 kp (22 lbf).



PLANE IRON

Grinding area:
235 mm² (0.36 in²)

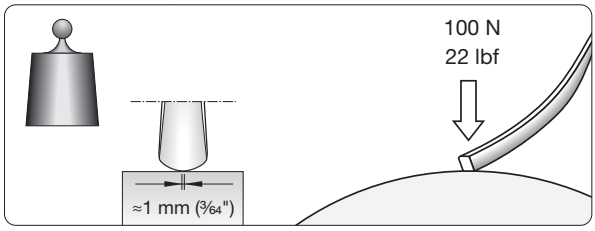
Grinding pressure:
0.43 N/mm² (61 psi)



WOOD CHISEL

Grinding area:
48 mm²
(0.074 in²)

Grinding pressure:
2.1 N/mm² (302 psi)



CARVING GOUGES

Grinding area:
4.7 mm²
(0.0078 in²)

Grinding pressure:
21 N/mm² (3,085 psi)

As shown in these examples, you must ensure that you do not push too hard when grinding small delicate tools, especially those with a curved edge. Otherwise the grinding pressure will be too high, which could cause you to overgrind. The stone will also wear too quickly and the tool will make grooves in the grindstone.

On the other hand, there is no limitation to the force you can apply when you utilise the whole width of the stone, e.g. when grinding a wide plane iron or an electric planer blade.

When grinding hard HSS steel the stone needs a certain grinding pressure to replace old and worn grains with new, fresh ones. Therefore when grinding electric planer blades, which have a large grinding area, you should activate the stone with the Stone Grader SP-650. Please see the chapter *SP-650*. After some practice you will soon learn to control the grinding pressure and the optimal grinding speed for each tool.

Dry Grinding

High speed grinders removes steel faster and therefore you must ensure that you do not overgrind the tool. Woodcarving tools are very sensitive to grinding as they have narrow edge angles and are made of carbon steel. Woodcarving tools should therefore not be ground on a high speed grinder – the risk of overgrinding is too great and there is a big risk of drawing the hardening of the steel, making it impossible to hold a sharp edge.

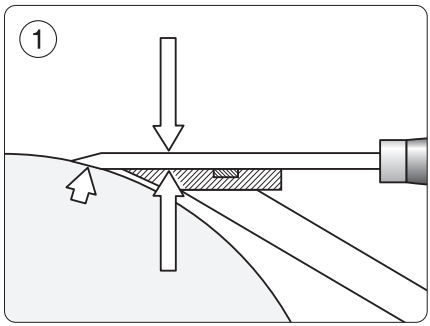
Tool Rests and Grinding Jigs

To achieve an even and sharp edge, the tool must be held steadily and with a consistent grinding angle to the wheel. This is obtained by resting the tool on a tool rest or clamping it in a grinding jig.

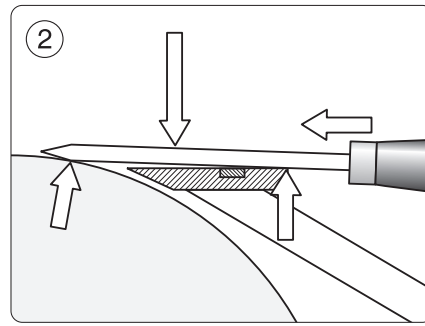
A common tool rest on fast running bench grinders is a bent plate which is usually too short to support the tool properly. This simple tool rest can be replaced by a larger and more sturdy support to enable you to hold the tool steadily towards the grinding wheel. The tool rest can also have a fence which is guided in a slot, so you can keep the tool at 90° or at a specific skew angle to the grinding wheel.

These type of tool rests have been developed for high speed grinders, where you work with a low grinding pressure due to the high rpm. However when mounted on a water-cooled grinder which requires a higher grinding pressure, they do not work satisfactorily. This is because the pressure which you apply to the tool does not reach the grinding spot but instead goes to the tool rest. (Picture no 1).

To obtain the required grinding pressure, you also need to push the tool from the handle direction towards the wheel. Then the tool tends to climb up on the grinding wheel and the precision is lost. (Picture no 2). You need to push the tool both towards the wheel and downwards so that it does not lose its contact with the tool rest. In practice this is not possible.



On a conventional tool rest the pressure you apply to the tool mainly goes to the tool rest.

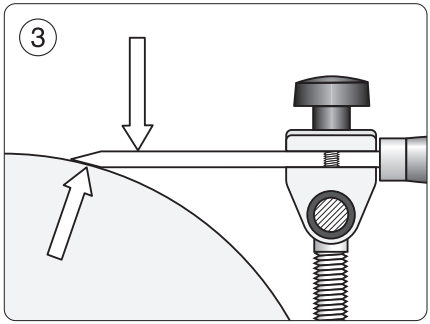


When you push the tool towards the grinding wheel to achieve the required grinding pressure, it climbs up on the wheel.

This effect appears when grinding narrow edge angles and when grinding both towards and away from the edge. The disadvantage is more severe when grinding turning tools, as they are often made of HSS-steel which is hard and requires a high grinding pressure.

For turning scrapers which are ground at larger edge angles, this type of tool rest works satisfactorily on dry or water-cooled grinders. The reason that these types of tool rest work fairly well on high speed dry-grinders, is that they require a lower grinding pressure and therefore the disadvantages can be overcome.

For water cooled grinders, the tool rest or grinding jig should be designed so that you can control the grinding pressure. This is achieved by mounting the tool in a jig, which is pivoted around an axle positioned at a distance from the grindstone. The pressure which you then apply to the tool is distributed to the grinding spot on the grinding wheel instead of the tool rest. Furthermore, the tool is guaranteed to be in the same position on the grinding wheel, which is necessary for achieving a precisely ground edge.



The tool must be mounted in a jig pivoted at a distance from the grindstone. The pressure applied is distributed to the grindstone and you have full control over the grinding operation.

Honing

When grinding, a burr (or wire edge) develops on the upper side of the edge. This burr must be honed off on a fine grit honing stone or slipstone. The honing also removes the marks left by the grinding wheel which makes the surface finer. When the grinding is made on a coarse grinding wheel, the surface requires more honing.

The honing stone must work on the entire bevel of the edge otherwise the tip will be rounded off. The burr bends from side to side and therefore both sides of the edge need to be honed alternately.

You can also power hone on a felt buffing wheel mounted on a bench grinder. However there is here a great risk of rounding off the tip of the edge due to the aggressive honing effect caused by the high speed (usually 2,850 rpm at 50 Hz and 3,400 rpm at 60 Hz). You must also pay attention so that you do not press the tool too hard towards the wheel which could cause overheating of the edge.

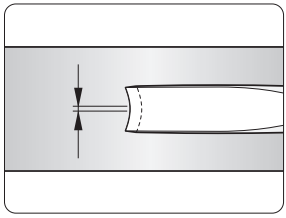
With the Tormek system you hone on leather honing wheels running at a low rpm. The low speed enables you to control the operation and there is no risk of rounding off or overheating the edge. The honing process is also controlled with jigs, so you get exactly the same edge angle and movement pattern towards the wheel as during the previous sharpening.

Techniques for Carving Gouges and V-tools

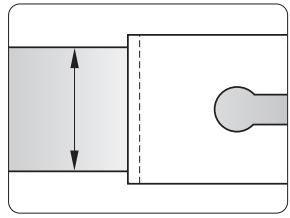
The technique for sharpening carving gouges and V-tools is different from other edge tools such as plane irons, wood chisels, turning tools, axes and scissors. The reason is that the edge is not straight – gouges have a curved edge and V-tools have two edges meeting each other. Another difference is that the steel is thinner and the edge angle smaller on carving gouges and V-tools.

Since the sharpening takes place on a narrow and convex spot on a gouge instead of on a flat bevel as on a plane iron, the surface that is in contact with the grinding wheel is very small. The grinding area is actually a line whilst for other tools is a rectangle. This means that the grinding pressure can become very high, even if you apply only a small pressure on the tool with your hands.

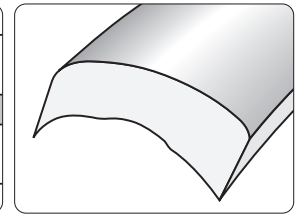
If you grind more than necessary on a flat bevel, e.g. on a plane iron, it does not matter. But if you over grind on a spot on a curved edge, the shape of the edge will be changed and needs to be re-ground. This is also the case for V-tools – over grinding on one wing means that the entire edge must be re-ground.



The grinding area on a gouge is almost as narrow as a line.



The grinding area on a plane iron is a rectangle.



Over-grinding on a spot means that the entire edge must be re-shaped.

Firstly you should question whether you need to sharpen your tool or if you should only hone it. This question is especially important when working with small and delicate tools with a small edge angle. A slight over grinding on a spot on these tools makes a pronounced pit or hollow on the contour of the edge.

The basic recommendation is therefore not to sharpen small and delicate tools, which have become dull, but instead hone them on a bench stone or on a rotating honing wheel. Grinding/sharpening on a grinding wheel is however required in the following cases:

- The edge has become too dull to be honed.
- You want to change the shape of the edge, e.g. the edge plane angle. (See next page).
- You want to change the edge angle.
- The edge has become damaged.

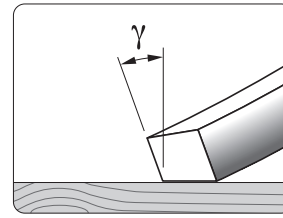
The Principle

Firstly grind the edge to its correct shape before you start sharpening. Viewed from the side, the edge should look like a straight line, as in the line drawing below showing the edge plane angle, (γ).

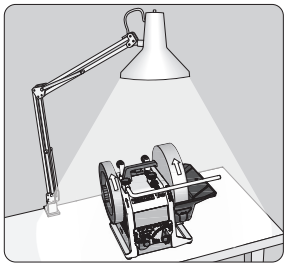
The edge is now blunt, which clearly can be observed as it reflects light. You should see light reflecting along the entire edge. This blunt edge is called line of light and is a guide for you where to grind. By closely observing the line of light and only grinding where it is thickest, you will achieve a perfectly ground edge. The grinding must stop immediately when the line of light has just been ground away!

Good light is very important for all grinding and honing work, but it is a demand when grinding carving gouges and V-tools, as you must clearly be able see the line of light.

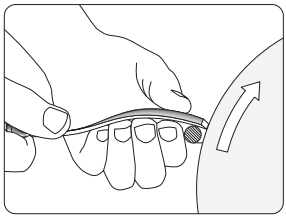
Carving gouges and V-tools have wings. These lean more or less forward when the bevel lies flat on the wood. The inclination can be described as the edge plane angle, (γ). This angle controls how the tool will cut in the wood. It should be around 20° to make the wings and the centre part of the edge work in the best way and leave a clean cut in the wood. This recommendation is independent of the edge angle.



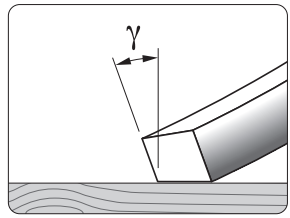
Bevel viewed from side of gouge showing edge plane angle.



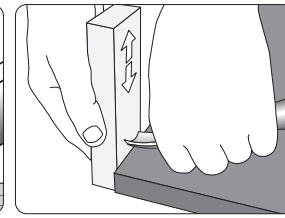
It is of greatest importance that you have a very good light to be able to observe and control this delicate sharpening work. Use a flexible lamp and position it close to the machine.



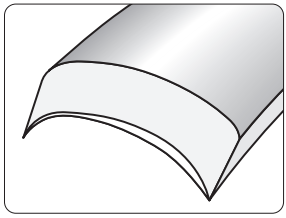
Grind the edge to its correct shape.



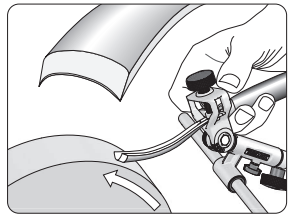
The edge plane angle (γ) should be approx. 20°.



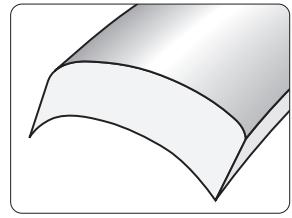
Flatten and smooth the blunted edge with a fine grit honing stone.



The edge is ground to the correct shape. The line of light shows you where to grind.



Grind only where the line of light is thickest.



Stop grinding immediately when the line of light disappears, which is a sign that the edge is sharp.

The grinding of the bevel can be done either free hand on bench stones or with jigs on a grindstone. Using jigs is easier and gives you a better result as you then can concentrate on where the edge touches the grinding wheel without needing to pay attention to the edge angle and position of the tool which is controlled by the jig.

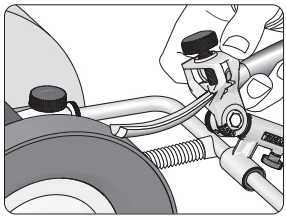
Important *Dry grinding woodcarving tools on high speed grinders and belt grinders is absolutely not recommended! They grind too aggressively, which makes it impossible to control the grinding and the heat development draws the hardening of the thin steel.*

Honing

After the grinding, the bevel is honed to give it as fine a surface as possible. The remaining burr on the flute (inside) must also be honed off. The outside honing can be done free hand with a fine grit bench stone or with jigs on a rotating felt or leather wheel. The inside can be honed freehand with slipstones or on profiled honing wheels.

The honing is of the greatest importance as a finer surface on the bevel and flute makes the tool cut more easily and also makes the sharpness last longer. The surface left on the wood will also be smoother with a perfectly honed tool.

Also using jigs for the honing is an advantage. You work at exactly the same honing angle as the grinding angle and the edge receives exactly the same movement pattern towards the honing wheel as when grinding. Furthermore, you can make test cuts in the wood and then – if necessary – go back and continue the honing operation with exactly the same position of the tool towards the honing wheel.



Honing the bevel with a jig gives the same movement pattern towards the honing wheel as during the previous grinding.

Rounding of the Tip

The Tormek leather honing wheels work in the same way as a strop made of leather glued onto a piece of wood. If you look at the edge under a microscope, you will notice that the very outer tip of the edge is slightly rounded off as the leather honing wheel is not as firm as a stone. However, when using a jig this rounding off is negligible and has no negative influence on the cutting ability of the tool. Actually it is likely that the microscopic rounding off reinforces the very outer sensitive tip of the edge.

Theoretically, an edge tip honed on a flat hard bench stone could be considered to be sharper. However, this is only the case before you start to work with the tool. As soon as the edge penetrates into the wood, it will be affected by the fibres and become microscopically rounded off and even bent. This is because the outer tip is extremely sensitive on these tools, which have small edge angles, sometimes only 20°. What determines the practical quality of the edge sharpness and its durability, is how the tool works after a couple of cuts in the wood.

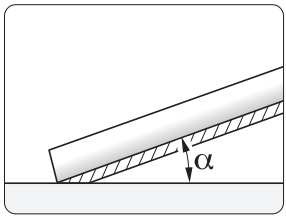
Edge Angles

Carving tools are usually ground with a 20° to 25° edge angle. The angle is a compromise between the easiest possible cutting and the maximum durability of the edge. For soft wood you can go down to 20° or even less. For hard wood, and when you use a mallet, you will need a 30° angle or even larger to create an edge which is strong enough.

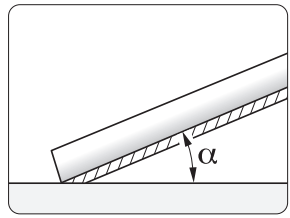
The choice of edge angle is very important for a carving tool. You can be tempted to make the angle too narrow in order to make the tool cut as easily as possible. Then there is a risk that the edge is too weak and becomes easily damaged by the wood. There is a noticeable difference in the strength of a tool with a 22.5° edge angle and one with a 20° edge angle.

You might ask, why not put a 25° edge angle on the tool to be sure that it works in any wood, but it is not that simple. An edge angle which is too large does not cut satisfactorily in a soft wood because the fibres becomes depressed before they are cut. Furthermore, it is easier to work with a tool, which has an edge angle which is as small as possible. You need to test and learn which is the optimal edge angle for your tool and the specific work. If you work in various hardnesses of wood, it is recommended that you have more than one tool and grind them with different edge angles.

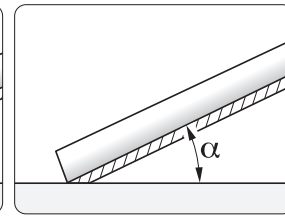
With the Tormek System you can measure the edge angle on a tool and set the angle before grinding. Write the angle on the ferrule.



A 20° edge angle is suitable for soft wood, but is too weak and can easily get damaged in harder wood.



A slight increase to 22.5° can enable the edge to withstand working in harder wood.



When using a mallet you need a 25° or even larger edge angle depending on the hardness of the wood.

Sharpening Techniques for Turning Tools

Turning tools are made of HSS or other special hard steel qualities to withstand the heavy wear and the heat development during the turning. These steel qualities are therefore tough to shape. A distinction should be made between the shaping and sharpening of a tool. When shaping you remove steel to achieve the shape and edge angle you want. When sharpening you just touch up an existing shape to renew the sharpness.

You can do the initial shaping either directly on the Tormek machine or, if a lot of steel needs to be removed, on a bench grinder using the Tormek Bench Grinder Mounting Set BGM-100 (page 29). The strength of the Tormek method is the sharpening, which is carried out with an exact replication of both the shape and the edge angle. Since so little steel is removed – you just touch up the edge – the Tormek method is very fast once you have an established shape.

Shaping the tool, which is normally a once only job, can take from 10 to 20 minutes depending on the size of the tool and how much steel you need to remove. The shaping can comprise a change of the skew angle on a chisel or the length of the wings on a gouge as well as a change of the edge angle.

If you use your bench grinder to remove steel, you must be careful so you do not overheat the edge. With high speed grinding, you are easily tempted to speed up the grinding by pressing the tool too hard towards the grinding wheel. HSS steel stands higher temperatures than carbon steel, but there is still a risk that the very outer tip of the edge, which is very thin, will be overheated.

Frequent cooling in water keeps the temperature down, but then there is a risk of micro cracks. Overheating and micro cracks mean that the life of the sharpness is reduced. The conclusion is that the final shaping should be made with a water cooled grinding stone running at low speed to eliminate the risk of overheating the steel.

The need for cautious steel removal and frequent cooling in water reduces the difference in time between shaping on a high-speed dry grinder and on the slow running Tormek water-cooled grindstone. The extra minutes it might take on the Tormek for the initial shaping are worth spending, since you will not risk changing the properties of the steel, which ensures that the tool stays sharp much longer. Bear in mind that you shape the tool only once.

Tips when shaping with your Tormek:

Grinding Pressure
On a slow running grindstone, you need to press harder than on a high-speed grinder to remove steel. The same high grinding pressure on a high-speed grinder will cause overheating. So do not be afraid of pressing hard on the tool. Press with your fingers close to the cutting edge. When sharpening with the Tormek Diamond Wheels, always apply a low pressure (page 155).

When you want to remove a significant amount of steel, for example when shaping a skew chisel, use the vertical mount and grind towards the edge. The rotation of the grindstone will then increase the grinding pressure (page 100).

Use the Whole Width of the Stone
Move the tool sideways and use the whole width of the stone so you avoid grooving. Lighten the pressure or lift the tool when moving to a new spot on the stone.

Activate the Grindstone
When shaping a large surface such as on a skew chisel with a straight edge, the low grinding pressure slows down the grinding. Re-activating the grinding stone a few times during the grinding with the Stone Grader SP-650 speeds up the work.

Honing

The advantages of honing the bevels to a finer surface are well known and are used for plane irons, wood chisels, knives and woodcarving tools. This technique is equally valid for wood-turning tools and as a Tormek owner you will be able to hone your edges to near perfection.

With the Tormek method, the sharpening as well as the honing is fully controlled. You only need a fine touch-up of the edge since you always sharpen and hone to exactly the same shape and at exactly the same edge angle. The whole operation – setting, sharpening and honing – takes only a few minutes and is time well invested.

These are the benefits of a properly honed and polished edge:

- The gouge cuts more easily.
- The edge stays sharp longer.
- Less friction against the wood and less heat development.
- Leaves a finer surface on the wood.
- Less time for sharpening and more time for turning.

Questions and Answers

Why does a Tormek edge cut more easily?

Sharpening on the Tormek stone and honing on the leather honing wheel creates a very fine edge surface. A finer edge surface means a sharper edge, which cuts more easily.

Why does a Tormek sharpened edge leave a smoother cut?

Since a Tormek edge is finer and sharper, it cuts the wood fibres more cleanly and leaves a smoother surface on the wood so there is less need for sanding.

Why does a Tormek edge stay sharp longer?

There are two reasons. An edge obtained from a high-speed dry grinder is serrated whilst the Tormek sharpened edge is more even and more resistant to wear. In addition, the Tormek edge can never be overheated during the sharpening and lose its hardness.

Why is the Tormek method fast?

The answer is the fast setting of the jigs and the exact repeatability. You just touch up the existing shape of the edge. Only a small fraction of the steel is removed. It is a myth that the Tormek System is slow. It has arisen because turners have not made a clear distinction between shaping and sharpening. Once you have ground the right shape on your tool, which you normally only need to do once, it is a quick job to touch up and hone the edge.

How can the Tormek stone last so long?

Since you just touch up the edge at each sharpening, the wear on the stone is limited. And since the sharpness stays longer, you sharpen less frequently. Furthermore the large diameter, 250 mm (10") and the generous width, 50 mm (2") lasts longer than a smaller and narrower grinding wheel or stone.

Should I colour the bevel when using the TTS-100 setter?

No. The Tormek TTS-100 Setter will automatically replicate the edge angle.

Should I use slip stones after the sharpening?

Not for the bevel. The fine grindstone and the leather honing wheel give you a superior sharpness without slip stones. The flute on gouges is honed and polished on the Profiled Leather Honing Wheel, LA-120. You could alternatively use a slip stone, which matches the flute profile.

Is the technique when shaping on the Tormek the same as on a bench grinder?

No. You need to press harder on the Tormek. Press with your fingers close to the edge for the best effect. There is no risk to your fingers since the stone runs so slowly at 90 rpm. When sharpening with the Tormek Diamond Wheels, always apply a low pressure. Apply a **very low** pressure when sharpening with a new diamond wheel.

How long does it take to shape a gouge or a skew?

Shaping takes between 10 and 20 minutes depending on the original shape of the tool and on how much steel you need to remove. The extra minutes you might spend on the Tormek is a good investment to ensure the best performance of your expensive tool; you are sure that the edge will not be softened due to overheating and that the durability of the sharpness will not be affected. Bear in mind that you normally shape the tool only once.

Can an HSS edge be affected with high speed dry grinding?

Yes. It is well known that carbon steel is easily affected when overheated. This is also the case for HSS steel, but the critical temperature is much higher. The extreme end of the tip, which is very thin, can easily reach the temperature which will affect the temper. You can limit the heating up by cooling the tool in water, but then there is a risk of micro cracks, which are invisible to the naked eye.

Do I need a bench grinder?

Not necessarily, but you can benefit from the fast steel removal for the initial rough shaping. With the Tormek Bench Grinding Mounting Set BGM-100 you can use the same precise Tormek jigs through the whole shaping and sharpening process.

You get the best of two worlds; the fast steel removal from your high speed bench grinder and the fine surface from your water cooled grindstone and leather honing wheel – all in one jig system. Thanks to the patented design, the Turning Tool Setter works on any stone diameter. So you can go from a 6" wheel to a 10" grindstone and achieve the same shape.

Will a low speed (4-pole) bench grinder eliminate the risk of overheating the edge?

No. This grinder works without water cooling and the speed is still too high even though it runs at half of the rpm of a conventional 2-pole grinder.

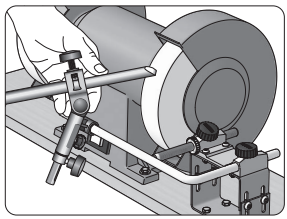
Using Tormek Jigs on a Bench Grinder

Dry grinders excel at quickly establishing a profile but the Tormek water cooled sharpening system has been proven in both the laboratory and the real world to provide a superior cutting edge. If you need to change the shape considerably on your woodturning tools, the initial rough shaping can be done on a high speed bench grinder. With the Bench Grinding Mounting Set BGM-100, you can use the Gouge Jig SVD-186 R, the Multi Jig SVS-50 and the Tool Rest SVD-110 on a bench grinder. Since the Turning Tool Setter TTS-100 works on any stone diameter you can easily go from the smaller bench grinder wheel to the larger Tormek stone and achieve exactly the same shape. You use the same Tormek turning tool jigs through the whole sharpening process.

Not all grinding wheels are suitable for the precision sharpening of edge tools. The standard wheels mounted on the bench grinder are often too hard and become glazed easily, which reduces the rate of steel removal and causes overheating of the tool. Use an aluminium oxide wheel with the correct binding – not too hard to avoid glazing and not too soft to reduce grooving. The wheel surface must be kept fresh and clean. Worn grains must wear away so that new ones come into play. If not, the surface becomes glazed and the grains will rub instead of cutting, which will increase the friction and heat development. Use a diamond hand wheel dresser to keep the grindstone surface in good condition. Do *not* attempt to use the Tormek Truing and Dressing Tool for this task.

HSS steel can stand a much higher temperature than carbon steel without decreasing the hardness. However, at the very tip of the edge, which is very thin, the temperature can easily rise to a level which will affect the hardness. Therefore grind cautiously at the tip of the edge and do not allow it to become blue. Overheating HSS steel can cause a decrease in the hardness by as much as 4 HRC, which shortens the life of the edge. If you cool it in water, do not cool abruptly from a high temperature, since this can cause micro cracks invisible to the naked eye.

A bench grinder must be handled with knowledge and care. Follow the instructions enclosed with the BGM-100 and the safety instructions for the bench grinder.



With the BGM-100 Bench Grinder Mounting Set you can also use the Tormek woodturning jigs on your bench grinder; the SVD-186 R Gouge Jig, the SVS-50 Multi Jig and the SVD-110 Tool Rest. The Turning Tool Setter works on any stone diameter.

Important *Do not use a bench grinder for tools made of carbon steel, e.g. woodcarving gouges and V-tools. It is very easy to overheat and soften the edge.*

The Tormek Way of Sharpening

The Tormek System

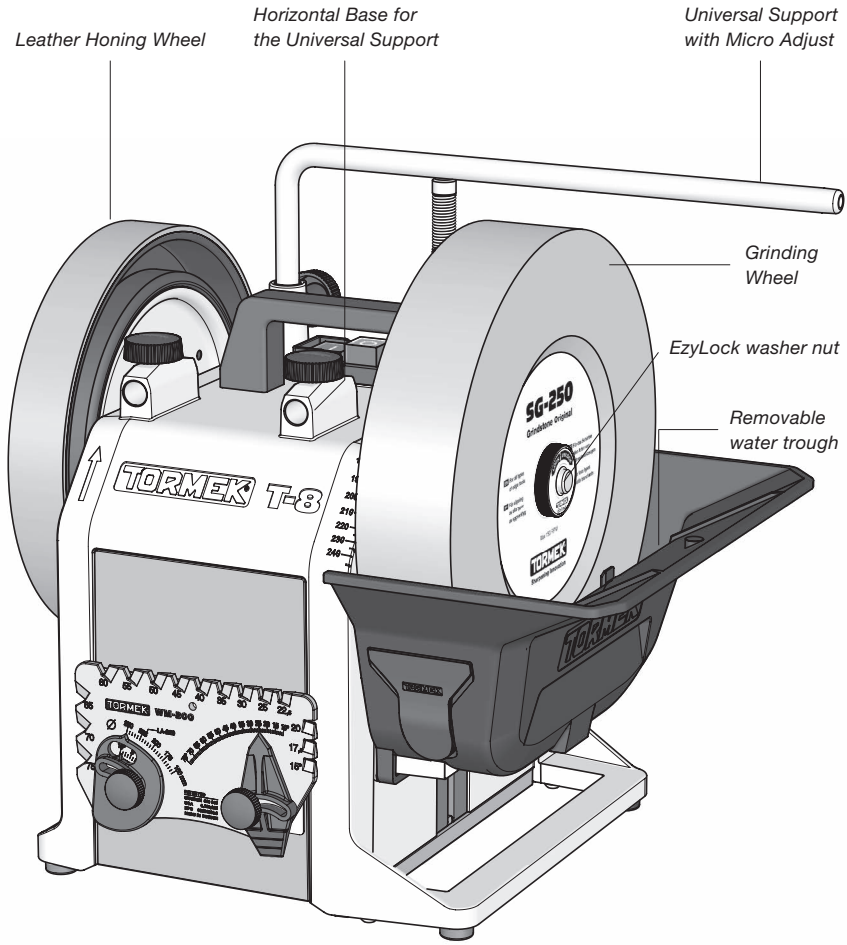
With the Tormek method you do not use a conventional bench grinder for the grinding, coarse benchstones for the initial sharpening or fine benchstones for the fine sharpening/honing.

You do both the initial grinding (when you shape the tool and create the optimal edge angle) and the sharpening on the same grindstone. The Tormek Original Grindstone can easily be changed from fast grinding to fine sharpening. The grinding/sharpening is carried out with water cooling, so there is no risk of burning the edge and drawing the hardening from the steel. The honing and polishing is carried out on a leather honing wheel. The surface of the grindstone can easily be maintained flat and true with the Tormek Truing Tool.

The grinding and sharpening on the grindstone as well as the honing and polishing on the leather honing wheel is controlled with uniquely designed jigs. This means that you have full control of the grinding, sharpening and honing angles. By means of a patented AngleMaster you can exactly pre-set the edge angle which you have selected.

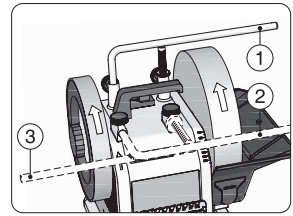
Precise replicate sharpenings are possible. Once you have ground your tool to the desired shape and edge angle, you can easily reproduce exactly the same shape with all future sharpenings. This is even possible for “difficult” tools with special shapes such as fingernail turning gouges, spoon shaped woodcarving gouges and oval skew chisels with a curved edge. Because of the exact repeatability, you remove very little material and therefore the sharpening is completed quickly. The result is that the lifetime of your tools is considerably prolonged.

The fact that you exactly can replicate the shape of an edge is a great advantage when working with a tool. You can continue with exactly the same turning and cutting technique you have learned for the specific tool, as it has not changed its shape and cutting characteristics.



The illustration above shows Tormek T-8 Original. Its predecessor T-7 and the smaller Tormek T-4 model works in the same way and uses the same range of jigs and accessories.

Tormek Universal Support

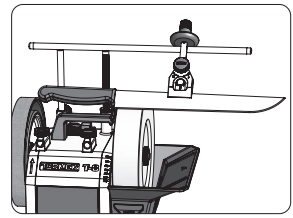


The versatile Tormek Universal Support is the basis of the Tormek system. It is made of 12 mm (½") round steel and has a dual mounting for maximum stability. It has a micro adjust for an exact and easy fine setting. It can be positioned for grinding either vertically (1) or horizontally (2) or for honing (3), see page 40.

It has the following functions:

- Support for the grinding jigs.
- Support for the Truing Tool, TT-50.
- Tool rest when grinding without jigs.
- Rest for your hands when grinding free-hand.
- Rest for your hands when grading the stone with the Stone Grader, SP-650.

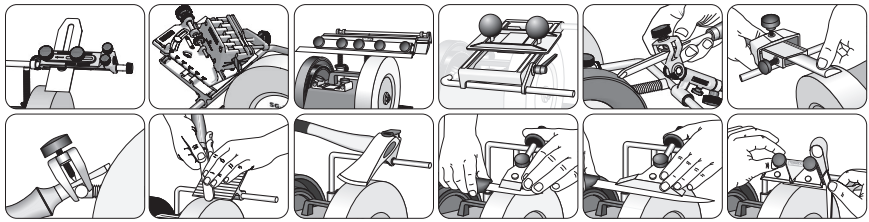
Tormek Universal Support Extended



Tormek Universal Support US-430 is both longer and higher than the original universal support. The universal support is designed for sharpening long tools, such as long knives, cleavers and machetes. Micro adjust with scale for precise setting of edge angle. Length: 436 mm (17⅝"). Height: 212 mm (8$^{11}/_{32}$").

Tormek Grinding Jigs

Tormek has developed jigs for the accurate and safe grinding of most edge tools. With these jigs you can grind the tools at exactly the angle you want and achieve a perfect edge in a short time. The grinding is controlled and always takes place at the correct angle for each tool.



Safe

At the low speed of the Tormek grinding wheel, you can fully control the grinding operation. No sparks are produced and the steel and grinding wheel particles are transported by the water into the water trough. Tormek machines are tested and approved according to Semko, CSA and UL standards, depending on the model and country. Please refer to the marking on your machine or the safety instructions that came with your machine.

Tormek Original Grindstone

The Tormek Original Grindstone SG-250 has been developed to run in water at low speed. The stone grinds effectively and gives a fine finish to the bevel. It quickly grinds large tools for example plane irons, axes, scythes and even HSS steel. The grit rating is 220 and the grain size is 0.06 mm (0.0024"). The stone can be graded with the Tormek Stone Grader SP-650 to a finer surface corresponding to 1000 grit suitable for fine grinding/sharpening.

The special structure of the grindstone combined with the continuous flushing over the edge make that the surface does not become clogged by residual steel particles from the tool or worn stone particles.

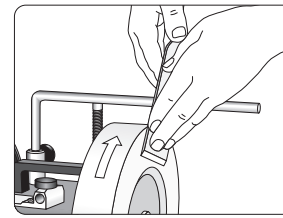
Since it is not possible to incorporate the fastest steel removal and the finest surface finish in one stone, Tormek has developed two stones to cope with special needs; the fast grinding Blackstone Silicon and the fine Japanese Waterstone (page 154). There are also three diamond wheels available; Diamond Wheel Coarse, Diamond Wheel Fine and Diamond Wheel Extra Fine (p. 155).

Perfect Visibility of the Sharpening Process

Because the grinding wheel runs slowly in water and no sparks are produced, there are no eye shields on the machine. This means that you can clearly see and control the sharpening process.

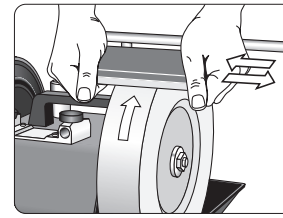
Flat Surface

The outside of the stone is machined flat and has a depressed centre so the grinding surface does not interfere with the washer and nut in the centre. This surface is reserved for flattening the back of plane irons, wood chisels and similar tools.



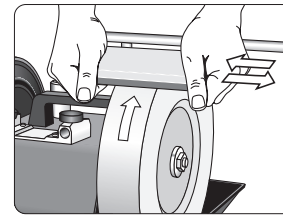
Grinding and Fine Sharpening

With the Tormek Stone Grader, you can do both the initial fast grinding and then the fine sharpening on the same stone with an identical setting of the grinding jig. The sharpening is done at exactly the same angle as the initial fast grinding (page 140). It works on the Original SG-250 stone and the Blackstone Silicon SB-250. On the Japanese Waterstone the fine side of the Stone Grader is used for cleaning the surface. Diamond Wheels shall never be trued.



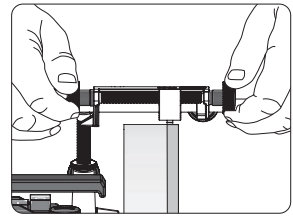
Always an Efficient Grindstone

With the Tormek Stone Grader you can reactivate the grindstone easily so fresh grains are exposed on the surface and the stone is always effective. This is a benefit when grinding hard HSS steel with a large grinding surface, e.g. electric planer/jointer blades (page 140). The reactivating works on the Original Stone SG-250 and on the Blackstone Silicon SB-250.



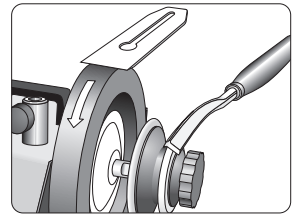
Always a Smooth Running Grindstone

A grindstone can, after a period of use, become uneven on its surface and run out of true. With the Tormek Truing Tool you can easily restore the stone to an exact roundness while the stone runs normally on the machine. Please see the chapter TT-50 (page 138).



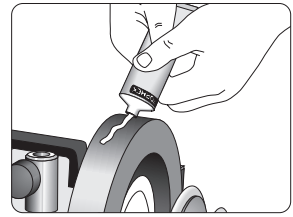
Tormek Leather Honing Wheels

After grinding, a burr appears on the edge. You gently hone away this burr on the Tormek Leather Honing Wheel to leave a razor sharp edge. As an accessory you can fit a smaller and profiled wheel for honing the inside of gouges and V-tools (page 44).



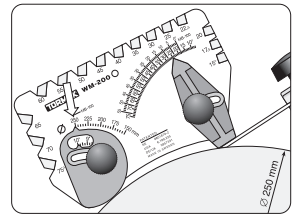
Tormek Honing Compound

If you use the Honing Compound on the Leather Honing Wheels, you achieve a still finer surface. The edge is polished to the highest lustre, giving you the finest cutting edge (page 44).



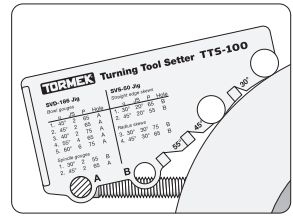
Pre-set Edge Angle

With the Tormek AngleMaster you can set the jigs so that your tools will have the edge angle of your choice. It also measures the edge angle. Please see the chapter on the WM-200 (page 142).



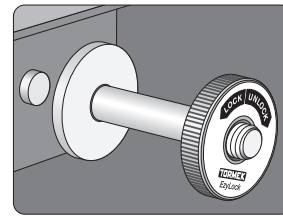
TTS-100 Turning Tool Setter

For instant replication of the shapes on turning gouges and skews when using the SVD-186 R Gouge Jig and the SVS-50 Multi Jig. With built in edge geometries recommended by experienced woodturners. Thanks to the patented design it works on any grinding wheel diameter.



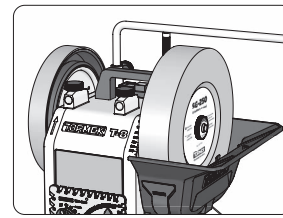
EzyLock for Mounting the Grinding Wheel

With the Tormek EzyLock (pat. pending), which is both a nut and a washer, you need no tools for mounting and dismounting the grinding wheel. The special thread causes the rotation of the wheel to tighten the nut to the right torque. No tools are needed when mounting and dismounting the wheel (page 161). The shaft, washer and EzyLock washer nut for the grinding wheel are stainless steel.



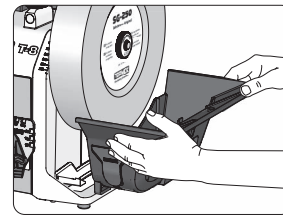
Ultimate Precision

Vital functions like the motor and the main shaft are mounted in the zinc cast top, which includes the integral sleeves for the Universal Support. This advanced design ensures an unbeatable precision for the Universal Support, which is the foundation of the Tormek jig system.



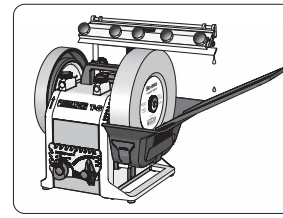
Removable Water Trough

When sharpening, the tool is continuously rinsed by water, which cools the edge. The water also works as an effective lubricant, which gives a finer finish to the tool and transports worn particles from the wheel and the steel into the water trough. The water trough can easily be lowered and removed for emptying and cleaning.

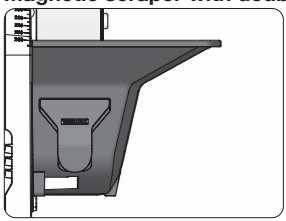


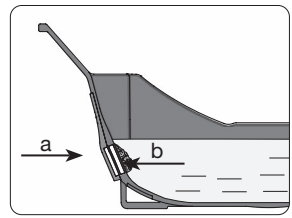
Water Chute for Long Tools

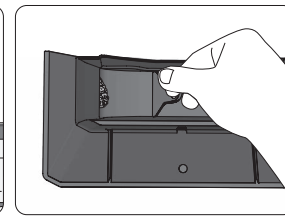
For long tools that drip water over the edge of the lip (like chef's knives and planer blades), you can add the water chute. Set the widest edge of the chute onto the tab in the middle of the lip of the trough and the water chute will direct the water back into the trough from even the longest tools. (The model T-4 has no separate water chute.)



Magnetic scraper with double function



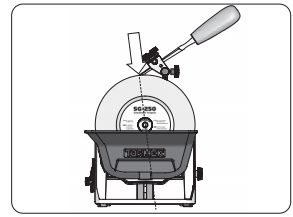




The removable scraper incorporates a strong magnet (a), which attracts the steel particles ground from the tools being sharpened (b). This keeps your grinding wheel clean and cutting more freely. These small steel particles would otherwise be pressed into the wheel's surface and can affect the sharpening. When you clean the water trough, you'll find that most of the steel will be located on the magnet. When you remove the scraper, the magnet will release the steel particles and you can easily clean the trough. (The T-7 has an integrated magnet in the through. The T-4 has no magnet).

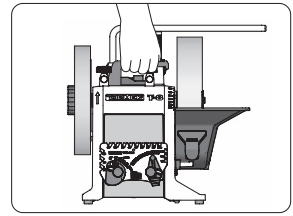
Sturdy Construction – High Stability

The machine remains steady when grinding due to the rubber feet and does not need to be fixed to the workbench. The downward force exerted when the Universal Support is placed vertically, further stabilizes the machine.



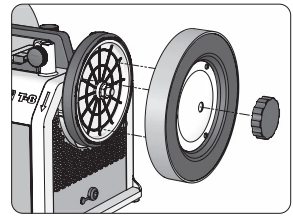
Easy to Move and Carry

The machine has a convenient handle, which makes it easy to move and carry. This is an advantage for site work and can save space in a confined workshop. (The Tormek T-3 has no handle.)



Quick Coupling for the Honing Wheel

The quick coupling enables you to remove the honing wheel when grinding large tools, e.g. long knives, axes or scythes. (The Tormek T-4/T-3 has no quick coupling).



Continuous Operation

The single phase motor is the highest industrial quality and is rated for continuous operation. (The Tormek T-4/T-3 is rated for 30 min/hour.)

Quiet Running

The Tormek machine run very quietly thanks to the silent induction motor and the patented friction drive.

No Grinding Dust

No sparks are produced and the steel and grinding wheel particles are transported by the water into the water trough. Therefore you get no dust in the air and around the machine, which is better for your lungs.

Preparation Before Grinding

Working Height

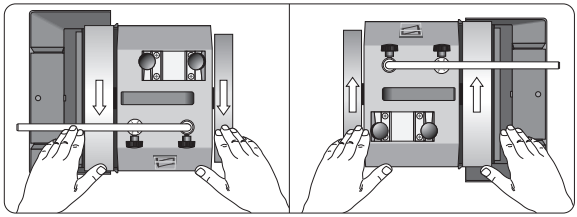
Place the machine on a stable surface at a convenient height. This depends on the type of grinding operation and of course on your height. At knife sharpening the height of the bench should be 750–830 mm (29½–32⅔"). You can also sit on a chair for certain operations, e.g. when grinding scissors or when using the MB-100 Multi Base.

Light

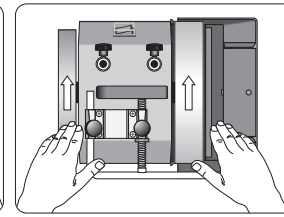
Ensure that you have satisfactory light, so that you can see clearly and can control the grinding process in detail. A perfect light is absolutely necessary when you grind small and delicate woodcarving tools.

Positioning of the Machine

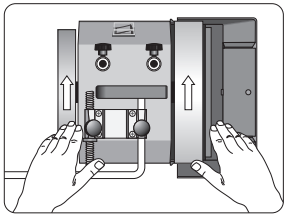
The machine has no front or back side – it is designed to be operated from either side depending upon the optimal function of each grinding and honing operation. In the instructions there is a recommendation of the best position for each tool.



Grinding towards the edge.



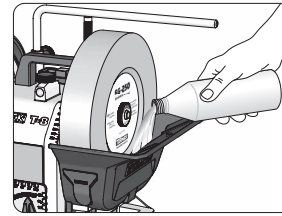
Grinding away from the edge.



Honing away from the edge.

Water Filling

Fill the trough with the grindstone running and with the trough raised, until the water reaches the *max water level* line inside the trough. Continue filling until the stone cannot absorb any more water, which is approx. 1.2 litre (2 pints) for the T-8 and 0.6 litre (1 pint) for the T-4 (less water is needed when sharpening with the Tormek Diamond Wheels, as they do not absorb any water). The stones must run in water at all times when grinding.

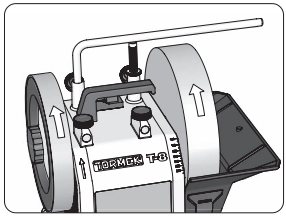


Positioning of the Universal Support

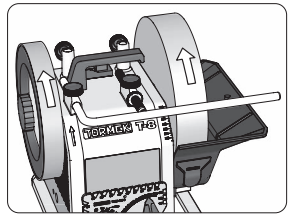
The Universal Support can be placed either in the vertical sleeves or in a horizontal base. These two positions enable you to grind either towards the edge or away from the edge. Some tools are best ground, or must be ground, in one of the directions while other tools can be ground in both directions. The recommended grinding direction and the position of the Universal Support for each tool are shown in the instructions.

The Truing Tool must operate with the Universal Support placed in the vertical sleeves (towards the edge position). The Universal Support can also be placed horizontally for honing with jigs. Honing must always be done with the wheel running away from the edge.

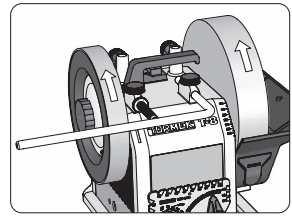
The Universal Support can be placed in three positions:



Vertically in the two sleeves. For grinding towards the edge.



Horizontally for grinding away from the edge.

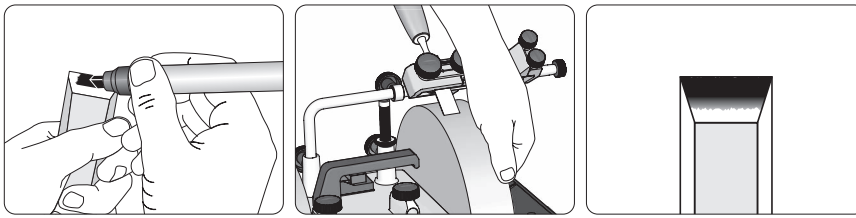


Horizontally for honing away from the edge.

Replicating an Existing Edge Angle

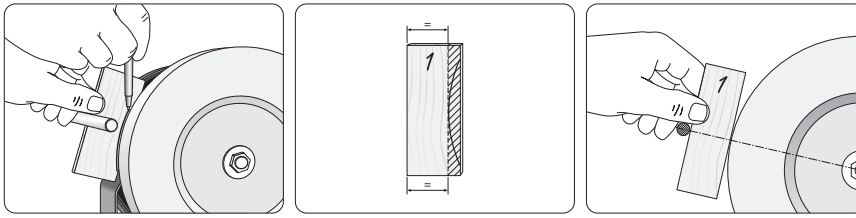
There are in principle two ways of replicating an existing edge angle on all tools when using the Tormek jigs, namely the *Marker Method* and the *Spacer Block Method*. For turning tools the Tormek *Turning Tool Setter TTS-100* offers you a third method, which gives you an exact replication of both the edge angle and the shape.

1. The Marker Method



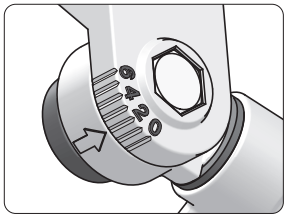
Colour the bevel with a permanent marker. Rotate the stone by hand and adjust the setting until the grindstone removes the colouring from the tip to the heel.

2. The Spacer Block Method

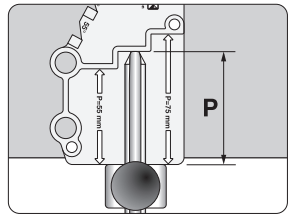


This method requires a constant stone diameter to give an exact replication. Place a rectangular wooden block close to the stone and mark the contour. Draw a parallel line and cut away the surplus wood. Now you have a wooden spacer, which lets you copy the setting of the Universal Support.

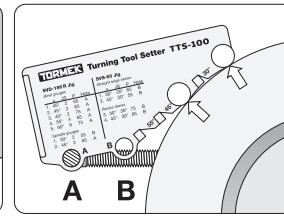
3. The Tormek TTS-100 Method for turning tools



Set the jig, JS.



Mount the tool with protrusion, P.

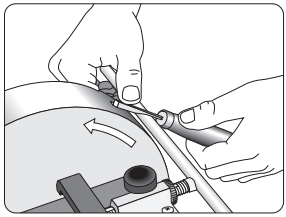


Set the Universal Support. Use hole A or hole B.

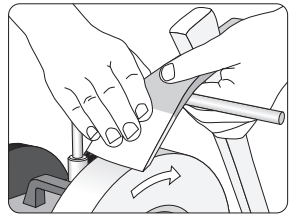
The Universal Support as Tool Rest

The Universal Support is a good aid when grinding various types of tools.

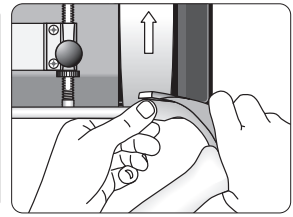
Examples of tools



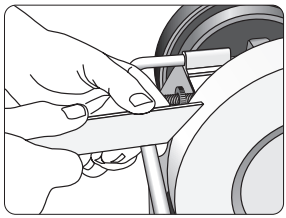
Extra short woodcarving chisels are ground by resting them directly on the Universal Support utilising the shoulder as a stop. The Universal Support is placed horizontally for grinding away from the edge.



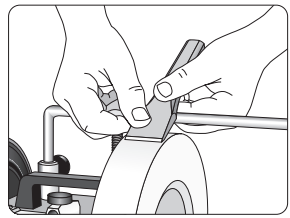
Large axes and adzes are rested on the Universal Support. Use your index finger as a stop. The Universal Support is placed vertically for grinding towards the edge for the most effective grinding.



Hollowing adzes are best ground along the edge. The Universal Support is placed horizontally for grinding away from the edge.



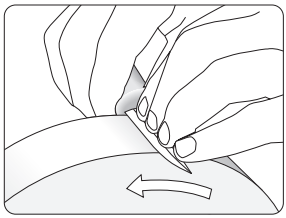
Wide turning parting tools you rest on the Universal Support, which is placed horizontally.



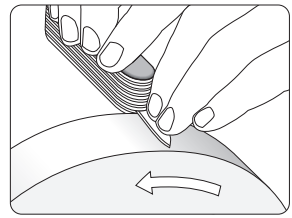
Stone working chisels. Place the Universal Support vertically. Let your index finger work as a stop.

Free-hand Grinding

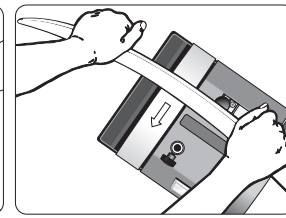
With free-hand grinding you grind away from the edge. This direction gives you the best control as you avoid the risk of the tool digging into the grinding wheel. You can also better observe the grinding process, as no water flows over the edge.



Grinding a short wood carving knife. Rest your hands on the Universal Support and keep your fingers close to the grinding wheel for best control.

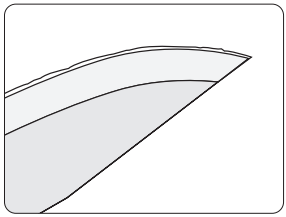


Grinding a pocket knife. Use a light grinding pressure so that the blade does not fold. First grade the grindstone to fine grinding with the Stone Grader SP-650 (when sharpening on the Tormek Original Grindstone).



This is the best way to grind a scythe. As no water flows over the edge, it is easy to observe the burr developing. Hold your elbows close to your body. The honing wheel is removed.

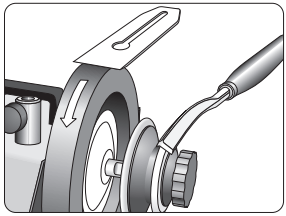
Honing and Polishing



The burr on a knife.

Burr

When a tool is being ground, a burr develops on the upper side of the edge. This is a confirmation that you have ground fully out to the tip of the edge. When grinding the other side (if both sides are ground) the burr still remains but will now be bent to the other side of the edge. This burr must be honed off in a gentle way to achieve a really sharp and durable edge. It must not be broken off, otherwise micro damage will be left on the edge.



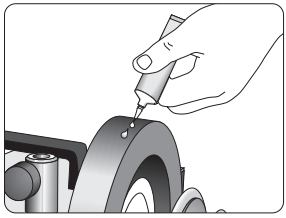
The profiled honing wheel is an accessory mounted outside the standard honing wheel.

Honing Wheels

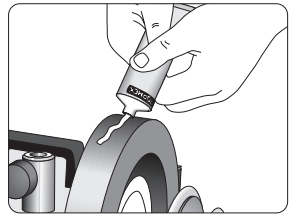
You hone away the burr on the Tormek honing wheels, which are made of special leather and then impregnated with the Tormek honing compound. The leather removes the burr gently like the barber's leather strop, giving you a razor sharpness and a bevel polished to a mirror finish.

There is a large, flat honing wheel fitted as standard and as an accessory you can fit a profiled wheel for the inside honing of gouges and V-tools.

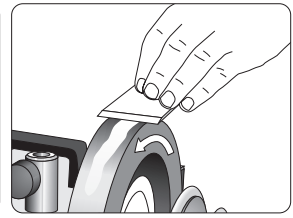
Preparation of the honing wheel



*Firstly, impregnate the leather with the oil * included, use approx ⅔ of the tube for the T-8 and half the tube for the T-4. It will soften the leather and cause the honing compound to penetrate.*



Apply a thin string of the compound before starting the machine. Rotate the wheel by hand.



Start the machine and distribute the compound by pressing a tool gently against the wheel. Let the compound penetrate the leather.

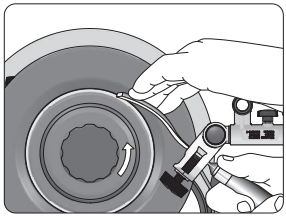
One application lasts for 5–10 tools. Then re-impregnate the honing wheel with a few drops of oil and apply fresh honing compound. Work the honing compound into the leather. Do not let the compound dry, apply more oil if necessary.

** 100% Pharmaceutical white oil. Material safety data sheet available from www.tormek.com*

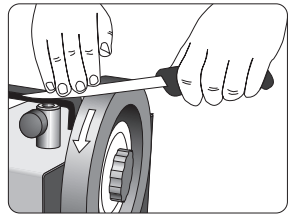
Honing

You can hone either free-hand or let the tool remain in the jig after the grinding. Set the jig so that the honing is carried out at exactly the same angle as the previous grinding. This is especially advantageous when honing the bevel on gouges where with free-hand honing it is difficult to exactly follow the shape. The inside is honed free-hand. Honing must always be carried out *away from* the edge.

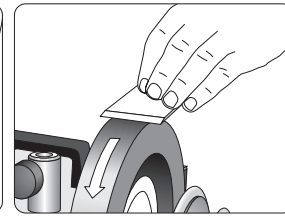
Honing free-hand



The inside on gouges and V-tools are honed on the profiled wheel.

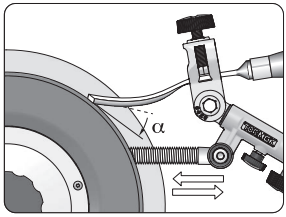


Honing a long knife. Hold the blade diagonally to clear the grindstone.

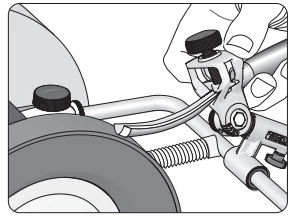


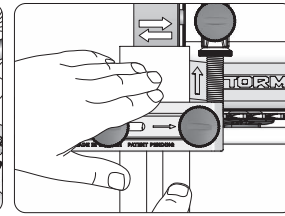
Honing the back on a plane iron.

Honing with jigs



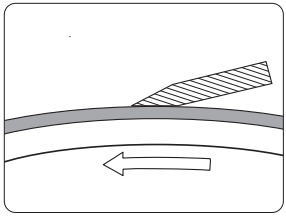
Honing a curved gouge in the SVD-186 R jig. Set the universal support so that you have the same honing angle as the grinding angle.



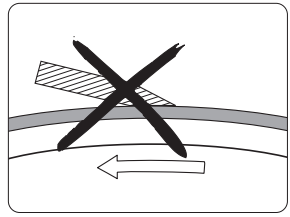


Honing a plane iron in the SE-77 jig.

Honing direction



Always hone away from the edge!



If you hone towards the edge, it cuts into the wheel!

Note *The leather honing wheel is made with a strip of leather glued onto a plastic rim. This strip has a glued joint, which is sanded down at the factory to the surface of the leather. After a period of use, when the leather has become depressed, the glued joint can remain above the leather surface. You can easily sand away this thin layer of glue by carefully using sanding paper mounted on a wooden piece.*

Benefits of Proper Honing

All edge tools should be honed properly to work to the maximum efficiency. The only exception is scissors. As well as removing the burr, the two surfaces forming the edge should be honed so you get as fine a surface as is practically possible. An edge with finer surfaces on the bevels is not only sharper and cuts more easily, it also makes the sharpness more durable. Furthermore a smooth and shiny surface has less friction against the wood which makes it easier to work with the tool.

Honing of Turning Tools

The advantages of honing the bevels to a finer surface are well known and used for plane irons, wood chisels, knives and woodcarving tools. These advantages are equally valid for woodturning tools but some turners do not pay the same attention to the honing as cabinet makers and woodcarvers do.

The reason is that the grinding and sharpening of, for example, a fingernail shaped bowl gouge or a curved skew chisel is quite a difficult task with the conventional free-hand grinding method on a bench grinder followed by repeated honings with honing stones and slip stones. Even if your are experienced and skilled, it is difficult to avoid faceting on the bevel and the honing takes time from the turning. Therefore most turners accept an “almost” sharp edge without honing and instead frequently resharpen on the bench grinder.

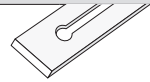
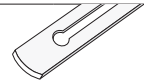
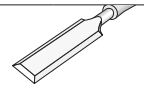
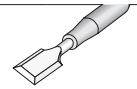
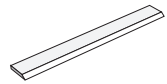
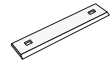
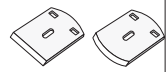
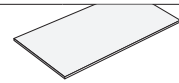
With the Tormek method the sharpening is fully controlled as well as the honing. The whole operation – setting, sharpening and honing – takes only a few minutes and is therefore time well invested. A honed tool cuts more easily, causes less friction against the wood, gives the wood a finer surface and the edge stays sharp much longer. You also save time, as you do not need to sharpen so often and your tools last longer.

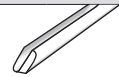
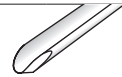
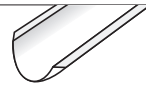
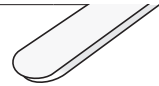
Polishing

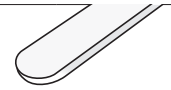
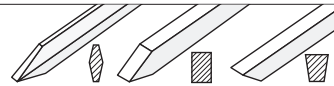
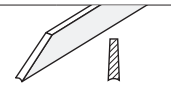
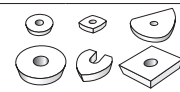
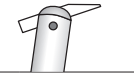
The Tormek leather honing wheel and honing compound increase the versatility of your grinder – it will also work as a polishing machine. You can also polish chrome-plated surfaces, as well as brass, copper, silver and aluminium to the highest lustre.

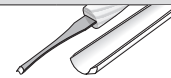
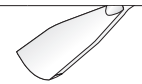
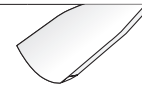
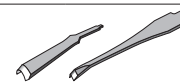
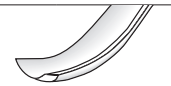
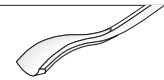
Grinding Jigs

Which Jig Should I Use?

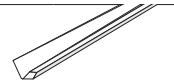
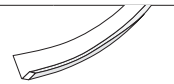
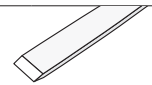
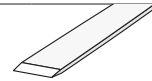
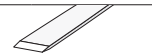
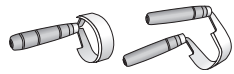
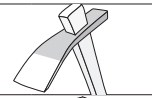
Tools for Cabinet Making	Grinding Jig	Universal Support	Page
Plane irons 	SE-77	Vertically	121
Scrub plane irons 	SVD-110	Vertically	-
Wood chisels Min length approx 75 mm (3") 	SE-77	Vertically	121
Short wood chisels Max width 38 mm (1½") and min length approx 45 mm (1¾") 	SVS-38	Horizontally	73
Planer and jointer blades (Not tungsten carbide) 	SVH-320	Vertically	129
Portable electric planer blades (Not tungsten carbide) 	SVX-150	Vertically	65
Moulding knives 	SVP-80	One vertically and one horizontally	133
Spoke shave blades 	SVD-110	Vertically	120
Cabinet scrapers 	SVD-110	Vertically	120

Tools for Woodturning	Grinding Jig	Universal Support	Page
Bowl gouges 	SVD-186 R	Horizontally	77
Spindle gouges 	SVD-186 R	Vertically or horizontally	77
Roughing gouges 	SVS-50	Horizontally	108
Scrapers With edge angles up to approx. 60° 	SVD-110	Vertically	117

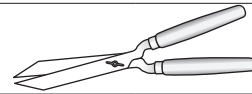
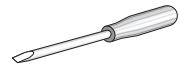
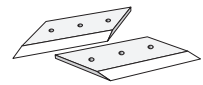
Scrapers With edge angles over approx. 60° 	SVD-110	Horizontally	117
Parting tools **Bedan tools** 	SVS-50	Horizontally	107
Thin parting tools 	SVD-110	Horizontally	-
Skew chisels Straight or curved 	SVS-50	Horizontally	98
Turning cutters 	SVD-186 R	Horizontally	83
Hollowing tools 	SVD-110	Horizontally	120

Tools for Woodcarving	Grinding Jig	Universal Support	Page
Gouges with straight shanks Up to 38 mm (1½") width 	SVS-38	Horizontally	68
Gouges with straight shanks Up to approx. 50 mm (2") width 	SVS-50	Horizontally	109
Gouges Wider than approx. 50 mm (2") 	Resting on the Universal Support	Vertically or horizontally	42
Gouges for power carvers Up to 38 mm (1½") width 	SVS-38	Horizontally	68
Curved gouges* Up to 36 mm (1⅜") width 	SVD-186 R	Horizontally	85
Spoon shaped gouges** Up to 36 mm (1⅜") width 	SVD-186 R	Horizontally	85
Back bent gouges Up to 36 mm (1⅜") width 	SVD-186 R	Horizontally	89

** Also called long bent or swan necked* *** Also called short bent, shallow bent or front bent*

Down bent gouges Up to 36 mm (1⅜") width 	SVD-186 R	Horizontally	89
Straight fishtail tapered gouges Up to approx. 38 mm (1½") width Wider than approx. 38 mm (1½") width 	SVS-38 SVS-50	Horizontally	68 109
Straight V-tools 	SVS-38	Horizontally	68
Curved V-tools 	SVD-186 R	Horizontally	90
Violin making knives 	SVD-186 R	Horizontally	94
Square chisels Min length approx 100 mm (4") 	SVS-50	Horizontally	113
Square chisels Min length approx 60 mm (2⅜") 	SVS-38	Horizontally	74
Square chisels Shorter than approx 60 mm (2⅜") 	Resting on the Universal Support	Horizontally	42
Skew chisels Min length approx 105 mm (4⅛") 	SVS-50	Horizontally	114
Skew chisels Shorter than approx 105 mm (4⅛") 	Resting on the Universal Support	Horizontally	42
Scorps and inshaves With outside bevel 	SVD-110	Vertically	120
Axes 	SVA-170	Vertically	66
Adzes With flat inner bevel 	Resting on the Universal Support	Horizontally	42
Adzes With outer bevel 	Resting on the Universal Support	Horizontally	42
Drawknives 	SVM-45	Horizontally	58

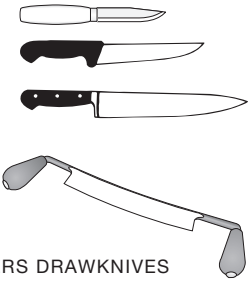
Carving knives Min blade length 60 mm (2⅜") and min width 14 mm (⁹⁄₁₆") 	SVM-45	Vertically or horizontally	52
Carving knives – short Blade length under 60 mm (2⅜") or width under 14 mm (⁹⁄₁₆") 	SVM-00	Vertically or horizontally	59

General	Grinding Jig	Universal Support	Page
Knives Min blade length 60 mm (2⅜") 	SVM-45	Vertically or horizontally	52
Short knives 	SVM-00	Vertically or horizontally	59
Knives Thin blades longer than 160 mm (6¼") 	SVM-140	Vertically	62
Machetes and long knives 	SVM-45	Vertically with US-430	52
Cleavers 	SVM-45	Vertically with US-430	52
Scissors 	SVX-150	Vertically	63
Garden shears 	SVX-150	Vertically	65
Scythes 	Free-hand	—	43
Screw drivers 	SVD-110	Horizontally	-
Mitre guillotine blades 	SVH-320	Vertically	132
Stone working chisel 	Resting on the Universal Support	Vertically	42

Knife Jig SVM-45

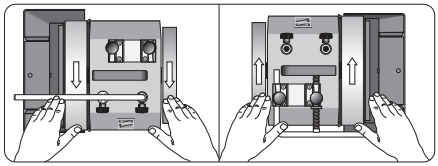
KNIVES

Min length of blade 60 mm (2⅜").



CARVERS DRAWKNIVES

Positioning of Machine

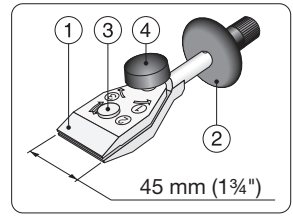


Grinding direction: Towards or away from the edge.

Note *The height of the bench must not be too high when grinding knives. 750–830 mm (29½–32⅔") is suitable depending on your height.*

Design

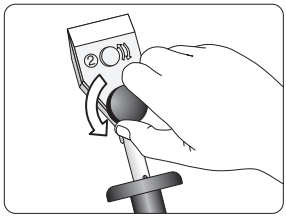
The jig comprises an *adjustable clamp* (1) for holding knives of any thickness and an *adjustable stop* (2). You adjust the jig to the knife thickness with the *screw* (3) and lock by tightening the *knob* (4).



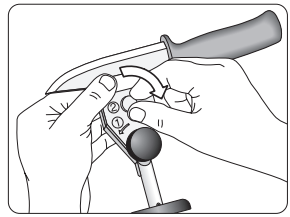
The jig rests on the Universal Support. The exact edge angle is set by rotating the stop or with the Micro Adjust on the Universal Support.

The Universal Support is normally placed vertically for grinding *towards* the edge. Short knives can also be ground *away from* the edge with the Universal Support placed horizontally (page 57).

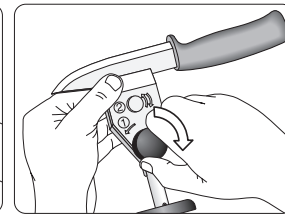
Mounting the knife in the jig



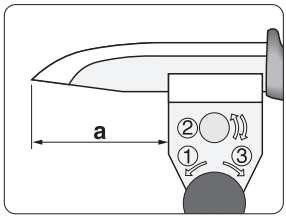
Check that the knob is loose.

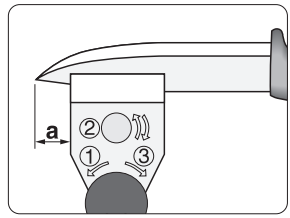


Adjust the jig with the small screw to fit the thickness of the knife.

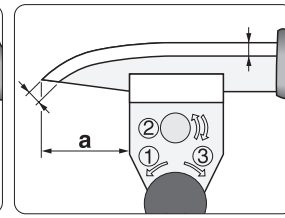


Tighten the knob. The knife is now firmly mounted in the jig.



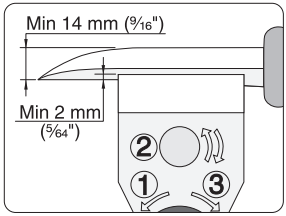


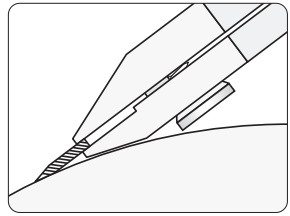
The edge angle on the tip is depending on where the jig is mounted on the blade (a). If it is mounted towards the handle, the edge angle at the tip will be smaller. If the jig is mounted towards the tip, the edge angle at the tip will be larger.



The correct mounting position (a) will make the bevel and the edge angle the same along the entire length of the blade.

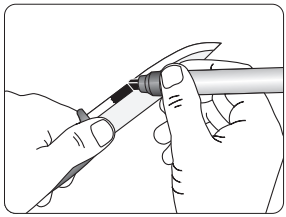
Minimum width of blade



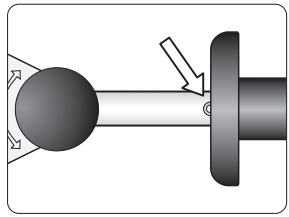


The jig needs to grip the knife with min 2 mm (5⁄64"). You can grind knives with a width down to 14 mm (9⁄16") with an edge angle of 25°. Knives with narrower blades, see SVM-00 page 59.

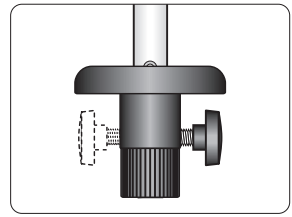
Replicating the existing edge angle



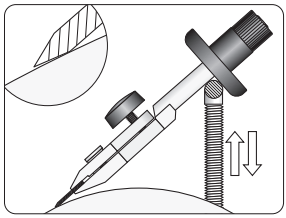
Colour the bevel with a marker so that you can see where the grinding will occur.



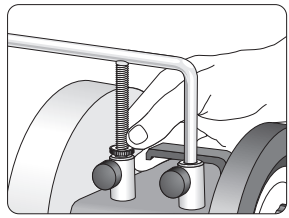
Turn the stop of the jig to zero.



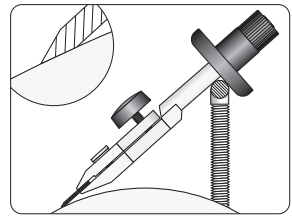
Earlier design with locking screw. (The new design is self-locking.)



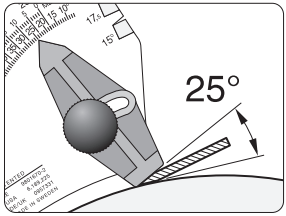
Set the Universal Support so that the heel of the bevel touches the grinding wheel.



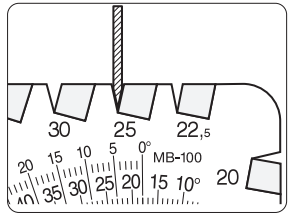
Raise the Universal Support with the Micro Adjust until the whole bevel touches the grinding wheel. Check by moving the wheel by hand to see where the grinding will take place.



Setting a new edge angle and measuring an edge angle



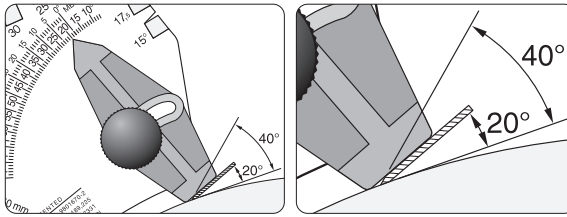
Set the desired edge angle on the AngleMaster WM-200. Adjust the jig until the whole bevel touches the angle setter.



You can measure the edge angle in the grooves of the AngleMaster.

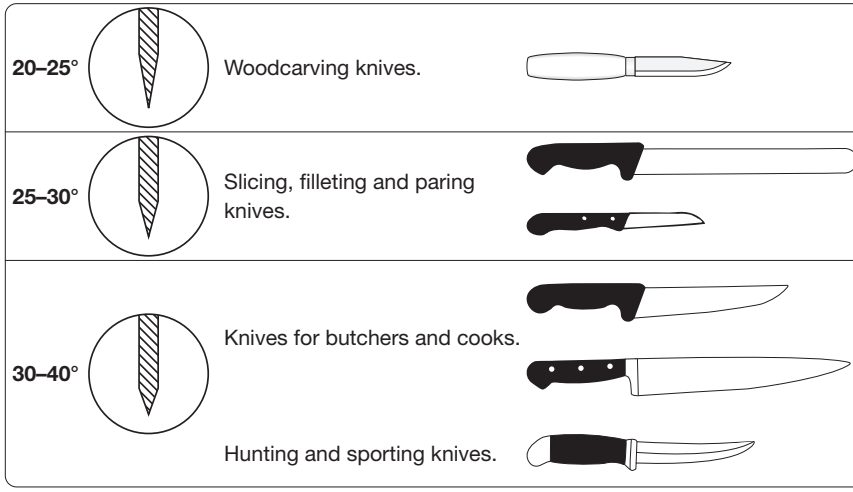
Thin Knives

When setting an edge angle on thin knives the length of the bevel is too short to be aligned to the angle setter. Let the angle setter touch the blade of the knife instead of the bevel. Then the angle setter should be set to half of the desired edge angle.

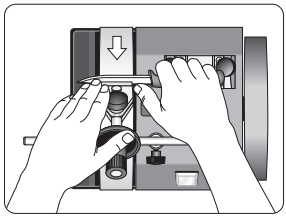


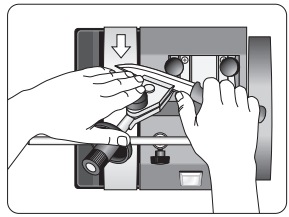
Recommended Edge Angles

Select the edge angle for the type of knife and it's intended use. With a narrow edge angle (20°) the knife cuts very easily but the edge is not so durable. A larger edge angle (40°) gives a stronger and more durable edge.

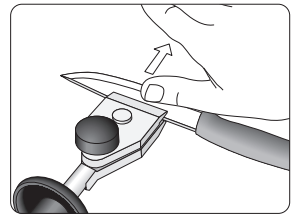


Grinding



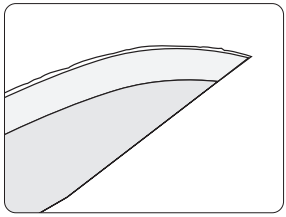


Hold the knife and the jig as illustrated. Make sure that you press your thumb (or palm) on the jig so that it is always pressed against the back of the Universal Support. Move the knife slowly back and forth over the grinding wheel. Ensure that the blade is in contact with the entire width of the wheel. Raise the knife handle when grinding the tip of the knife.

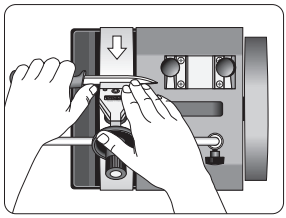


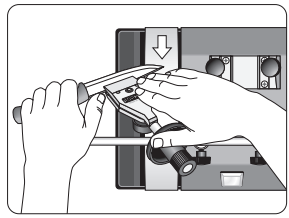
Grind until a burr forms on the upper side along the entire length of the blade. This you will notice by lightly stroking the blade from the back.

Tip *Watch how the water flows over the edge to ensure that the blade is in contact with the entire width of the grinding wheel. This is important to achieve an even bevel.*

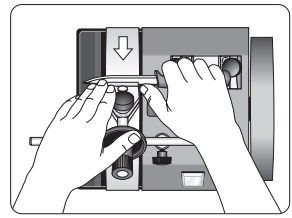


In good light the burr will show up as a silver line. When you have a burr along the entire blade, the first side is ground.





When the first side is ground, turn the jig upside-down – the knife is still fixed in the jig – and grind the other side. Now the burr appears immediately as it has already developed on the under side. Grind as much as on the first side to obtain a symmetrical edge.



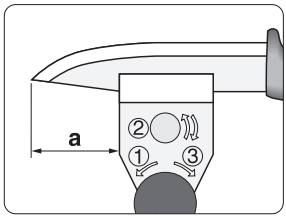
The burr will be weakened and more easily removed later if you grind the first side again with a light pressure.

Tip *When grinding long knives, remove the honing wheel.*

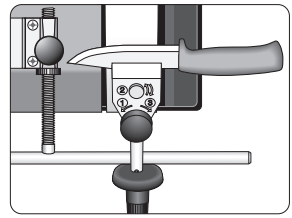
Grinding Away From the Edge

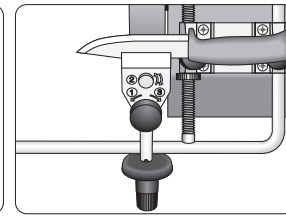
This instruction has so far shown how to grind knives towards the edge with the Universal Support placed vertically. This way works for all types and lengths of knives. For short knives you can also place the Universal Support in the horizontal position and thus grind away from the edge. This can be an advantage when you only need to sharpen the edge slightly since grinding away from the edge gives a lower grinding pressure. With this grinding direction you can keep the knife mounted in the jig and hone on the leather honing wheel with a controlled angle.

Long knives cannot be ground this way since the jig touches the leg of the Universal Support. (On the T-4 model you cannot grind knives with jigs away from the edge as this model is too narrow between grinding wheel and honing wheel.)



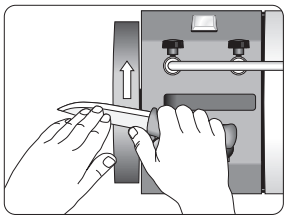
Short knives, which you can mount in the jig up to approx. 50 mm (2") from the tip (a), can be ground away from the edge.

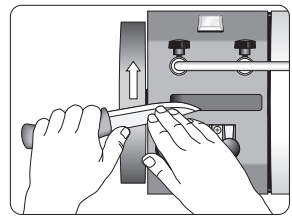




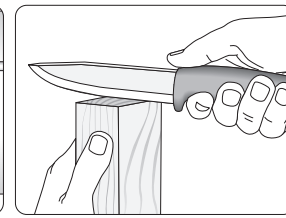
Move the Universal Support to the honing wheel side. Set the jig so you get the same honing angle as grinding angle.

Honing





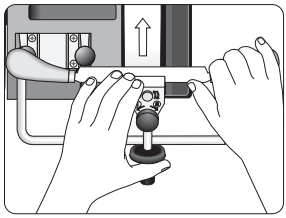
Turn the machine around. Dismount the knife. Hone and polish the bevels on the leather honing wheel. Let the entire bevel touch the leather wheel, so you hone at the same angle as at the grinding. Move the knife back and forth a few times on each side of the blade until the burr disappears.



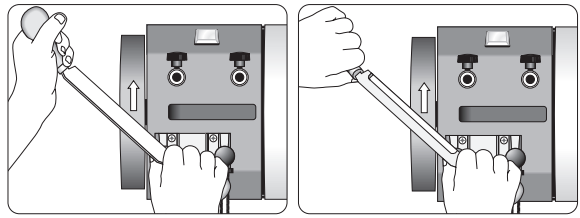
You can ensure that the burr is completely removed by drawing the knife through a piece of end grain wood.

Important *Always hone in the direction of rotation (away from the edge). Place the machine as shown with the wheels running away from you and the honing wheel to the left.*

Carver’s Drawknives



Press the jig downwards so that the stop is all the time in contact with the Universal Support. Ensure that the grinding takes place across the entire width of the grinding wheel.

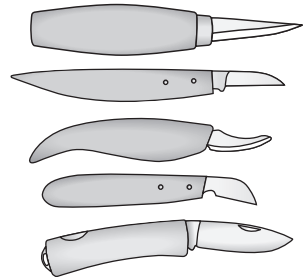


Hone free-hand. Hold the knife diagonally to clear the grinding wheel. Hone the bevel and the reverse side alternately.

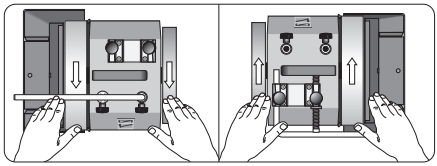
Small Knife Holder SVM-00

SMALL KNIVES

Various carving knives, skew knives and pocket knives.



Positioning of Machine



Grinding direction: Towards or away from the edge.

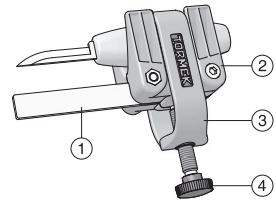
Note *The height of the bench must not be too high when grinding towards the edge. 550–650 mm (22–26") is suitable depending on your height.*

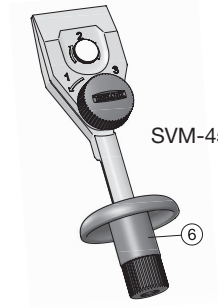
Design

The Small Knife Holder SVM-00 complements the Tormek Knife Jig SVM-45. It extends the usage so that you can also sharpen even the smallest knives.

It consists of a Guide Bar (1), a Handle Grip (2), and an Adjustable Clamp (3). The knife handle is fastened with the Knob (4). The holder is designed to securely hold the knife without damaging the handle.

The Guide Bar (1) mounts in the jaws of the Tormek Knife Jig SVM-45 and you sharpen using the same technique as for the knife jig. The exact edge angle is set by turning the Adjustable Stop (6) or using the Micro Adjust on the Universal Support.

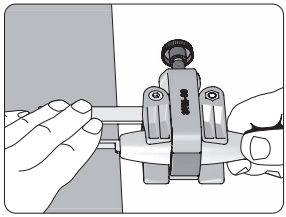




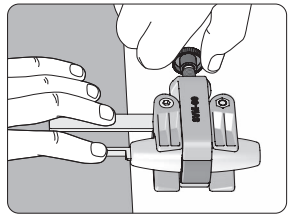
SVM-45

Mounting the knife

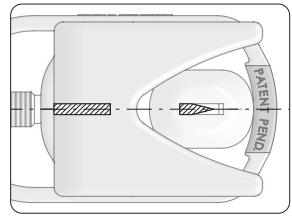
1. Mount the knife in the SVM-00



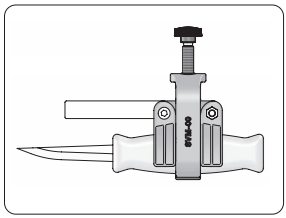
Mount the knife in the holder whilst lying flat on a table edge.

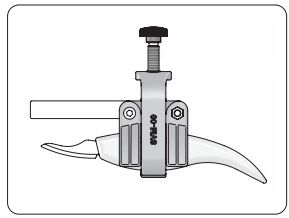


Press the Guide Bar and the knife blade against the table. Lock the knife with the Knob.



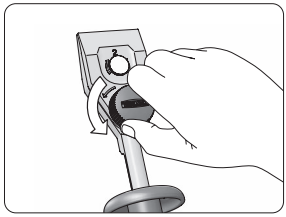
Check that the knife blade is in line with the Guide Bar.



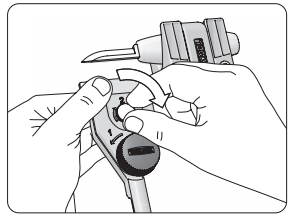


The shape of the knife handle determines how far into the holder the knife needs to be mounted. Make sure it is secured.

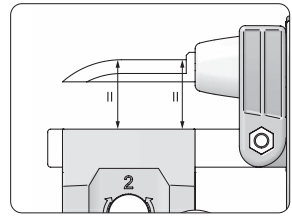
2. Mount the knife in the jig SVM-45



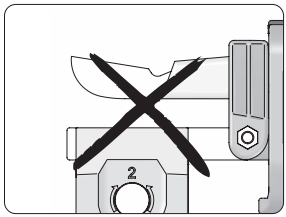
Check that the Knob is loose.



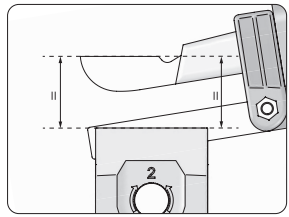
Mount the Guide Bar in the jig with the small adjustment screw.



Check that the knife edge is parallel to the SVM-45. Tighten the large black knob.



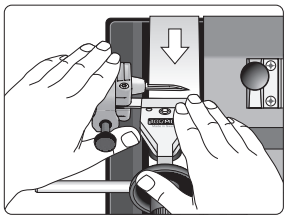
Wrong. The edge of the knife is not parallel to SVM-45.



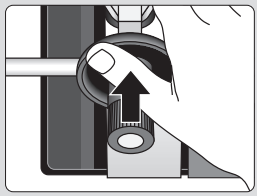
Right. The edge of the knife is parallel to SVM-45.

Sharpen away from or towards the edge?

Sharpen towards the edge



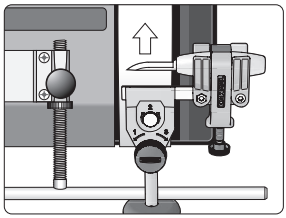
The Universal Support is normally mounted vertically for sharpening *towards* the edge. It will give you a more effective grind and you will get less burr to remove when honing. For folding knives (which cannot be locked) you should work in this position to prevent the knife blade from closing during the sharpening.



Important!

Apply a bit of pressure onto the stop so that it is always resting firmly against the Universal Support. In this way you will get an even edge and will not risk that the knife cuts into the wheel.

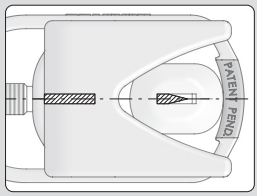
Sharpen away from the edge



You can also sharpen *away* from the edge with the Universal Support mounted horizontally. If your machine is placed on a bench over 700 mm high (27½") this will give a better working position. Some prefer this position since the knife cannot cut into the grinding wheel. It can also be advantageous if for some knives you want to have a slower grind.

Sharpening and honing

Set the edge angle and sharpen in the same way as the SVM-45, see p. 54. After sharpening, hone away the burr and polish the bevel on the leather honing wheel. The SVM-45 instruction is also available to download from www.tormek.com.

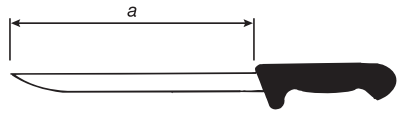


Note *Some knives are difficult to mount in line with the Guide Bar. Knives can also be sharpened with asymmetrical bevels. In these cases, and if the angle is not correct when you turn over to sharpen the second side, you can adjust it separately with the Micro Adjust.*

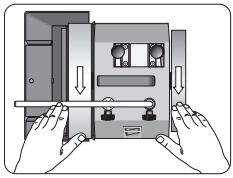
Long Knife Jig SVM-140

LONG AND THIN KNIVES

E.g. filleting knives.
Min length of blade (a) 160 mm (6¼").



Positioning of Machine

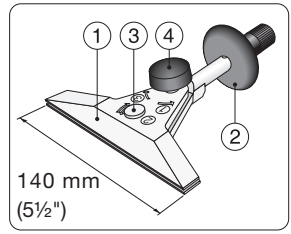


Grinding direction: Towards the edge.

Note *The height of the bench must not be too high when grinding knives. 550–650 mm (22–26") is suitable depending on your height.*

Design

The jig comprises an adjustable clamp (1) for holding knives of any thickness and an adjustable stop (2). You adjust the jig to the knife thickness with the screw (3). You lock the tool by tightening the knob (4).



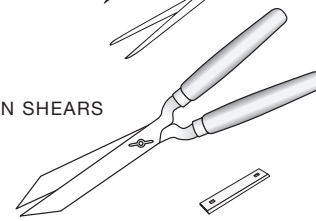
The jig rests on the Universal Support. The exact edge angle is set by rotating the stop. The Universal Support is placed vertically for grinding towards the edge.

This jig is made especially for long and thin knives. It works in the same way as the SVM-45 jig but it is wider and therefore gives more support to long and thin blades.

Scissors Jig SVX-150

SCISSORS

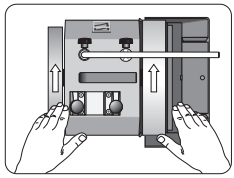
GARDEN SHEARS



PORTABLE ELECTRIC PLANER BLADES

(Not tungsten carbide)

Positioning of Machine

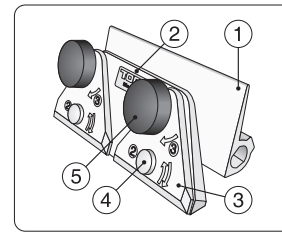


Grinding direction: Towards the edge.

Tip *The best working position is sitting on a chair in front of the machine.*

Design

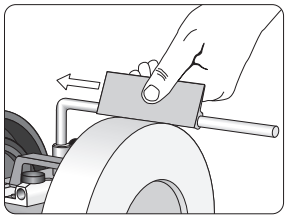
The jig comprises a support plate (1) and a holder (2) with two clamps (3) for the scissors. Usually you use only the right clamp. For large scissors and garden shears you use both clamps.



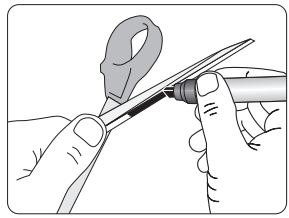
You adjust the clamp to fit the scissors' thickness with the screw (4). You lock the scissors by tightening the knob (5). The support plate has a sliding surface, so the holder with the scissors can easily be moved while it is pressed onto the plate.

Setting the edge angle

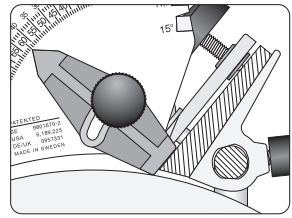
The edge angle is set by adjusting the support plate. You can either repeat the existing angle or put a new edge angle to your scissors by using the AngleMaster WM-200. A common edge angle is 60°.



Slide the support plate onto the Universal Support. Lock the Universal Support in the lowest possible position with clearance for the plate.

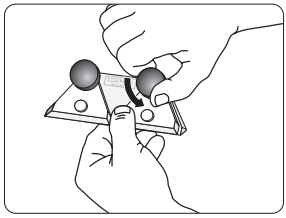


If you want to repeat the existing edge angle, colour the bevel with a marker to see where the grinding will take place.

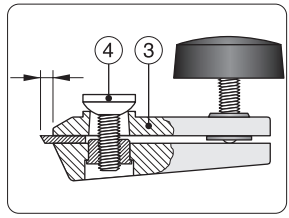


If you want to grind a new edge angle, use the AngleMaster WM-200. Let the indicator touch the holder between the two clamps.

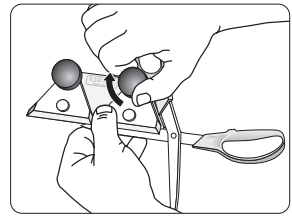
Mounting the scissors in the jig



Loosen the larger knob (5).

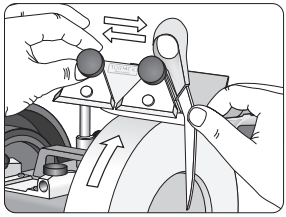


Adjust the screw (4) so the clamp (3) fits the scissor thickness. Leave about 3 mm (⅛") protruding.

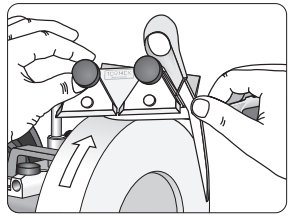


Ensure that the other blade will remain clear of the side of the wheel and tighten the large knob to hold the scissors in place.

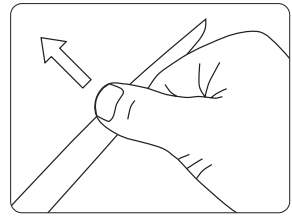
Grinding



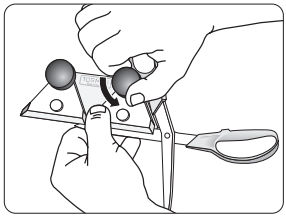
Grind carefully by placing the jig on the support plate with a light downward pressure.



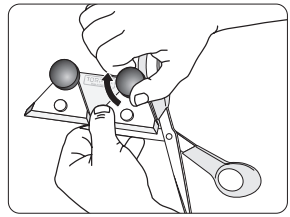
Move the jig back and forth across the wheel while following the shape of the blade.



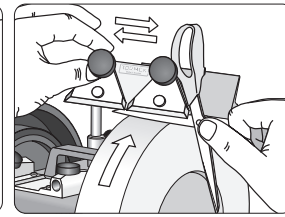
Grind until you have a burr along the entire length of the blade, and you can see an evenly ground bevel.



Remove the partially ground scissors from the jig by loosening the large knob.

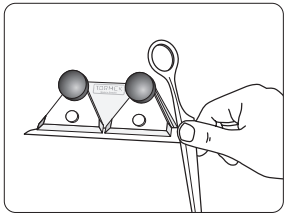


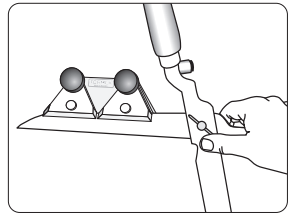
Mount the other blade in the jig.



Grind the other blade in the same way as the first one.

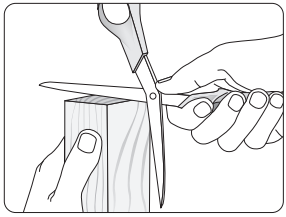
Larger scissors and garden shears





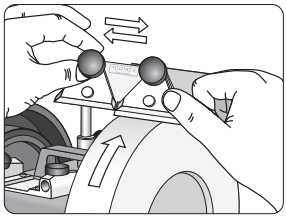
For larger scissors and shears, use both clamps.

No honing



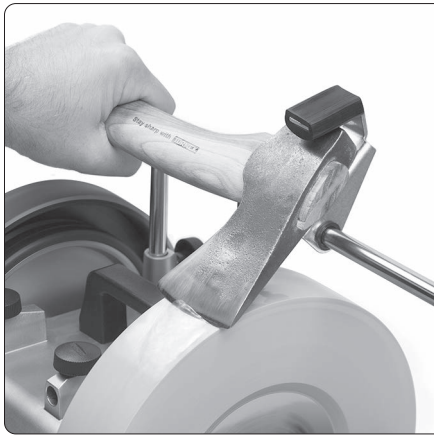
Do not hone the edge after grinding! There is no need for a finer surface. As a matter of fact a coarser surface on the scissors makes them work better, as the material (cloth or paper) to be cut slides less and cuts more easily. Remove the little burr resulting from the grinding by drawing the scissors through the end grain of a piece of wood.

Portable electric planer blades



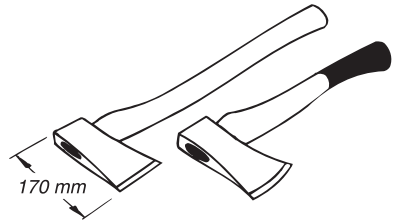
These are ground the same way as scissors. The bevel and back should however be honed. After grinding, keep the blade in the holder and hone the bevel and the back alternately until the burr disappears.

Axe Jig SVA-170

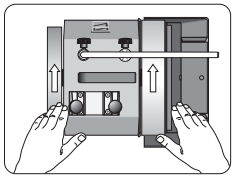


AXES AND HATCHETS

Fits axes up to 170 mm (6¾").
Larger axes are ground without a jig and supported on the Universal Support.
(page 42).



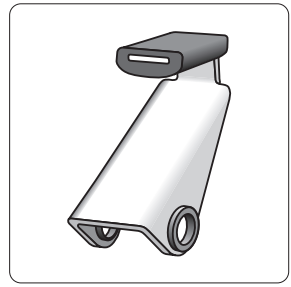
Positioning of Machine



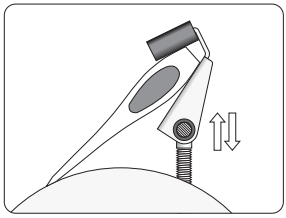
Grinding direction:
Towards the edge.

Design

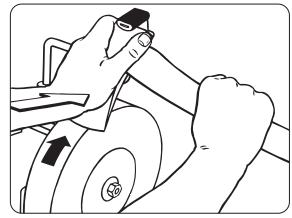
The jig comprises a clamp with a rubber lined, wedge shaped stop, which holds the axe in a fixed position towards the grindstone. The clamp works on the Universal Support, on which it slides across the wheel.



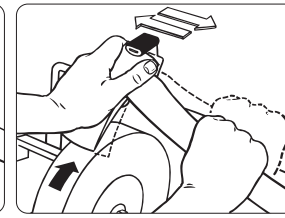
The jig is designed so that the rotation of the wheel presses the axe firmly into the jig. You only need to hold and guide the axe with your hands. This jig only works with the wheel running towards the edge. If necessary, the honing wheel can be removed to allow clearance for the axe handle.



Place the axe into the jig. Set the edge angle by adjusting the Universal Support. Either at the original angle using the Marker Method or at a new angle using the AngleMaster WM-200.



Press with your palm on the axe, close to the wheel. The axe will automatically be pressed up against the stop in the jig and the grinding is most efficient.

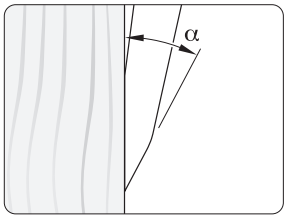


Follow the shape of the edge (straight or curved) during grinding by raising or lowering the handle. Let the jig slide sideways on the Universal Support so that the wheel wears evenly.

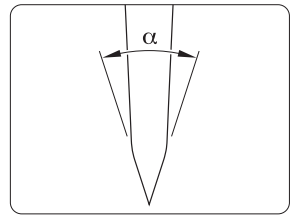
Edge Angle

The edge angle of a carpenters axe or hatchet should be 25–30°, depending on the hardness of the wood. Grind the edge with a smaller bevel angle on the side towards the wood than on the other side. This longer bevel gives you a good support towards the wood. Also, as the axe works closer to the surface of the wood, the cutting will be more effective and easier to control.

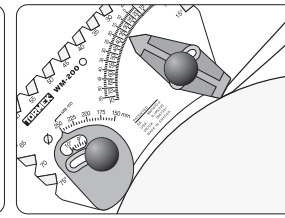
A felling axe and a hunting axe must have a larger edge angle, 30–40°, so that the edge is more durable. Round off the heals of the bevels and the axe cuts more easily. This is done by lowering the Universal Support and grinding in two steps.



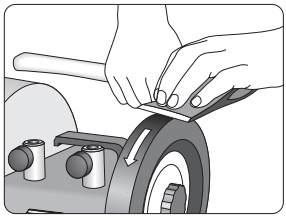
Put a longer bevel on the woodside on a carpenter axe.



A felling axe should have an edge angle (α) of 30–40°. Round off the heals and the axe cuts more easily.



You can set and measure the edge angle with the AngleMaster WM-200.



Honing and polishing the bevels on the leather honing wheel makes the edge cut more easily and the sharpness will stay longer. Always hone away from the edge.

Short Tool Jig SVS-38

CARVING TOOLS WITH
A STRAIGHT SHANK

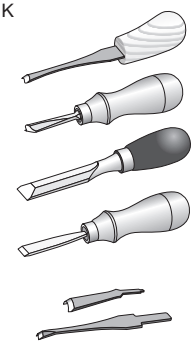
Straight gouges

Straight V-tools

Short wood chisels

Square carving chisels

Gouges and V-tools for reciprocating power carvers

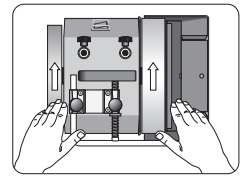


SVS-38 is a further development of SVS-32. It can handle slightly wider tools but apart from that, the function is the same as for SVS-32.

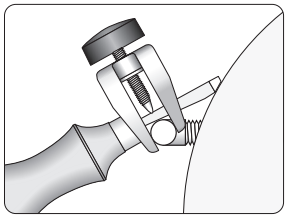
SVS-38: Max tool width 38 mm (1½").
SVS-32: Max tool width 32 mm (1¼").

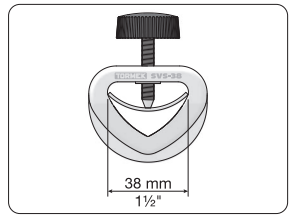
Min length of tool 45 mm (1¾") at 20° edge angle.

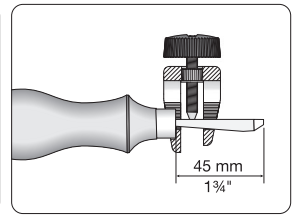
Positioning of Machine



Grinding direction: Away from the edge.







Design

This patented jig was developed for short woodcarving tools, butt chisels and tools for power carvers. The jig has two parallel flanges running on both sides of the Universal Support.

The technique achieved with this design ensures that at all times the jig – even when rotated – holds the tool square to the wheel. This is a great advantage, as you can continuously concentrate on how the edge touches the grindstone or the honing wheel without having to worry whether the jig is square to the stone.

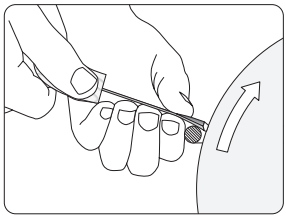
Carving Gouges

Grinding/Sharpening/Honing or Just Honing?

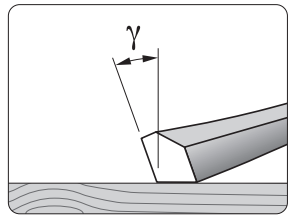
As mentioned in the chapter *Sharpening Techniques for Carving Gouges and V-tools* on page 20, you should question whether you should grind the tool or you should go directly to the honing wheel. This question is especially valid when coping with small and delicate tools, for which this jig is designed. The small size of the tool, which can be as small as 3 mm (⅛"), also enables the honing wheel to remove small amounts of steel and thus substitute the grinding.

The following instruction describes the whole process for achieving a sharp edge on a tool, which has become so blunt that it needs re-grinding. The instruction is also valid for tools, upon which you want to put a new shape and for tools upon which you want to change the edge angle. A tool which is only slightly dull and which has the right shape and edge angle, you should not grind, but go directly to the honing process (page 71).

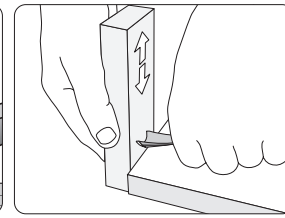
Shaping the edge



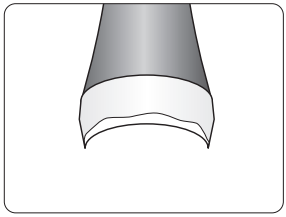
Shape the edge by resting the tool on the Universal Support placed horizontally and close to the wheel.



The edge plane angle (γ) should be approx. 20°. (Page 21).



Flatten and smooth the blunt edge with the fine side of the Tormek Stone Grader, SP-650.

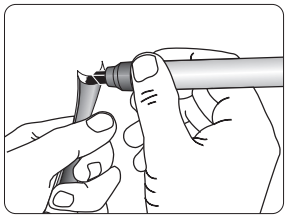


Now you have a line of light, which is your guide as to where to grind.

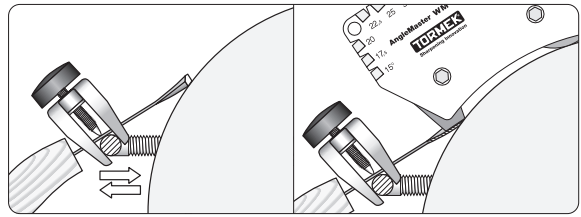
Edge Angle

As described in the chapter *Sharpening Techniques for Carving Gouges and V-tools* on page 24, the choice of edge angle is very important for a carving tool. The way of setting the edge angle depends on if you want to replicate an existing edge angle or if you want to put a new edge angle on your tool.

When replicating an existing edge angle, you should use the *Marker Method* (page 41). If you want to put a new edge angle to your tool, you can either set the angle by eye or you can use the AngleMaster (page 142).



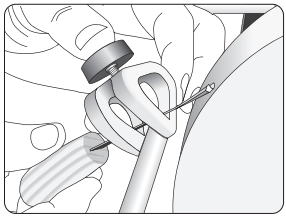
When replicating the existing edge angle you should use the Marker Method.

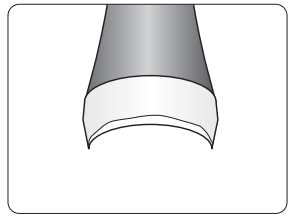


Setting a new edge angle can be done by eye or you can set to a pre-determined edge angle using the AngleMaster (page 142).

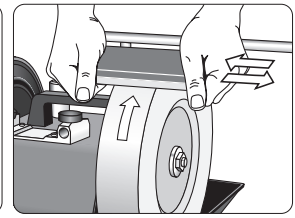
Grinding

When you have put the right shape on the tool and set the edge angle, it is time for grinding. Use the *line of light method* described on page 20.

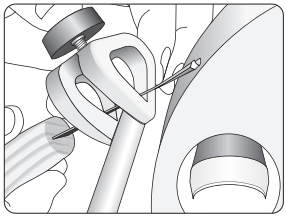




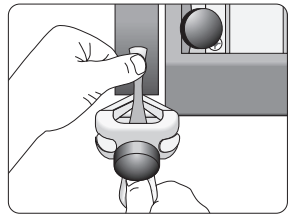
Always grind where the line of light is the thickest, while rolling the tool on the Universal Support. Check frequently where the grinding takes place. Grind until you get an even and thin line of light.



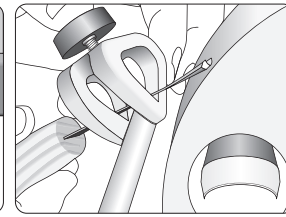
Grade the grindstone for fine grinding with the fine side of the Stone Grader SP-650.



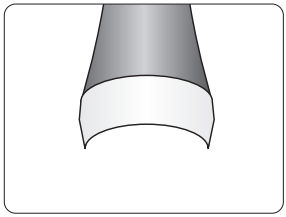
Continue grinding. Check the result frequently so you do not over grind on a spot.



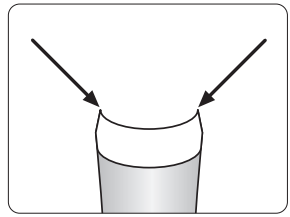
Remove the burr free-hand on the leather honing wheel to observe the line of light more clearly. The tool is left mounted in the jig.



Grind again. Now with a very light pressure. Check frequently so that you do not over grind on one spot.



Stop grinding immediately when the line of light disappears! This is the sign that the edge is sharp.

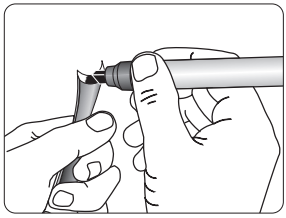


Be careful when you grind at the sides of the gouge, so you do not round off the corners.

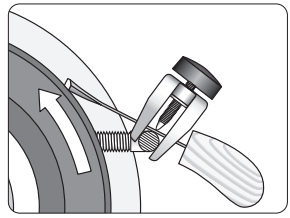
Important *It is very easy to be misled by the burr and mistake the burr for the line of light! Therefore you must remove the burr frequently during the finishing of the grinding operation, so you clearly can watch the progress of gradually thinning the line of light.*

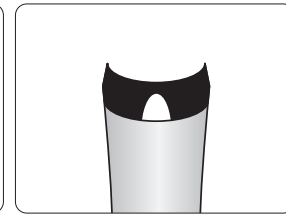
Honing

It is important that you hone with the same edge angle as used during the grinding. This is done by setting the Universal Support carefully using the *Marker Method*.

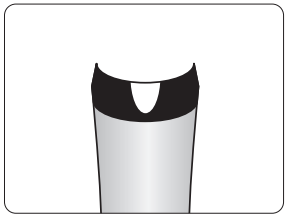


Colour the bevel with a marker and mount the tool in the jig. Set the Universal Support so that the honing wheel touches the entire length of the bevel. Check with the honing wheel running.

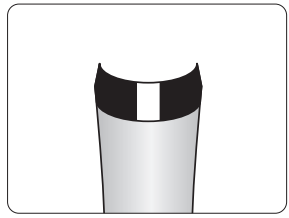




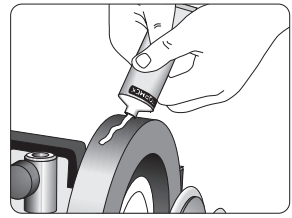
Wrong setting. The wheel is hitting the heel. Adjust the Universal Support away from the wheel.



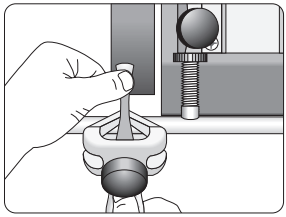
Wrong setting. The wheel is hitting the tip. Adjust the Universal Support towards the wheel.



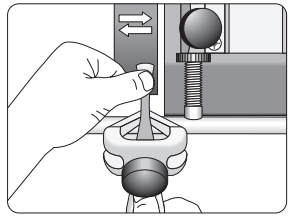
Correct setting. The honing wheel hits the full length of the bevel.



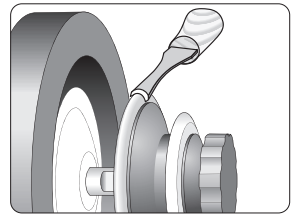
Prepare both the honing wheels with honing compound (p 44).



Sharpen/hone the edge. Roll the tool on the Universal Support and apply pressure on the tool near the edge.

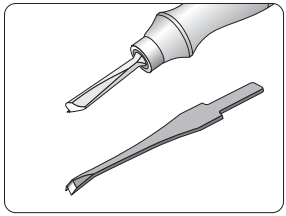


Move the jig sideways so you work on the whole width and avoid uneven wear on the leather.



Remove the tool from the jig and hone the inside free hand on the leather honing wheel.

V-tools



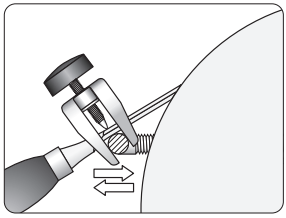
In the chapter of SVD-186 R on page 90 it is described how to grind and hone V-tools. This principle is the same when using the SVS-38 jig.

Short Wood Chisels and Carving Chisels

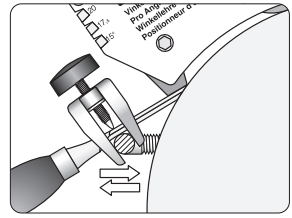
Grinding a wood chisel is much easier than grinding a gouge or V-tool, since a wood chisel has a single and straight edge. Before grinding, check that the edge is square across the edge. If not, make the edge square on the grindstone resting the tool on the Universal Support positioned close to the grinding wheel.

When grinding a new wood chisel for the first time, check that the back is flat and is free from manufacturing grooves. If necessary, flatten and smoothen it on the outside of the wheel (page 123) and then hone it on the leather honing wheel.

Setting the edge angle



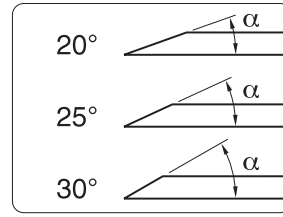
Setting the existing edge angle. Adjust the Universal Support so the entire bevel touches the wheel. Use the Marker Method.



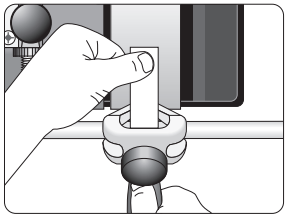
Setting a new edge angle. This can be done by eye or you can, as shown here, set the jig to a pre-determined edge angle using the AngleMaster WM-200.

Edge Angle

Wood chisels are usually ground with a 25° edge angle (α). If you work delicate details with a wood chisel in soft wood, you can decrease the edge angle down to 20°. If you work in hard wood and when using a mallet, you must increase the edge angle to 30° or even larger.

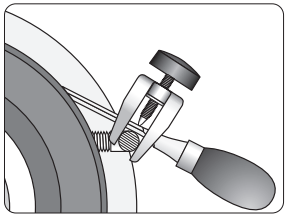


Grinding

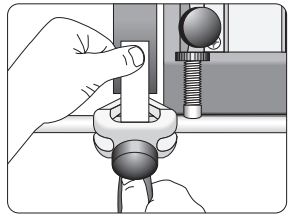


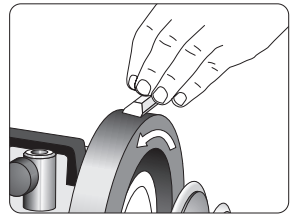
Press with your thumb close to the edge for best control. You also control with your hand on the handle that the edge is presented correctly to the grinding wheel and not turned. Check frequently so that you achieve a symmetric edge. Do not slide the jig sideways, but instead lift it when you move it to another spot on the wheel.

Honing



Keep the tool in the jig and move to the leather honing wheel. Set the Universal Support so that the honing angle is the same as the grinding angle. Use the Marker Method. Hone away the burr and polish the bevels to a mirror finish.

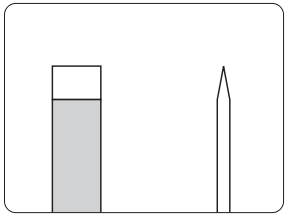




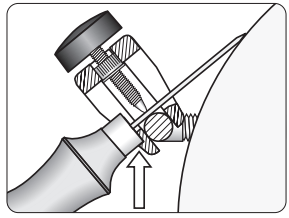
Hone the back free hand. Watch that you do not round the tip. Hold the tool so it is a tangent to the wheel.

Square Carving Chisels

These have symmetrical bevels on both sides. This jig copes with tools down to a blade length of approx 60 mm (2⅜") at 25° edge angle. As the jig cannot be turned upside down (as the SVS-50 jig), you need to de-mount the tool, turn it 180° and re-mount it in the jig. Let the tool handle touch the jig during each mounting and you will get the same setting and symmetrical bevels.

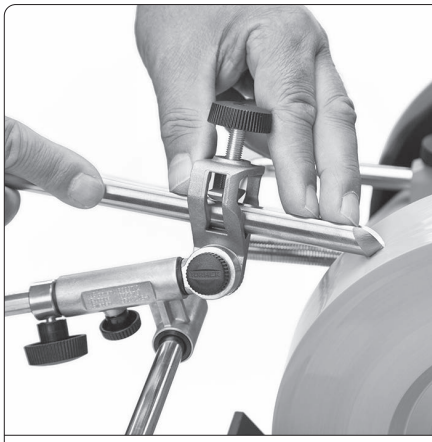


A square carving chisel.



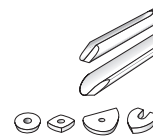
Let the tool handle touch the jig at both the mountings.

Gouge Jig SVD-186 R



TURNING TOOLS

Bowl gouges
Spindle gouges
Turning cutters



CARVING TOOLS

Curved gouges
Spoon-shaped gouges
Back bent gouges
Down bent gouges
Curved V-tools

Max tool width 36 mm (1⅜")

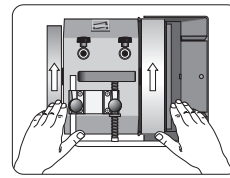
VIOLIN MAKING KNIVES

Knives with short bevel
Knives with long bevel
Double edged knives

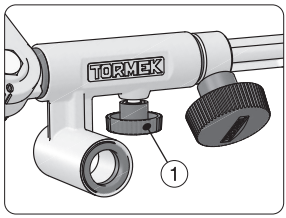
SVD-186 R is a further development of SVD-186

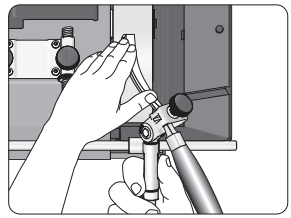
A new locking knob (1) allows you to now lock the jig's rotary motion. This makes it easier to get full control when sharpening woodcarving tools, such as bent V-tools. The locking knob also enables sharpening with a completely flat bevel on violin making knives when using Tormek's Multi Base MB-100 and Tormek's Diamond wheels.

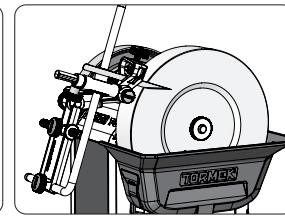
Positioning of Machine



Grinding direction:
Away from the edge.

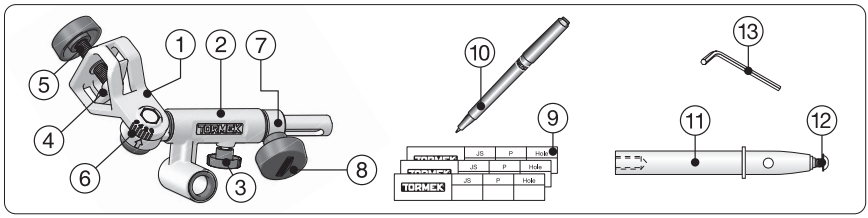






Design

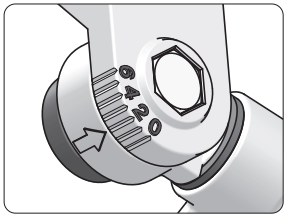
The jig comprises a *tool holder* (1) which runs in a *sleeve* (2). The *locking knob* (3) locks the rotary motion of the gouge jig. The tool is aligned with a *disc* (4) and tightened with a *screw* (5). Easy and precise *click setting* (6). The *stop ring* (7) can be set with the *screw* (8) in order to round off the heel of the grinding bevel. The setting can be noted on a special *recipe label* (9), which is attached to the ferrule. A special *pen*, which works on these labels is included (10). For turning cutters there is a *shaft* (11) with a *mounting screw* (12) and a 2.5 mm *allen key* (13).



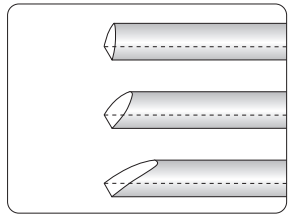
Jig setting

You can grind turning gouges with the so called fingernail shape as well as carving gouges with various shapes. You can also grind straight and curved V-tools.

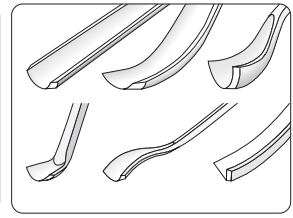
The jig causes the tool to move towards the grinding wheel in a special way, according to the setting selected from 0 to 6. This means, that for turning gouges you can decide the maximum length of the side edges. For curved carving gouges, which are not ground with a fingernail shape, the jig setting compensates for the shape of the shank.



The jig can be set from 0 to 6, which permits the grinding of …

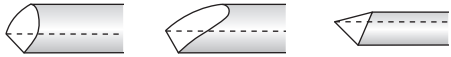


… turning gouges with various lengths of side bevels and …



… carving gouges with various shapes and V-tools.

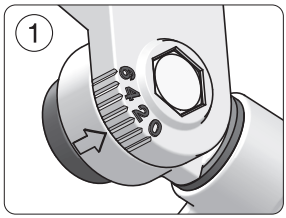
Turning Gouges



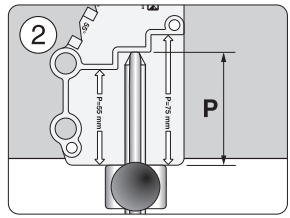
Shaping

The jig positions the gouge on the grinding wheel so that you can get a specific and repeatable grinding at any point along the bevel. This enables you to get an even, single bevel around the entire profile from the left to the right wing.

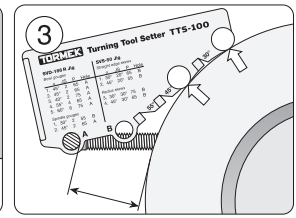
These three factors determine the geometry of a gouge



The setting of the jig, JS.

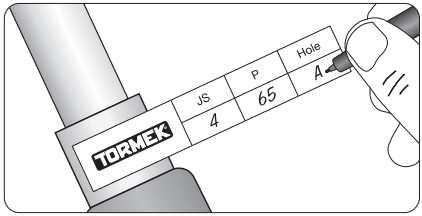


The protrusion of the tool in the jig, P.



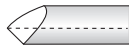
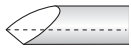
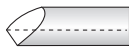
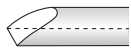
Universal Support position. Use hole A or hole B.

With the Turning Tool Setter TTS-100 you control these factors. Select the profile you want from the chart on the next page and use the three settings, which give that shape. Note the settings on the Profile Label and put it on the ferrule. After the initial shaping you can exactly replicate your favourite shape at every sharpening in less than a minute.



Note the settings on the Profile Label and put it in on the ferrule. A set of labels comes with the jig.

Selection Chart

Bowl gouges				
1	α=45°		**JS 2** **P 65** **Hole A**	Standard profile. Only lightly swept back wings. For turners of all skill levels.
2	α=45°			Irish profile. Swept back wings. Swing the tool 180° from side to side.
3	α=40°		**JS 2** **P 75** **Hole A**	With long swept back wings. Somewhat aggressive. For professional level turners.
4	α=55°		**JS 4** **P 65** **Hole A**	The larger edge angle is beneficial when turning deep bowls.
5	α=60°		**JS 6** **P 75** **Hole A**	"Ellsworth" shape. Wings are pronounced convex.

Spindle gouges				
1	α=30°		**JS 2** **P 55** **Hole B**	For tight spots, detail work and finest finish. For professional level turners.
2	α=45°		**JS 2** **P 65** **Hole A**	Standard profile. For turners of all skill levels.

These geometries, i.e. the shape and edge, angle are recommended by experienced woodturners and recognized woodturning workshops around the world, e.g. Glenn Lucas Woodturning in Ireland, Nick Agar's "Turning Into Art" in the UK and Drechselstube Neckarsteinach in Germany.

Since a tool can have an unlimited number of combinations of shapes and edge angles, a new tool has a more or less a different shape compared to any of the shapes on the chart. Therefore, you first need to shape your tool to one of the shapes on this chart. Then the following sharpenings will be an easy task and done in less than a minute.

Tip *Stick to the shape you have selected and do not switch from one shape to another. Then you will get the full benefit of the Tormek TTS-100 Setter, since you can instantly replicate exactly the same shape every time. Should you need a different shape, then buy another tool and grind it to your alternative shape. This way of working will give you more time for turning and fewer interruptions for shaping and sharpening.*

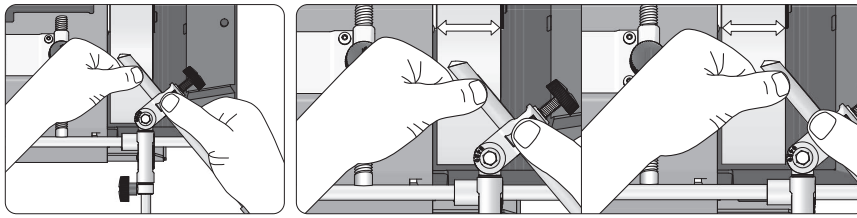
Shaping

You can do the initial shaping either directly on your Tormek or, if a lot of steel needs to be removed, on a bench grinder using the Tormek Bench Grinder Mounting Set BGM-100 (page 29).

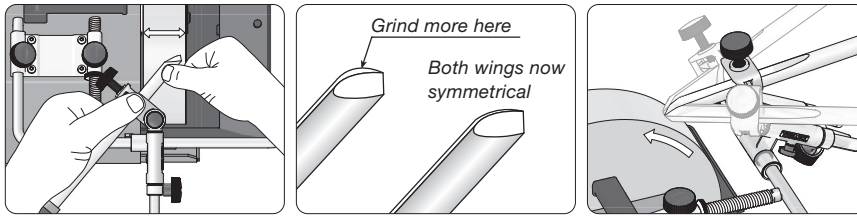
When shaping on the Tormek, contrary to a high speed bench grinder, you need to apply a high grinding pressure. Therefore, press with your hand or thumb on the tool to increase the grinding pressure. Grind one side at the time. This is easier since you do not need to swing the tool from side to side. Finish the grinding with a full swing over the entire bevel. Do not spend too long on the same spot on the grindstone, as it will leave grooves on the stone. Instead, grind on new spots so that you use the whole width of the stone.

By this technique the remaining grooves will not be too pronounced. They will reduce with future grindings of straight edges. If you immediately require a flat surface of the stone, you can true it with the Truing Tool TT-50.

Check your grinding frequently to ensure that the gouge acquires an even shape. Grind more on the spots where it is needed. Your hands and eyes decide the final evenness and shape of the bevel. Remember that once you have created your desired fingernail shape, this can be kept forever and you will always benefit from the time spent on the initial shaping. This initial shaping needs only to be made once. It takes 10–20 minutes depending on the original shape of the tool and on how much steel you need to remove.



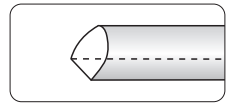
Make the first rough shaping on one side at the time. Move the tool sideways so you use the whole width of the stone and avoid creating grooves.



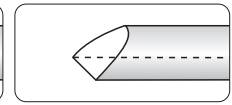
Grind the other side. Again use the whole width of the stone to wear the stone evenly. Check frequently to ensure that you are grinding evenly. Grind more where it is needed. Decrease the grinding pressure as you complete the shape and finish the grinding with a full swing over the entire bevel.

Length of the Wings

The length of the wings depends on how wide you swing the tool from side to side.



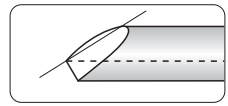
Limited swing.



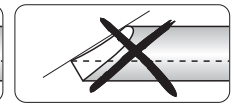
Full swing.

Shape of the Wings

Watch that you grind on the right spots on the bevel so the wings become symmetrical and slightly convex or straight. They must never be concave.

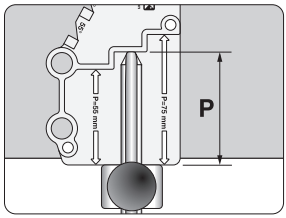


Convex.



Concave. Not suitable!

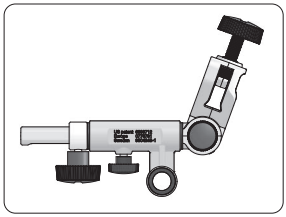
Note *You decide how much grinding takes place on any one spot and hence the final shape. If the wings tend to be concave, then grind more on the centre of the edge.*



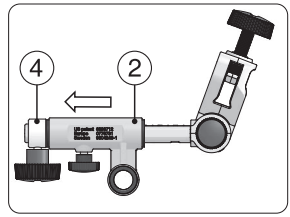
When the desired shape is achieved, check that the protrusion has not decreased during the shaping. If so, re-position the tool to the correct protrusion and then make the final shaping. By doing so, you will ensure that you exactly replicate the edge geometry at future sharpenings.

Rounding Off the Heel

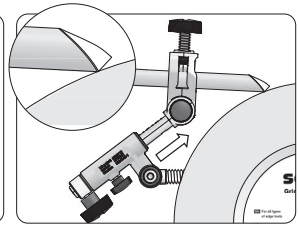
Some turners round off the heel of the bevel on bowl gouges and spindle gouges. The jig is designed so that you can move the tool towards the wheel and grind the heel. The heel can be ground either as a flat secondary bevel or rounded off by sliding the jig back and forth during grinding. If you want a more pronounced rounding off, you move the Universal Support a little towards the grinding wheel.



Normal position.



You can round off the heel by moving the stop ring (4) and the sleeve (2) backwards.

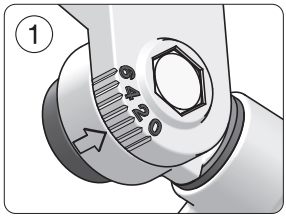


Now you can press the jig towards the wheel to round off the heel.

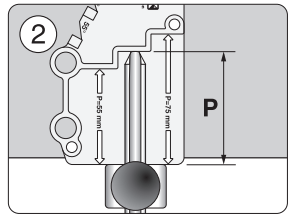
Sharpening

Once you have created the shape of the edge, it is an easy task to quickly re-sharpen the tool. The sharpening should be done on your Tormek machine for the best finish and to ensure that the edge is not overheated. Make the three settings noted on the Profile Label carefully and you will obtain exactly the same shape every time even when the stone wears and decreases in diameter.

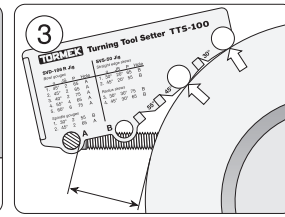
These three factors determine the geometry of a gouge



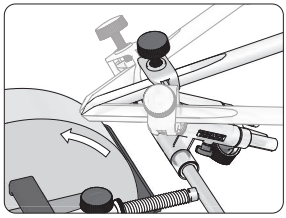
Set the jig, JS.



Mount the tool with a fixed protrusion, P.



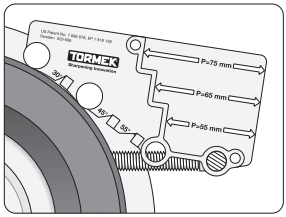
Set the Universal Support. Use hole A or hole B.



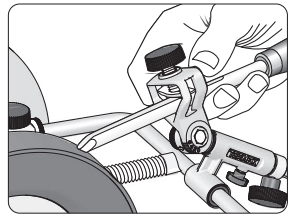
Sharpen with a light pressure and swing the tool from side to side. Since the shape is exactly replicated and the edge is just touched up, the sharpening takes just 20–30 seconds.

Honing

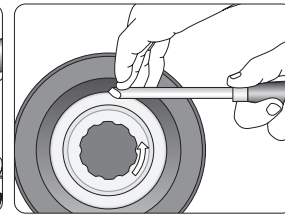
Honing and polishing the bevel and the flute to a finer finish will make the sharpness more durable. Also, use the Setter and jig for this operation and you are sure that you are honing to exactly the same shape as the sharpening plus you do not risk rounding off the very tip of the edge.



Move the Universal Support to the honing wheel and make the same setting with the Setter.



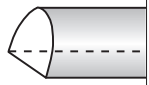
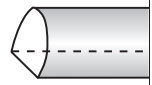
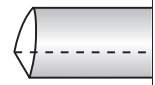
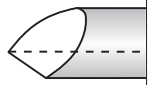
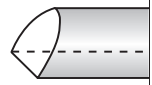
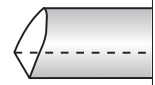
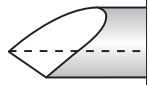
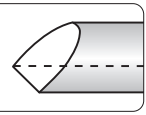
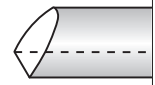
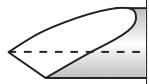
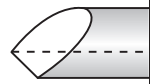
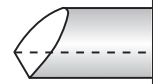
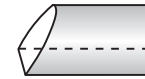
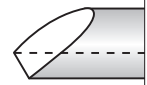
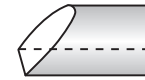
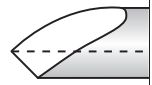
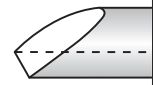
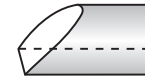
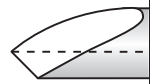
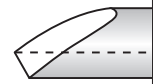
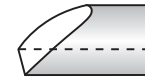
Hone by swinging the tool from side to side. You now have an extra fine finish.



Polish the flute and remove the burr on the Profiled Leather Honing Wheel LA-120.

Other Shapes

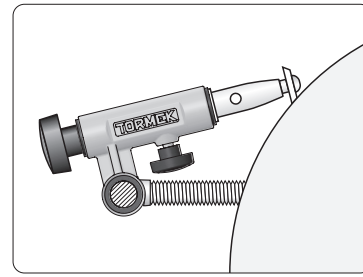
You can of course shape your gouge to a different geometry from those provided with the TTS-100 Setter. This graph shows examples of shapes which you can achieve on a bowl gouge at various jig settings and edge angles. In each example, the protrusion of the tool in the jig (P) is 65 mm (2½"). The gouge is swung fully 180° from side to side.

Jig Setting	Edge angle **35°**	Edge angle **45°**	Edge angle **55°**	Edge angle **75°**
JS 0				
JS 1				
JS 2		* 		
JS 3				
JS 4			* 	
JS 5				
JS 6				

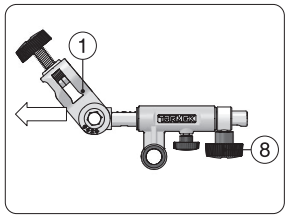
** Geometries achieved with the TTS-100 Setter.*

Turning Cutters

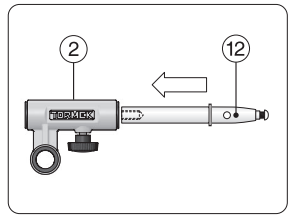
There are various types and sizes of exchangeable cutters for hollowing and scraping. The holes vary from 4–8 mm (5⁄32–5⁄16"), but due to a shoulder on the shaft they can all be mounted with the same screw. The cutters can be sharpened to their existing shape or to a new shape.



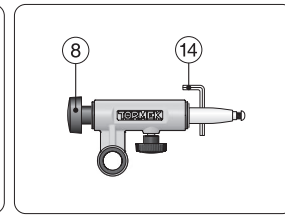
Mounting the jig



Loosen and remove the screw (8) and the tool holder (1).

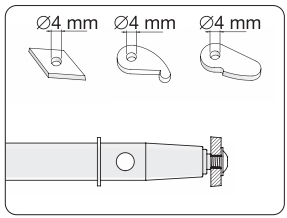


Insert the shaft (12) into the sleeve (2). Note: Position the sleeve according to the picture!

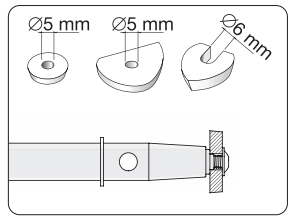


Mount the screw (8). Lock the shaft with the Allen key (14) when tightening.

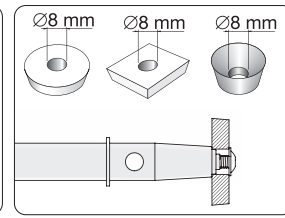
Mounting the cutter



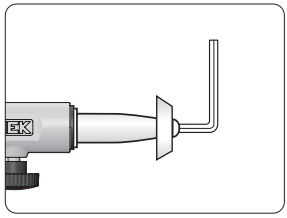
Cutters with 4 mm (5⁄32") holes are centered by the M4 screw.



Cutters with 5 and 6 mm (3⁄16"–1⁄4") holes are centered on the first shoulder on the shaft.

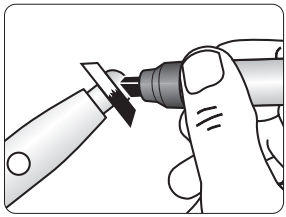


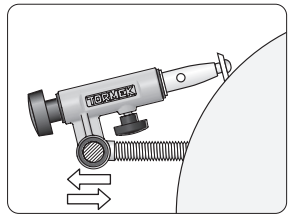
Cutters with 8 mm (5⁄16") holes are centered on the second shoulder on the shaft.

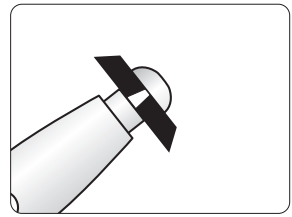


Use the Allen key (14), which comes with the jig.

Setting the edge angle



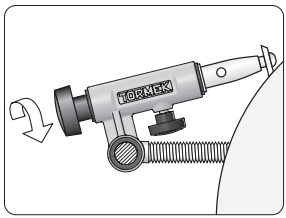


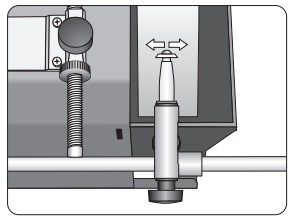


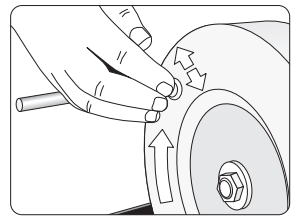
Colour the bevel with a marker. Set the Universal Support so that the grinding wheel touches the entire length of the bevel when rotating it by hand.

At the right setting the wheel removes the colouring along the whole length of the bevel.

Sharpening



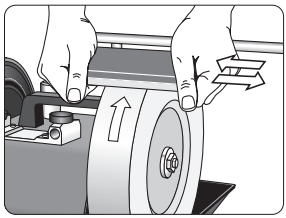


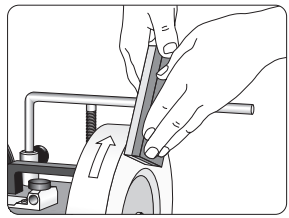


Rotate the jig all the time during the sharpening so you achieve an even grinding around the whole circumference. Use only a light pressure for the best result. Slide the jig sideways on the Universal Support so the wheel wears evenly.

Smooth the back on the machined, flat outside of the grinding wheel. Move the cutter in order to use the whole surface of the wheel.

Tip *When smoothing the back of the cutter, hold it towards the grinding wheel before you start the machine. This is easier and you do not risk dropping it into the water trough.*

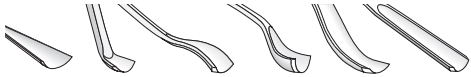


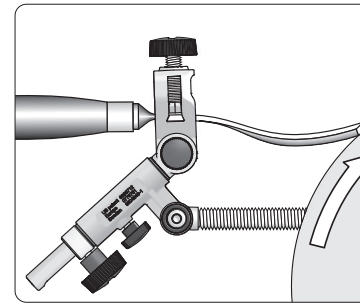


If you want an extra fine surface on the bevel, grade the Tormek Original Grindstone with the Stone Grader SP-650 so it grinds more finely corresponding to a 1000 grit grindstone.

Important *Do not hone these small tools on the leather honing wheel! They can easily get caught on the leather surface and spoil the leather.*

Carving Gouges





Carving gouges can be straight, curved or spoon shaped. They can also be back bent, down bent or tapered. The jig can be set to compensate for any radius on the curve so that the grinding takes place evenly across the edge, so creating a constant edge angle from the centre to the sides of the gouge.

Unlike turning gouges, carving gouges should not be ground with side bevels. The edge should form a straight line viewed from above and the corners must be sharp.

The Principle

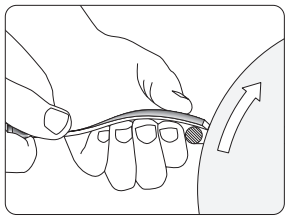
Use the technique as described in *Sharpening Techniques for Carving Gouges and V-tools* on page 20.

Edge Angle

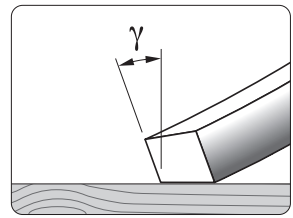
As described in the above chapter on page 24, the choice of edge angle is very important for a carving gouge. The method of setting the jig for a certain angle depends on whether you want to replicate an existing edge angle or if you want to put a new edge angle on your tool.

When replicating an existing edge angle, you should use the *Marker Method*, which is described on page 41. If you want to put a new edge angle to your tool, you can either set the angle by eye or you can use the AngleMaster (page 142).

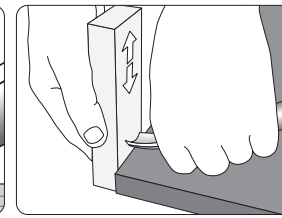
Shaping the edge



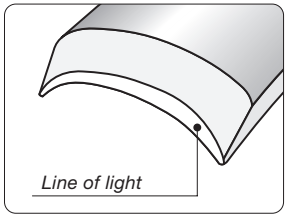
Shape the edge by resting the tool on the Universal Support placed horizontally and close to the wheel.



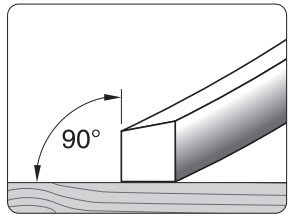
The edge plane angle (γ) should be approx. 20° (page 21).



Flatten and smooth the blunted edge with the fine side of the Tormek Stone Grader, SP-650.

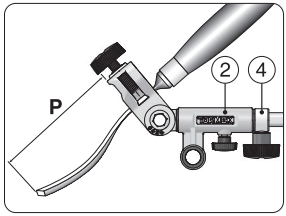


Now you have a line of light, which is your guide as to where to grind.

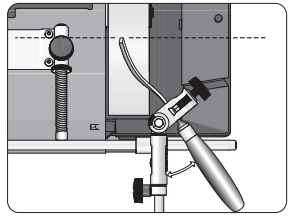


When cutting steep bowls using a curved or a down bent gouge, the edge plane angle can be decreased. Here it is 0°.

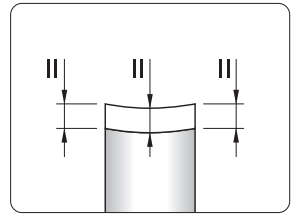
Setting the jig



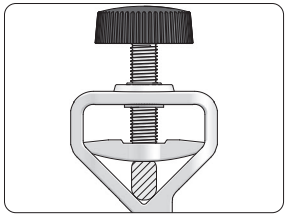
Mount the gouge in the jig protruding approx. 100 mm (4"). The stop ring (4) must be locked close to the sleeve (2).



Put the jig on the Universal Support and swing it to one side. Set the jig so that the plane of the edge is approx. parallel to the axis of the wheel.

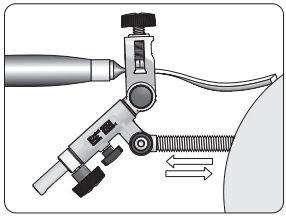


The edge angle will now be equal across the edge. If the thickness of the steel is even, the bevel length will also be equal along the edge.

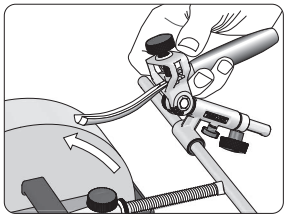


If the shank has a convex upper side, you should grind it flat to make sure that the tool does not turn in the jig.

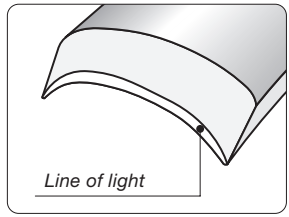
Setting the edge angle



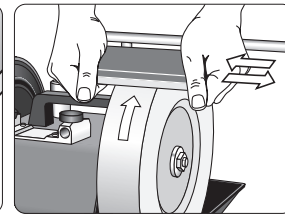
Set the edge angle by adjusting the Universal Support. When replicating an existing angle, use the Marker Method. When setting a new angle you can use the AngleMaster.



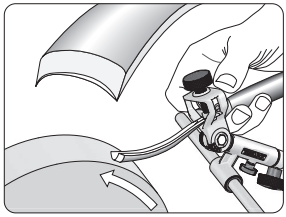
Always grind where the line of light is the thickest while swinging the tool.



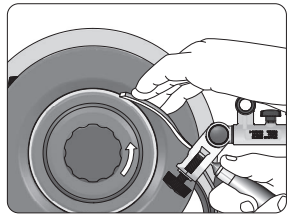
Check frequently where the grinding takes place. Grind until you get an even and thin line of light.



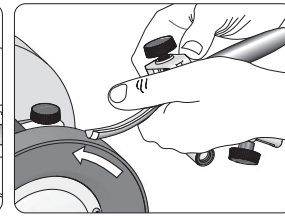
Grade the Tormek Original Grindstone for fine sharpening with the fine side of the Stone Grader SP-650.

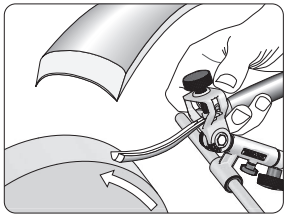


Continue sharpening. Check the result frequently.

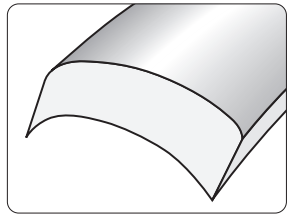


Remove the burr on the leather honing wheels to observe the line of light more clearly. The tool is left mounted in the jig.

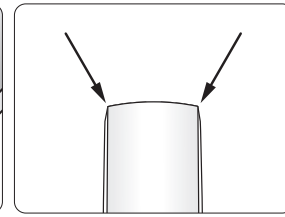




Sharpen again. Now with a very light pressure. Check frequently so that you do not over-sharpen.

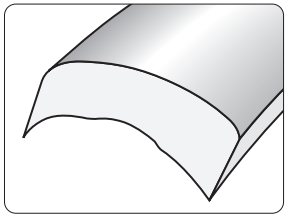


Stop sharpening immediately when the line of light disappears, which is a sure sign that the edge is sharp.



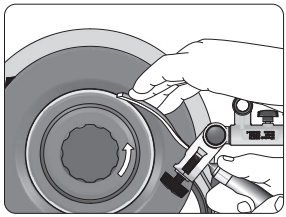
Be careful so you do not round off the corners. Woodcarving tools should have sharp corners!

Important *It is very easy to be misled by the burr and mistake the burr for the line of light! Therefore you must remove the burr frequently during the finishing of the grinding operation, so you clearly can watch the progress of a gradually thinner the line of light.*

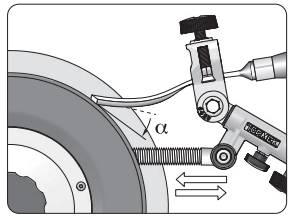


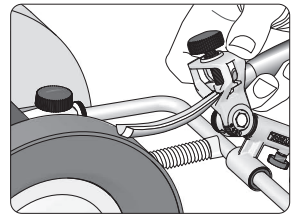
It is very easy to over-sharpen the edge at the end of the sharpening. If this happens, you need to reshape the edge and start again from the beginning.

Honing



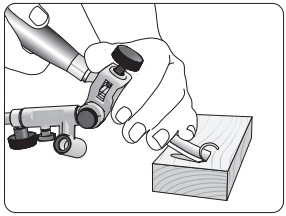
Keep the tool in the jig and hone and polish the inside on the Profiled Leather Honing Wheel LA-120.



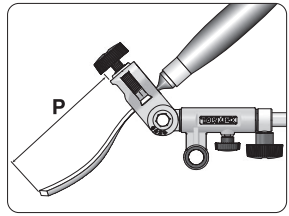


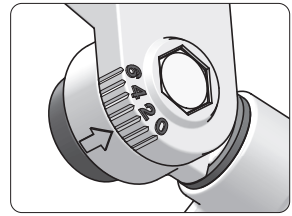
Hone and polish the bevel. Set the Universal Support so that the honing angle is the same as the grinding angle. Use the Marker Method. Hone away the burr and polish the bevel to a mirror finish.

Testing the sharpness



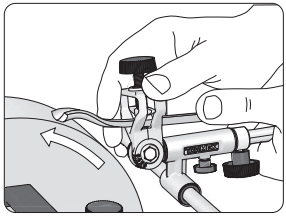
Leave the tool in the jig and test the sharpness by pushing the edge across the fibres in a piece of wood. The edge should cut easily and leave a smooth surface without tearing the fibres.



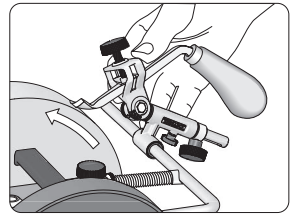


If the edge needs further honing or sharpening on some spots, you can continue with the same setting. When you are satisfied with the result, you remove the tool from the jig after having measured and noted the protrusion (P) and the jig setting. Please see the next page.

Back Bent and Down Bent Gouges



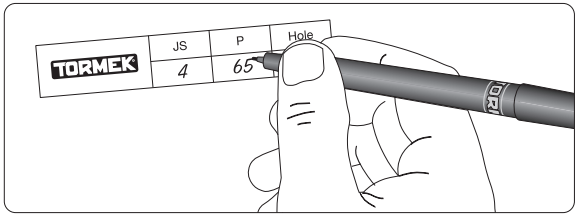
A back bent gouge is ground with the jig setting 0.



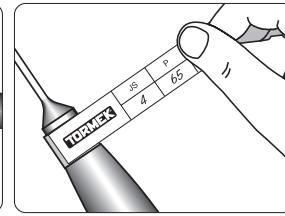
You can also grind a down bent gouge. The jig is set as shown on page 86.

Documentation of the Shape

The shape of the gouge is determined by the jig setting (JS) and the protrusion (P). Note these settings on the profile label, which comes with the jig. Now you can exactly replicate this shape at future re-sharpenings. Set the edge angle with the *Marker Method* or the *Spacer Block Method*.

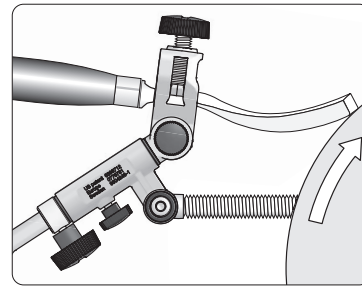


Note the jig setting (JS) and the protrusion (P) on the label. Use the water proof pen which comes with the jig.



Attach the label to the ferrule and you are assured that you have the same settings at future sharpenings.

V-tools



These tools are considered the most difficult to grind. The reason is that it has two edges joined with a radius.

However, with the method described here, you will also manage to achieve a sharp and correctly shaped edge on these tools.

The principle is the same as for carving gouges, i.e. you first give the tool its right shape and then let the line of light guide you as to where to grind.

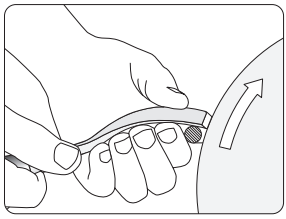
The Principle

Use the technique as described in *Sharpening Techniques for Carving Gouges and V-tools* (page 20).

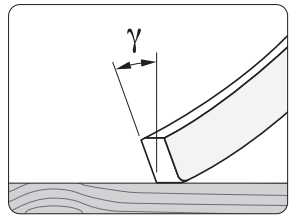
Edge Angle

As described in the chapter above on page 24, the choice of edge angle is very important for a carving gouge. The method of setting the jig for a certain angle depends on whether you want to replicate an existing edge angle or if you want to put a new edge angle on your tool.

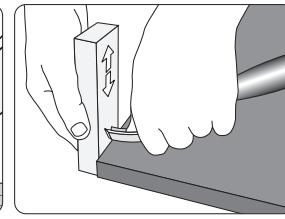
Shaping the edge



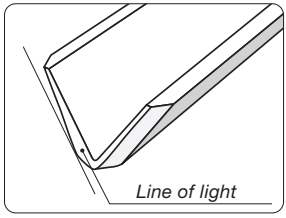
Shape the edge. Rest the tool on the Universal Support positioned horizontally.



The edge plane angle (γ) should be approx. 20° (page 21).

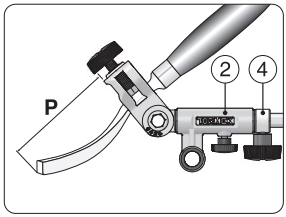


Flatten and smooth the blunt edge with the fine side of the Tormek Stone Grader, SP-650.

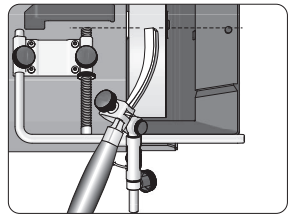


The blunt edge appears as a line of light, which is your guide as to where to grind.

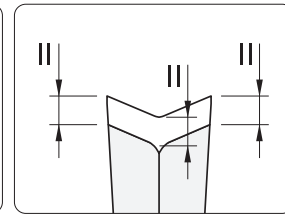
Setting the jig



Mount the tool in the jig protruding approx. 100 mm (4"). The stop ring (4) must be locked close to the sleeve (2).

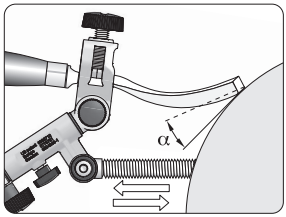


Turn the jig so one wing lies flat on the wheel. Set the jig so that the edge is approximately parallel to the axis of the wheel.

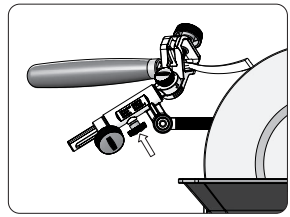


Now the jig is set to suit the shape of the tool, the edge angle will be uniform.

Setting the edge angle

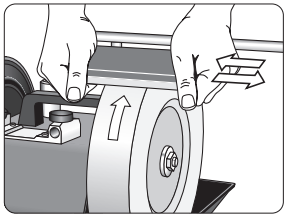


Set the edge angle by adjusting the universal support. When replicating an existing angle, use the Marker Method. When setting a new angle you can use the AngleMaster.

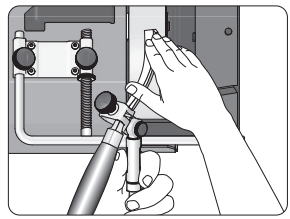


When you find the right angle, lock the jig's rotary motion using the smaller locking knob under the jig.

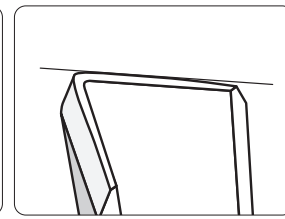
Grinding



Grade the Tormek Original Grindstone for fine sharpening with the fine side of the Stone Grader SP-650.

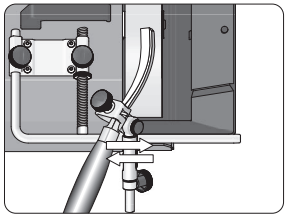


Adjust the sharpening pressure with a finger and check what sharpening is carried out. Fine adjust if necessary.

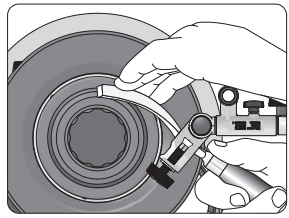


Grind parallel to the inside of the bent V-tool.

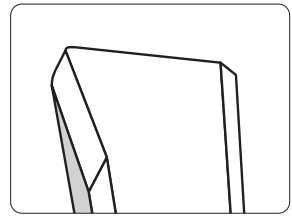
For those who have the older version of SVD-186 without the smaller locking knob, we recommend not to move the tool sideways when sharpening. Remaining in the same place on the grinding wheel gives better control.



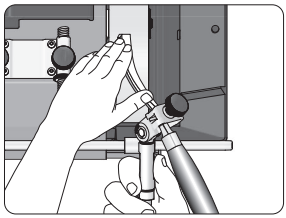
Move the tool slowly sideways.



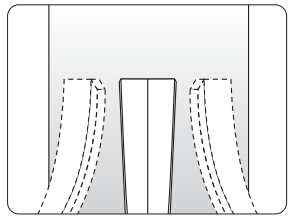
Remove the burr on the leather honing wheels so that you can better observe the line of light.



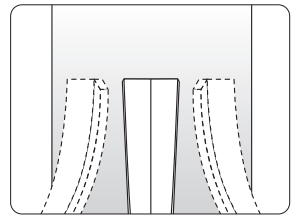
Stop sharpening immediately when the line of light disappears, which is a sign that the edge is sharp.



Now grind the other wing in the same way.



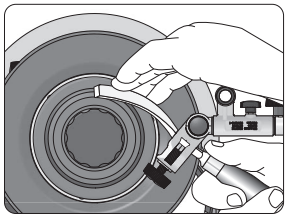
Then grind the keel. Start by loosening the locking knob.



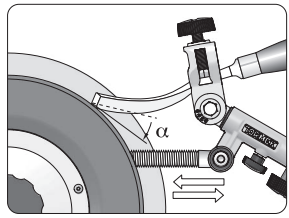
Turn the tool from side to side to equalise the grinding towards the wings.

Important *It is very easy to be misled by the burr and mistake the burr for the line of light! Therefore you must remove the burr frequently during the finishing of the grinding operation, so you clearly can watch the progress of a gradually thinning line of light.*

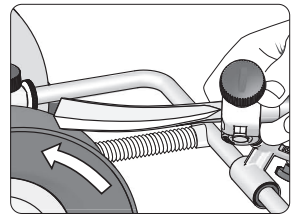
Honing

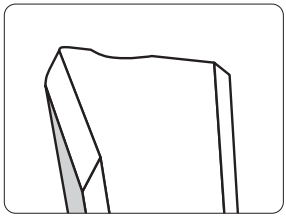


Keep the tool in the jig and hone and polish the inside on the Profiled Leather Honing wheel LA-120.

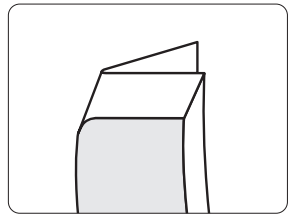


Hone and polish the bevels. Set the Universal Support so that the honing angle is the same as the grinding angle. Use the Marker Method. Hone away the burr and polish the bevels to a mirror finish.

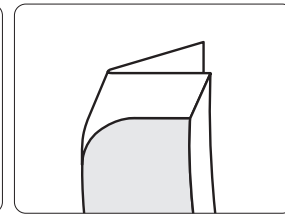




It is easy to over-grind the edge at the end of the grinding. If this happens, you need to reshape the edge and start again from the beginning.

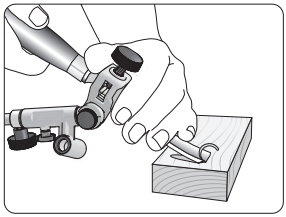


This is now how the tool should appear. The keel is slightly longer than the bevel of the wings since the steel is thicker in the centre.



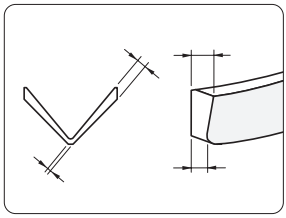
The tool cuts more easily if you round the keel. Move the Universal Support slightly towards the grindstone and grind gently while swinging the tool from side to side.

Testing the sharpness

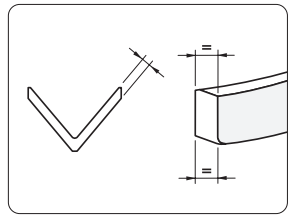


Keep the tool in the jig and test the sharpness by pushing the edge across the fibres in a piece of wood. The edge should cut easily and leave a smooth surface without tearing the fibres. If the edge needs further honing, you can continue with the same setting. When you are satisfied with the result, you remove the tool from the jig.

Uneven thickness of the steel



Uneven thickness



Even thickness

If the steel thickness varies, the length of the bevel will also vary despite the fact that the edge angle is the same. This has no influence on the function of the tool, as it depends on the edge angle. A V-tool with an even steel thickness has the same bevel length on the whole wing.

Violin Making Knives

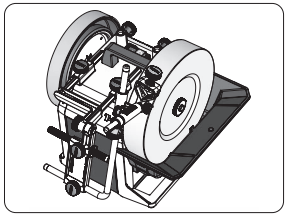
You need to use SVD-186 R, Multi Base MB-100 and one of Tormek's diamond wheels to sharpen violin making knives to a precise edge angle. This is because the violin making knives require a completely flat bevel, which is only possible when grinding on the side of the wheel. We recommend that you use the finest wheel, Diamond Wheel Extra Fine DE-250 with a grit size of 1200.

Edge angle

To sharpen violin making knives to the original angle, we recommend using Tormek's Marker method. This involves colouring the bevel with a permanent marker and then adjusting the other angle settings so the grindstone removes the colour from the bevel. You then know it is set at the right angle.

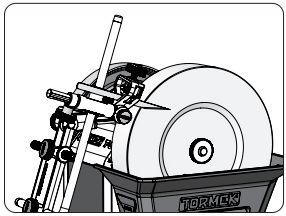
Note that the settings are virtually limitless when you use Multi Base MB-100. Experiment a little to find the setting that suits your tool.

Setting the jig

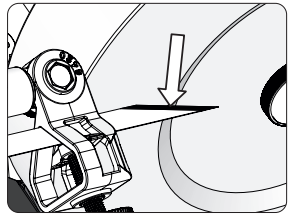


Fit MB-100 horizontally together with the universal support. Place the jig on the universal support.

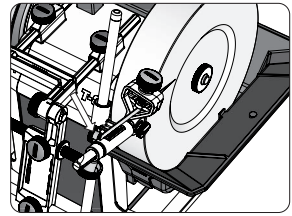
Setting the edge angle



Set the edge angle by adjusting MB-100, the universal support and the rotary motion on the jig. Note that all settings affect each other.

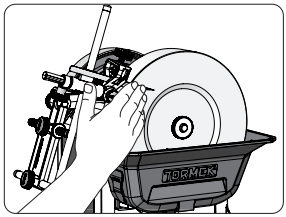


Colour the sharpening bevel with a permanent marker and place the knife against the grindstone. Pull it forwards. Adjust the angle setting until the grindstone removes the colour from the whole of the sharpening bevel.

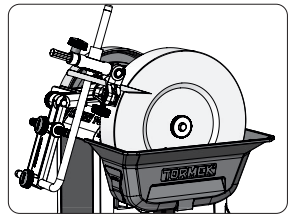


When you find the right angle, lock the jig's rotary motion using locking knob under the jig.

Grinding

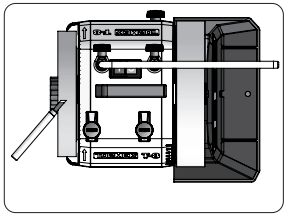


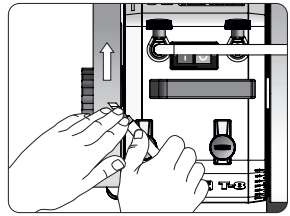
Adjust the sharpening pressure with a finger and check what sharpening is carried out. Fine adjust if necessary.



Sharpen the other side by loosening the locking knob and rotate the jig's rotary motion downwards. Adjust the settings on MB-100 and the universal support so that the sharpening bevel lies correctly against the wheel.

Honing

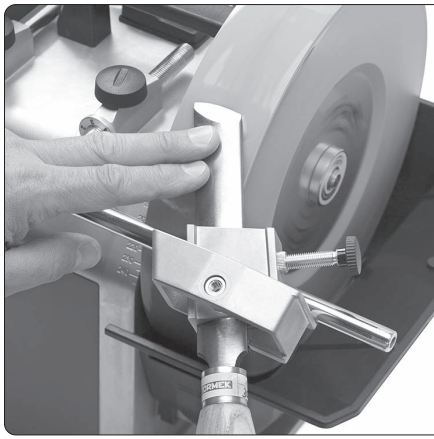




Turn the machine around. Dismount the knife. Hone and polish the bevels on the leather honing wheel. Let the entire bevel touch the leather wheel, so you hone at the same angle as at the grinding. Move the knife back and forth a few times on each side of the blade until the burr disappears.

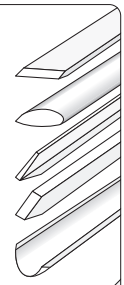
Important *Always hone in the direction of rotation (away from the edge). Place the machine as shown with the wheels running away from you and the honing wheel to the left.*

Multi Jig SVS-50



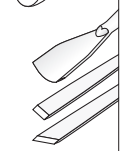
TURNING TOOLS

Square and skew chisels
with straight or curved edges.
Max width 32 mm (1¼").
Parting tools
Beading tools
Roughing gouges
Max width 50 mm (2").

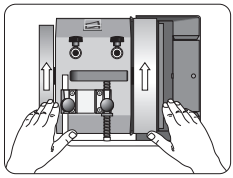


CARVING TOOLS

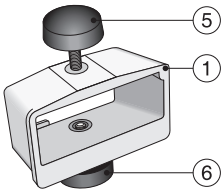
Gouges, 25–50 mm (1–2").
Straight shanked or tapered.
Square and skew chisels

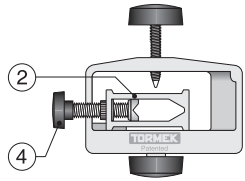


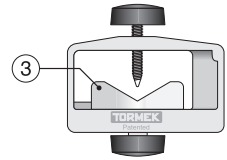
Positioning of Machine



Grinding direction:
away from the edge.





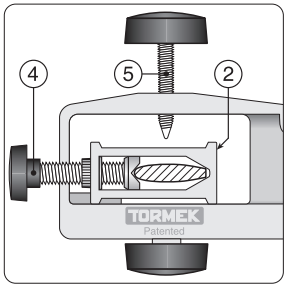


Design

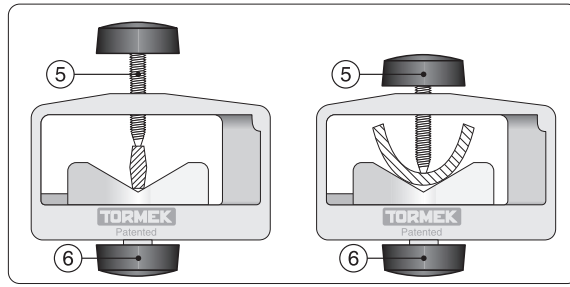
This patented jig consists of a housing (1) and two interchangeable seats – one closed, (2) and one open, (3). The seats can swivel and be locked with the screw (6) at any skew angle between 0° and 45°. Skew chisels have symmetrical bevels on both sides. With this jig you mount the tool only once for grinding both the bevels. By turning the jig upside down you can grind both of the bevels symmetrically.

The closed seat has been developed for the precision sharpening of turning skew chisels with an oval or square section and with curved or straight edges. Since the chisel is mounted in the centre of the seat, the bevels are ground to exactly the same shape. The turning skew chisel is mounted with a side screw (4). Tool size 13 mm (½") to 35 mm (1⅜"). It is also suitable for carving skew chisels longer than approx 110 mm (4¾").

The open seat, where the tool is fixed with a top screw (5), is used for tools which have the edge ground square across the shank, such as parting tools, roughing gouges and wide carving gouges. Both seats are mounted with a bottom screw (6), which also locks the chosen skew angle. A scale on each seat shows the skew angle.



The closed seat (2) is for skew chisels. The tool is fixed with the side screw (4). The top screw (5) is not used.



The open seat is designed for tools which have the edge square across the shank. The tool is fixed with the top screw in the housing (5). As the seat can be turned, it can also be used for short skew chisels.

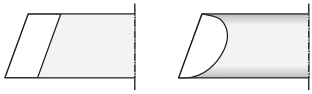
Grinding Direction

Grinding away from the edge with Universal Support placed horizontally is recommended. This gives you following advantages:

- With the lighter grinding pressure you can more easily control the operation. Especially advantageous when grinding small tools.
- As no water flows over the edge, it is easier to see where the grinding takes place.
- The rotation of the wheel pulls the jig towards the Universal Support.
- No risk of vibration.

Turning Skew Chisels

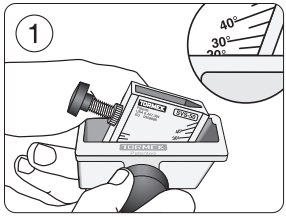
Flat or Oval with a Straight Edge



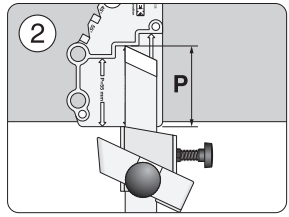
Here is shown the shaping of a flat skew, which has a rectangular section.
The oval skew is done in the same way.

You can do the initial shaping either directly on the Tormek machine or on a bench grinder using the Tormek Bench Grinder Mounting Set BGM-100 (page 29). When you need to remove a lot of steel, e.g. when decreasing the edge angle or changing the skew angle, you can use a bench grinder which removes steel faster.

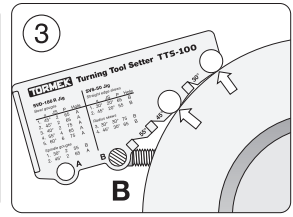
These three factors determine the geometry of a skew.



The setting of the jig to the skew angle, JS.

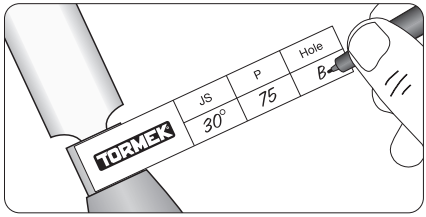


The protrusion of the tool in the jig, P.



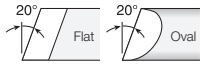
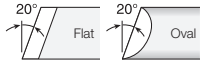
Universal Support position. Use hole B.

The Turning Tool Setter TTS-100 controls these factors. Select the profile you want from the chart on the next page and use the three factors, which will give that shape. Then note the settings on the Profile Label and put it on the ferrule. After the initial shaping you can exactly replicate your favourite shape at every sharpening in less than a minute.



Note the settings on a Profile Label and put it in on the ferrule. A set of labels comes with the jig.

Selection Chart

1	Straight edges α=30° 	**JS 20°** **P 65** **Hole B**	For tight spots, detail work and finest finish. For professional level turners.
2	Straight edges α=45° 	**JS 20°** **P 55** **Hole B**	For broad application. Easier to control than a 30° edge angle.
3	Radius edges α=30° 	**JS 30°** **P 75** **Hole B**	For tight spots, detail work and finest finish. For professional level turners.
4	Radius edges α=45° 	**JS 30°** **P 65** **Hole B**	For broad application. Easier to control than a 30° edge angle.

These geometries, i.e. the shape and edge angle, are recommended by experienced woodturners and recognized woodturning workshops around the world, e.g. Glenn Lucas Woodturning in Ireland, Nick Agar's "Turning Into Art" in the UK and Drechselstube Neckarsteinach in Germany.

Since a skew can have an unlimited number of combinations of skew angles, shapes and edge angles, a new tool has a more or less a different shape than any of the shapes on the chart. Therefore, you first need to shape your tool to one of the shapes on this chart. Then the following sharpenings will be an easy task and done in less than a minute.

Note *Stick to the shape you have selected and do not switch from one shape to another. Then you will get the full benefit of the Tormek TTS-100 Setter, since you can instantly replicate exactly the same shape every time. Should you need a different shape, then buy another tool and grind it to your alternative shape. This way of working will give you more time for turning and fewer interruptions for shaping and sharpening.*

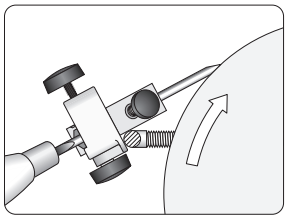
Tip *Like many professional turners you should put a curve on the edge. This is easily done with the SVS-50 jig (page 104). Shaping a skew with a curved edge is faster since the reduced area in contact with the wheel results in a higher grinding pressure.*

Position of the Universal Support

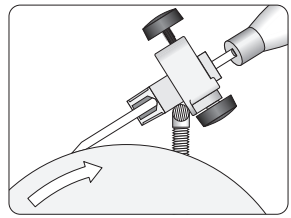
You can work with the Universal Support placed either horizontally with the wheel running away from the edge or vertically so the wheel runs towards the edge.

In the horizontal position the rotation of the grinding wheel pulls the jig towards the Universal Support. In the vertical position, the grinding pressure is increased by the rotation of the wheel but you must watch that you keep pressing the jig firmly towards the Universal Support to ensure that the edge does not catch the wheel.

In this instruction, we show the horizontal position. When much steel needs to be removed for the initial shaping, you could beneficially work with the Universal Support placed vertically. For future sharpenings, you should always work in the horizontal position so the rotation of the wheel pulls the jig towards the Universal Support and that you eliminate the risk that the edge catches into the wheel.



Horizontal mount. The wheel runs away from the edge.

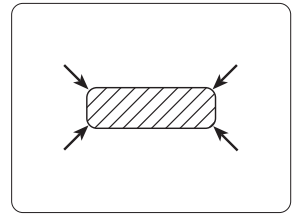


Vertical mount. The wheel runs towards the edge.

Round Off the Corners On a Flat Skew

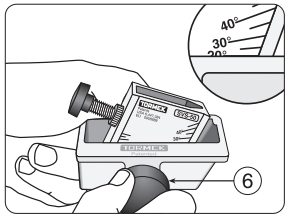
Before shaping a *flat* (rectangular) skew for the first time, you should for two reasons, check that the corners are rounded off. Firstly, the tool works more smoothly on your lathe tool rest and secondly the skew lines up more easily in the seat of the jig.

The rounding off can be done on your Tormek machine. You can even polish the surfaces on the honing wheel for the lowest possible friction on the tool rest of your lathe.

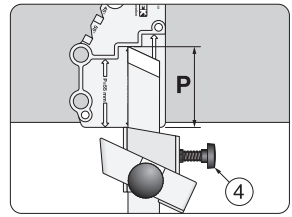


A flat skew should have rounded off corners.

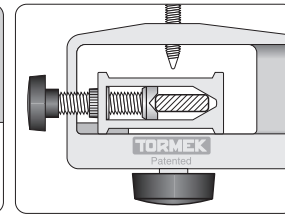
Settings



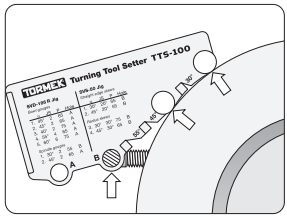
Set the jig and lock the position securely with the bottom screw (6).



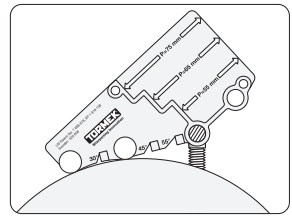
Mount the tool. Lock with the side screw (4).



Check that the tool is aligned so the shape later on will be exactly replicated.



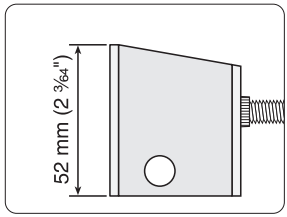
Horizontally



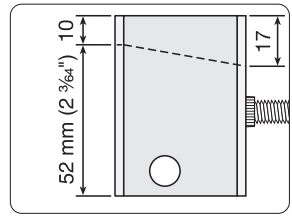
Vertically

Set the Universal Support. You can work with the Universal Support mounted either horizontally or vertically (page 100). Use the inner hole of the setter. Both metal discs must touch the grinding wheel.

The closed seat



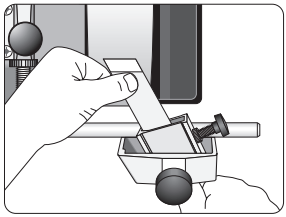
Current design



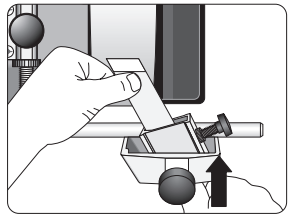
Earlier design

This seat has been re-designed (2006). It is now 10 mm shorter and also slanted in order to permit the sharpening of shorter tools. If you have the longer seat, you should trim it to 52 mm (2 3/64").

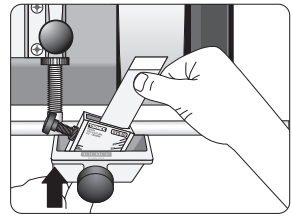
Shaping



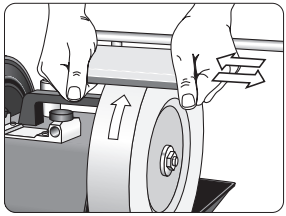
Lift the tool and then move it sideways during the sharpening. Do not slide the tool. Press with your thumb close to the edge.



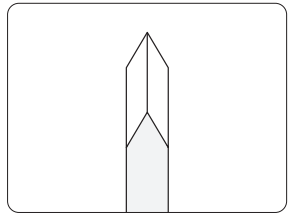
Apply forward pressure on the handle side to compensate for the force of the wheel against the tool.



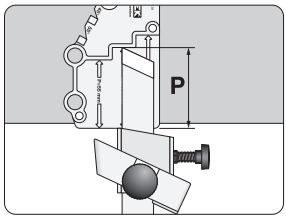
Turn the jig around and shape the other side. Apply forward pressure on the handle side.



Activate the grindstone during the grinding process with the coarse side of the Stone Grader SP-650.

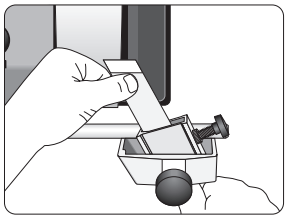


Grind until the bevels are symmetrical. If necessary grind the first side again.

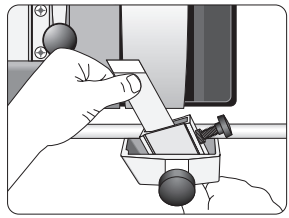


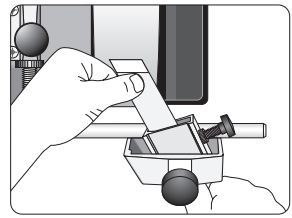
When the desired shape is achieved, check that the protrusion has not decreased during the shaping. If so, re-position the tool to the right protrusion and then complete the shaping. By doing so, you ensure that you will exactly replicate the edge geometry at future sharpenings.

Shaping wide chisels



When shaping a wide chisel, you can increase the efficiency of the stone by grinding half the width at a time. The grinding pressure will increase, which makes the stone grind faster.

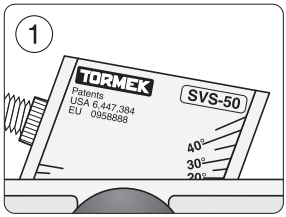




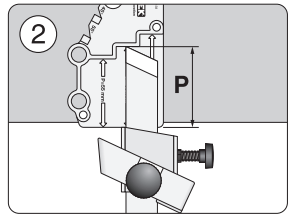
Complete the sharpening with the entire bevel on the wheel. Lift the tool to move it sideways.

Sharpening

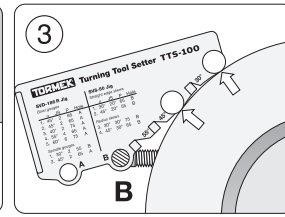
Once you have created the shape of the edge it is an easy task to quickly re-sharpen the tool. Do the three settings noted on the Profile Label carefully and you will obtain exactly the same shape every time even when the stone wears and decreases in diameter.



Set the jig, JS.

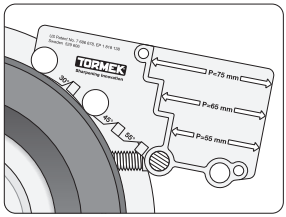


Mount the tool with a fixed protrusion, P.

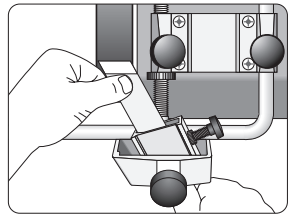


Set the Universal Support. Use hole B.

Honing



Move the Universal Support to the honing wheel and position identically with the Setter.



Hone both the sides alternately until the burr is removed and the bevels are polished to a mirror finish.

Flat or Oval Skews with a Curved Edge

You can put a curved (convex) edge on both your flat and oval skews. You pivot the jig with the tool on the Universal Support to create the curve. This curved edge has certain advantages and has been popularized amongst others by the Australian professional woodturner Richard Raffan. He prefers a slightly curved edge, which is shown in full scale on the next page.

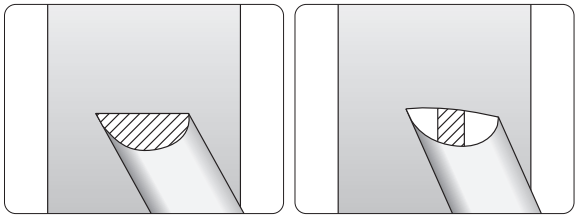
To achieve this shape, you need to set the SVS-50 jig on 30° instead of 20° for the straight edge shape. Even here, you will need to remove quite a bit steel, which can take 10–20 minutes depending on the original shape. But again, this is a once only task, from which you will benefit at future sharpenings.

Since the contact area against the grindstone on a convex edge is smaller than on a plain edge, the resulting grinding pressure is higher when applying the same force on the tool. (The grinding pressure is the force you apply onto the tool divided by the grinding area.)

A certain grinding pressure is required to maintain an active grindstone surface so it does not become glazed. When shaping or sharpening a skew chisel with a straight edge, which has a large grinding area, you therefore need to re-activate the grindstone frequently with the Stone Grader SP-650.

Since the grinding pressure is higher – even with the same force applied on the tool – on a skew with a convex edge, the grindstone activates itself and therefore grinds more effectively. This is why a skew with a convex edge is shaped faster than a skew with a straight edge.

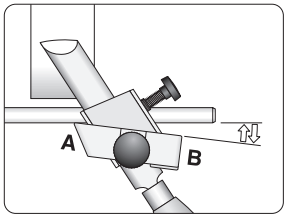
Grinding area and grinding pressure

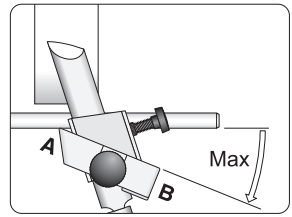


Straight edge. Large grinding area. Same as the entire grinding bevel. Low resulting grinding pressure. Grindstone requires activating.

Convex edge. Smaller grinding area. Higher resulting grinding pressure. The grindstone works more effectively.

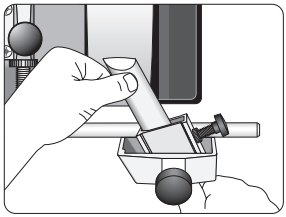
Principle of creating the curve



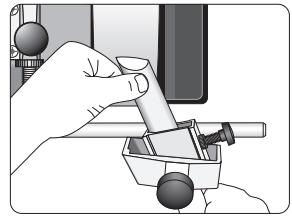


Pivoting the jig on the bevelled corner of the jig (A) creates the curve. Do not turn the jig more than the max. shown so the seat rests on the Universal Support all the time.

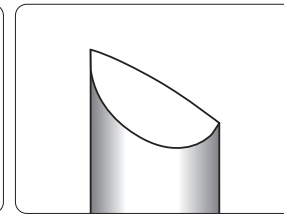
Shaping and sharpening



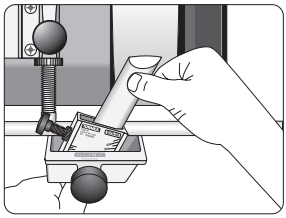
Pivot the jig so you create the shape of the edge.



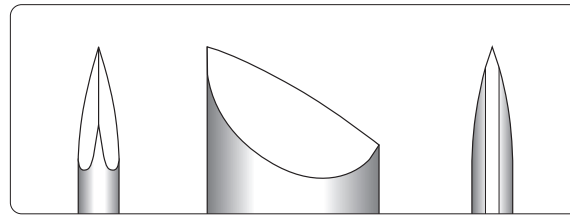
Watch that you do not grind too much on the long point.



This is a suitable shape (full scale) for a 19 mm (¾") oval skew.

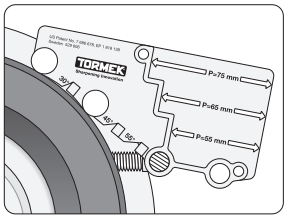


Turn the jig around and shape the other side.

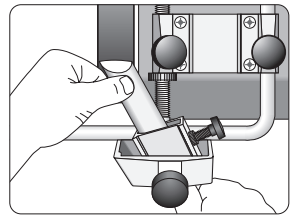


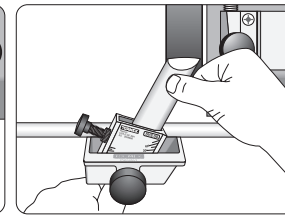
Grind until the bevels are symmetrical. If necessary, grind the first side again.

Honing



Move the Universal Support to the honing wheel and position identically with the Setter.



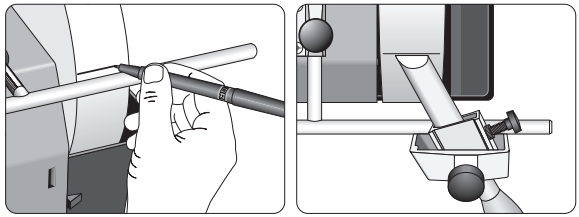


Hone both the sides alternately until the burr is removed and the bevels are polished to a mirror finish.

Customized Profiles

You can also sharpen skews with different geometries other than the standard shapes provided by the TTS-100 Setter. This is the way you can replicate an existing edge geometry on a skew with a straight edge.

1. Mount the tool with a 65 mm protrusion using the TTS-100 Setter.
2. Set the skew angle as shown below.



- Set the edge angle with the Universal Support. Use the *Marker Method* (page 41).

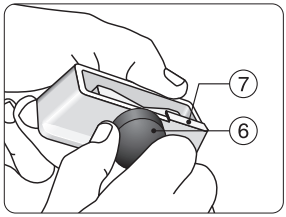
3. Note the protrusion (P) and the jig setting on the recipe label, which comes with the jig. Put the label on the ferrule. Protect it with clear varnish.

When resharpening the edge angle, you should use the *Spacer Block Method* (page 41).

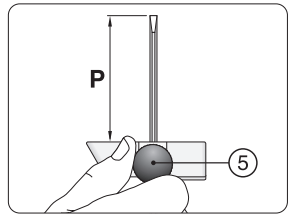
Tip *If the geometry does not differ too much from the shapes the TTS-100 offers, you should consider changing the shape to the TTS-100 shape for easier replication in the future.*

Parting and Beading Tools

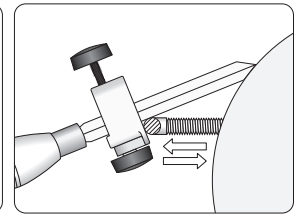
The Open Seat is Used 



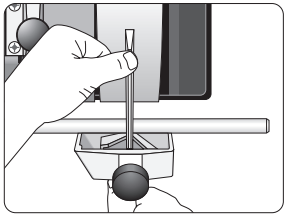
Lock the seat with the bottom screw (6) in the straight position (0°). The seat should touch the stop (7).



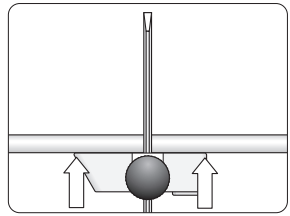
Mount the tool protruding (P) 75–100 mm (3–4") and lock it with the top screw (5).



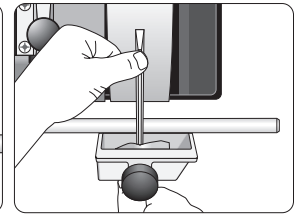
Set the edge angle by adjusting the Universal Support. When replicating an existing angle, use the Marker Method, (p 41).



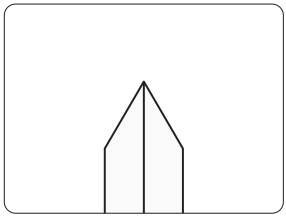
Press with your fingers close to the edge for best control while your other hand ensures that the tool is vertical.



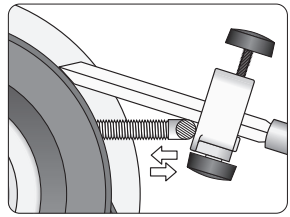
Ensure that the entire flange of the jig is in contact with the Universal Support.



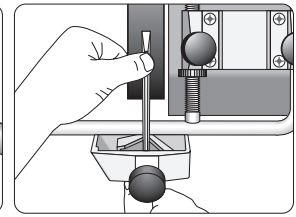
When the first side is ground then turn the tool around and grind the other side.



Grind until the bevels are symmetrical. If necessary grind the first side again.

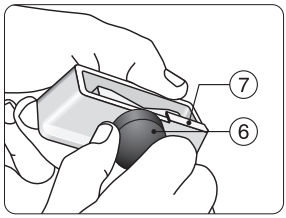


Honing. Move the Universal Support to the honing wheel side and hone the bevels with the tool still mounted in the jig. Set the Universal Support so that you get the same honing angle as the grinding angle. Use the Marker Method.

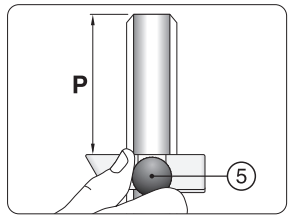


Roughing Gouges

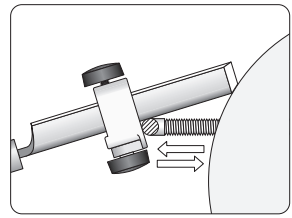
The Open Seat is Used 



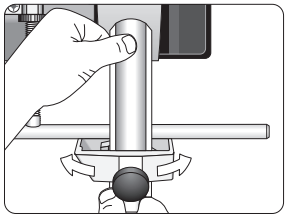
Lock the seat with the bottom screw (6) in the straight position (0°). The seat should touch the stop (7).



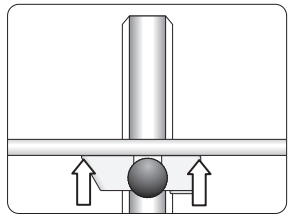
Mount the gouge protruding (P) 75–100 mm (3–4") and lock it with the top screw (5).



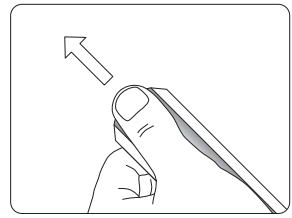
Set the edge angle by adjusting the Universal Support. When replicating an existing angle, use the Marker Method, (p 41).



Roll the gouge on the Universal Support while you slide it across the stone so that the wheel wears evenly.

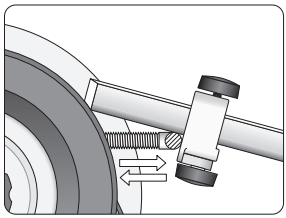


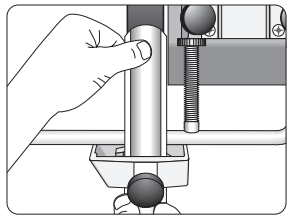
Ensure that the entire flange of the jig is in contact with the Universal Support.



Grind until you can feel the burr along the entire edge.

Honing





Move the Universal Support to the leather honing wheel. Hone and polish the bevel with the tool still mounted in the jig. Set the Universal Support so that you have the same honing angle as the grinding angle. Use the Marker Method.

Carving Gouges with a Straight Shank

The Open Seat is Used

The Principle

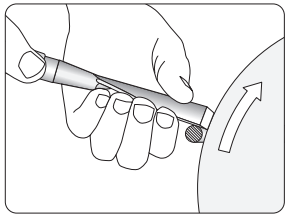
Use the technique as described in the chapter *Sharpening Techniques for Carving Gouges and V-tools* on page 20.

Edge Angle

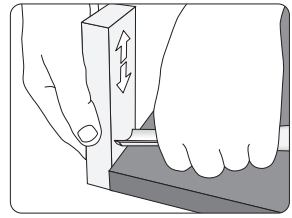
As described in the chapter above on page 24, the choice of edge angle is very important for a carving gouge. The method of setting the jig for a certain angle depends on whether you want to replicate an existing edge angle or if you want to put a new edge angle on your tool.

When replicating an existing edge angle, you should use the *Marker Method*, which is described on page 41. If you want to put a new edge angle to your tool, you can either set the angle by eye or you can use the AngleMaster (page 142).

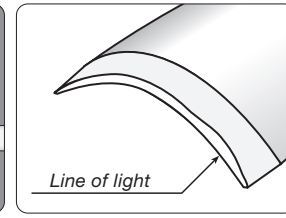
Shaping the edge



Shape the edge by resting the tool on the Universal Support placed horizontally and close to the wheel.

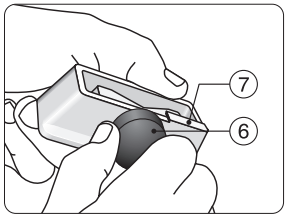


Flatten and smooth the blunt edge with the fine side of the Tormek Stone Grader, SP-650.

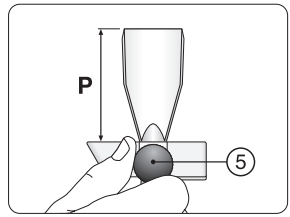


The blunt edge now appears as a line of light, which is your guide on where to grind.

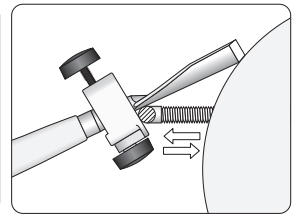
Mounting the tool and setting the jig



Lock the seat with the bottom screw (6) in the straight position, (0°). The seat should touch the stop (7).

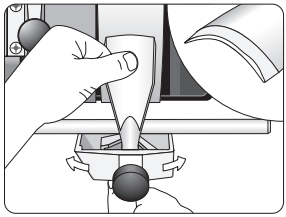


Mount the gouge protruding (P) 75–100 mm (3–4") and lock it with the top screw (5).

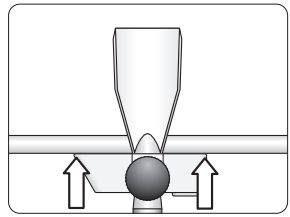


Set the edge angle by adjusting the Universal Support. When replicating an existing angle, use the Marker Method.

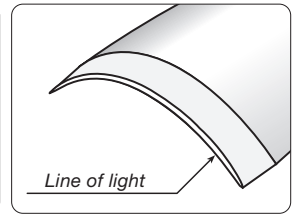
Grinding



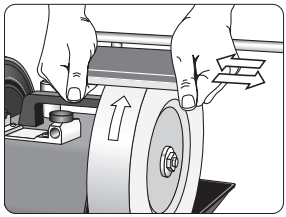
Always grind where the line of light is thickest whilst rolling the tool on the Universal Support.



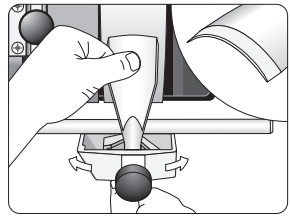
Ensure that the entire flange of the jig is in contact with the Universal Support.



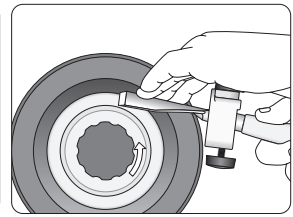
Check frequently where the grinding is taking place. Grind until you have a thin and even line of light.



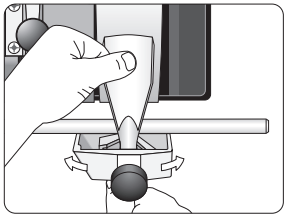
Grade the grindstone for fine sharpening with the fine side of the Stone Grader SP-650.



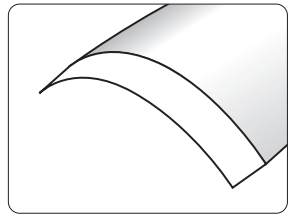
Continue grinding. Check the result frequently.



Remove the burr on the leather honing wheels so that you can more clearly observe the line of light.

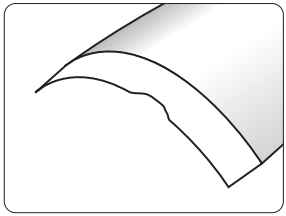


Now sharpen again with a very light pressure. Check frequently to ensure that you do not over-grind.

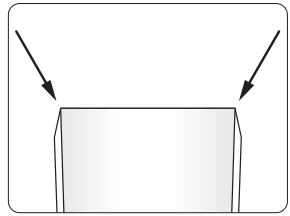


Stop sharpening immediately when the line of light disappears, which is a sign that the edge is sharp.

Important *It is very easy to be misled by the burr and mistake the burr for the line of light! Therefore you must remove the burr frequently during the finishing of the grinding operation, so you clearly can watch the progress of a gradually thinning the line of light.*

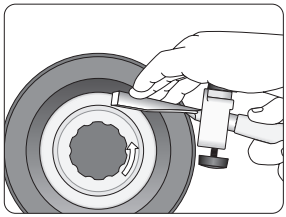


It is easy to over-sharpen the edge at the end of the process. If this happens, you need to re-shape the edge and start again from the beginning.

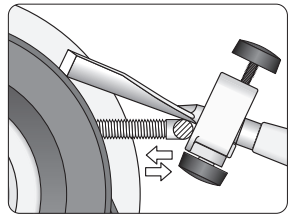


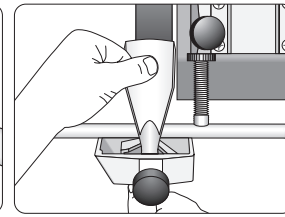
Be careful when you grind at the sides of the tool so that you do not round off the corners. Woodcarving tools should have sharp corners!

Honing



Keep the tool in the jig and hone and polish the inside on the Profiled Leather Honing Wheel LA-120.





Hone and polish the bevel. Set the Universal Support so that the honing angle is the same as the grinding angle. Use the Marker Method. Hone away the burr and polish the bevel to a mirror finish.

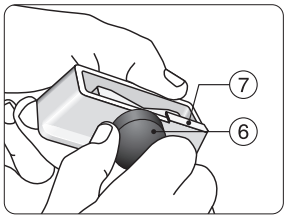
Testing the Sharpness

Keep the tool mounted in the jig and test the sharpness. Push the edge across the fibres in a piece of wood. The edge should cut easily and leave a smooth surface without tearing the fibres. Since the tool is still mounted in the jig and the Universal Support is left in its position, you can if necessary easily go back and continue the honing.

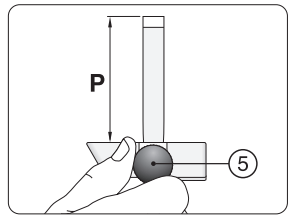
Square Carving Chisels

The Open Seat is Used

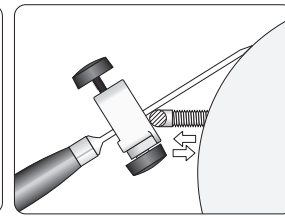
The min length of blade for this jig is approx 100 mm (4") at 25° edge angle. For shorter blades, down to 75 mm (3"), you use the SVS-38 jig (page 68).



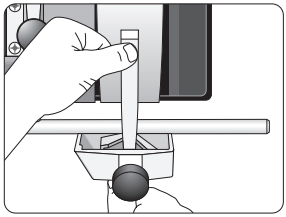
Lock the seat with the bottom screw (6) in the straight position (0°). The seat should touch the stop (7).

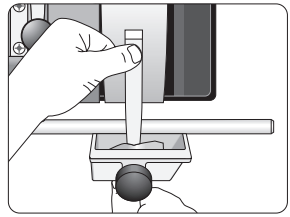


Mount the chisel protruding (P) min 100 mm (4"). Lock with the top screw (5).

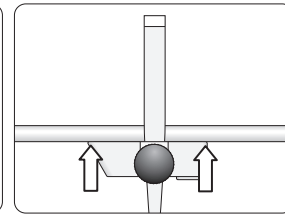


Set the edge angle by adjusting the Universal Support. When replicating an existing angle, use the Marker Method.

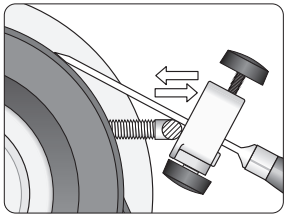


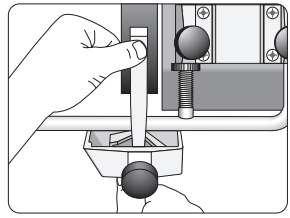


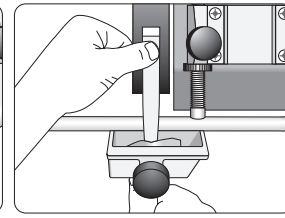
Sharpen the first side. Press with your thumb close to the edge for best control. Lift the tool and then move it sideways so that the wheel wears equally. When a burr has developed on the entire edge, turn the jig around and sharpen the other side.



Ensure that the entire flange of the jig is in contact with the Universal Support.

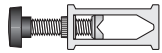






Honing. Keep the tool in the jig and move to the leather honing wheel. Set the Universal Support so that the honing angle is the same as the grinding angle. Use the Marker Method. Hone away the burr and polish the bevels to a mirror finish.

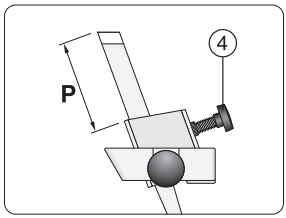
Carving Skew Chisels

The Closed Seat is Used 

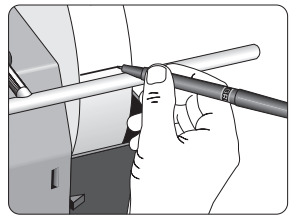
These tools are manufactured with a skew angle of approx. 25°. You can sharpen your chisel either with the existing skew angle or you can shape it to a new skew angle of your choice.

For using this jig the chisel must have a certain min. length, which depends on the edge angle and the skew angle. At a 25° edge angle and a 25° skew angle the min length of blade is approx. 105 mm (4⅛"). The shape of the shank must also be able to be locked in the seat, otherwise use the open seat.

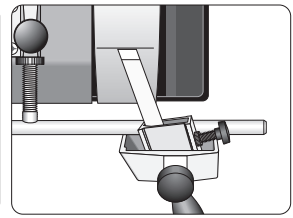
Setting the existing skew angle



Mount the tool protruding (P) 50–75 mm (2–3") and lock it with the side screw (4).

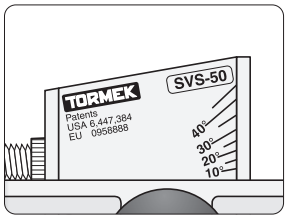


Mark a line across the wheel guided by the Universal Support. Use a water proof pen or a pencil if the wheel is wet.

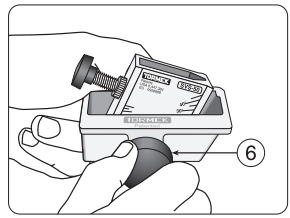


Put the tool on the Universal Support and turn it until the bevel is parallel to the line. Tighten the bottom screw (6).

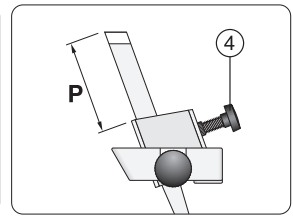
Setting a new skew angle



A scale on the seat enables you to set the desired skew angle.

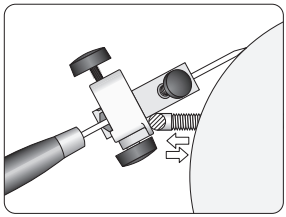


Lock the position with the bottom screw (6).



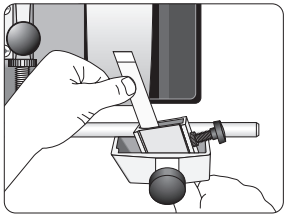
Mount the tool protruding (P) 50–75 mm (2–3") and lock it with the side screw (4).

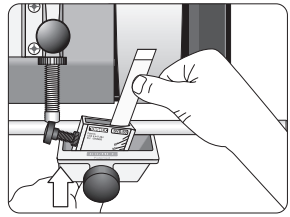
Setting the edge angle



Set the edge angle by adjusting the Universal Support. When replicating an existing angle, use the Marker Method. When setting a new angle you can use the AngleMaster.

Grinding

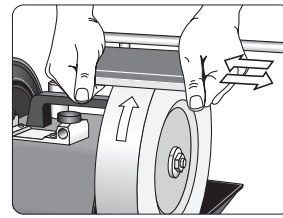




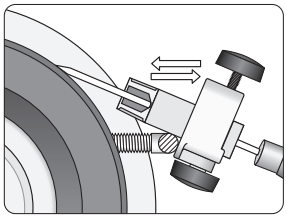
Grind the first side. Press with your thumb close to the edge for the best control. Lift the tool and then move it sideways. When a burr has developed on the entire edge, turn the jig around and grind the other side.

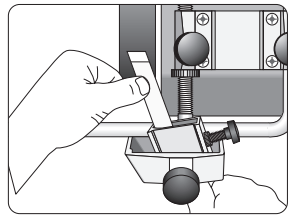
Grindstone Condition

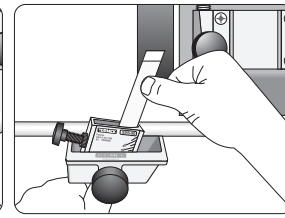
Usually carving chisels only need fine sharpening. Therefore you normally grade the grindstone to a finer grit with the Stone Grader SP-650 (page 140). When you need to *shape* the chisel, you use the normal fast grinding condition of the grindstone.



Honing

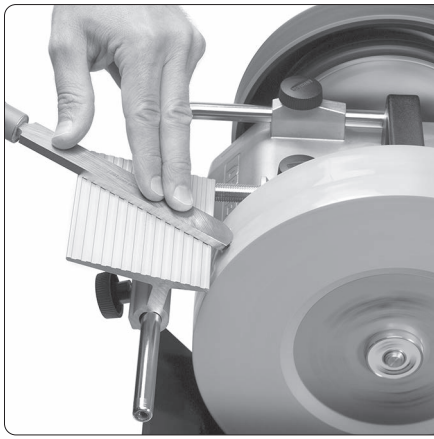






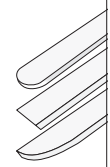
Keep the tool in the jig and move to the leather honing wheel. Set the Universal Support so that the honing angle is the same as the grinding angle. Use the Marker Method. Hone away the burr and polish the bevels to a mirror finish.

Tool Rest SVD-110

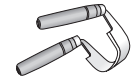


TURNING SCRAPERS

Round nose
Square end
Curved



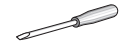
CARVING SCORPS
AND INSHAVES



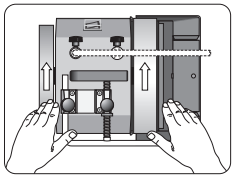
CABINET SCRAPERS

HOLLOWING TOOLS

SCREW DRIVERS



Positioning of Machine



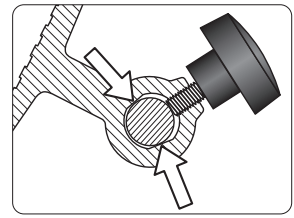
Grinding direction: away from or towards the edge.

Design

This Tool Rest is ideal for the grinding of turning scrapers and special tools for woodcarving, e.g. large scorps and inshaves. Also for cabinet scrapers and hollowing tools.

It has a generous surface, 90×110 mm (3½"×4¼"), which permits a safe and steady positioning of the tool towards the wheel.

The bore is made with a special wedge shape, which increases the locking force by 250 %. You can lock the Tool Rest instantly at the chosen angle. This unique design is patented by Tormek.



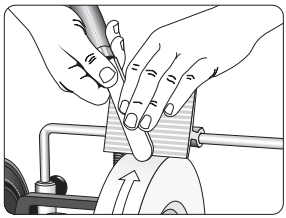
In the patented design, the sides of the tapered bore touch the round bar – not the bottom. This means that the locking action increases by as much as 250 %!

Turning Scrapers

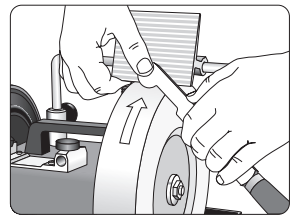
Scrapers normally come from the manufacturers with an edge angle between 70° and 80°. Some turners prefer a much smaller angle and they re-grind their tools to a 60° edge angle or even smaller. Scrapers are best ground *towards* the edge with the Universal Support in the vertical position. The rotation of the grinding wheel helps to press the tool onto the Tool Rest.

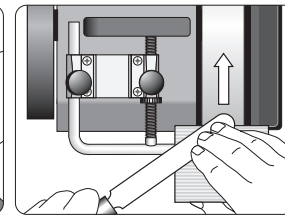
At steeper edge angles there is a risk of vibration when grinding *towards* the edge. If you want to keep the original large edge angle, you should grind *away from* the edge with the Universal Support placed in the Horizontal Base XB-100. Round off the heel of the bevel and you will reduce the risk that the tool will be pulled up by the wheel.

Recommended positioning of the Universal Support



Vertically for edge angles up to approx. 60°.





Horizontally for edge angles larger than approx. 60°.

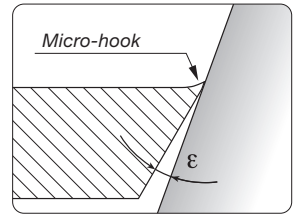
Keep the Burr or Ticket the Edge?

A scraper removes the wood by scraping instead of cutting unlike all other tools. A scraping action is a tough treatment of the wood. The fibres are pulled out of the wood leaving a rough surface, which therefore needs a lot of sanding. Often people do not hone away the burr as it works as a kind of cutting edge on the top of the large edge so causing the tool to “almost cut”.

The burr, which is left from dry grinding at high speed, consists of a sintered (melted) mixture of steel waste and abrasives from the grinding wheel as well as the steel which has been pushed upwards by the grinding wheel. The sintered mixture will soon be worn away when you start turning. What is left is the residual edge and this cuts the wood. You could argue that the burr changes the action of the scraper causing it to work as a cutting tool.

However the burr is very uneven and coarse and it is obvious that it cannot be durable. You therefore need frequent re-grindings to make new burrs. This is a drawback as it takes time from your turning and it shortens the life time of your tool. Another drawback is that the particles removed from the burr, i.e. the mixture of steel and abrasives, can get stuck in the wood and cause further wear of the edge. The burr, which is left after water cooled grinding at low speed does not contain any loose particles. It is just pure steel and is therefore smoother and sharper and also more durable.

There is an even better method to make a scraper work as a cutting tool. If you press with a hard steel rod towards the bevel at an angle (ε) of approx. 5°, the tip will be bent upwards creating a micro-hook. The pressure from the rod compresses the steel, smoothens the small scratches from the grindstone and makes the hook shiny.



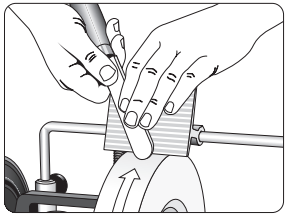
Ticketing the edge. The tip of the edge is pressed upwards forming a small edge hook. (Here enlarged.)

The result is an even, sharp and durable micro-hook or a cutting edge. The method is called ticketing (or burnishing) and gives you a far better and more durable hook than a burr. When using the ticketing method, you should grind the bevel as evenly and finely as possible and also hone the bevel as well as the top face. Then you get a sharper and more durable cutting edge.

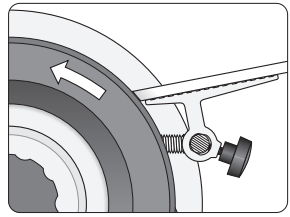
There are special ticketing or burnishing tools available on the market, but you can also do the ticketing by using a 12 mm (½") bowl gouge. Clamp the scraper in your workbench vice so you can hold the bowl gouge steadily with both hands.

You must not ticket too heavily so the hook tends to be bent backwards. The tip of the hook must point upwards to work. You should also adjust the pressure according to the edge angle. A scraper with a large edge angle (70–80°) requires a larger pressure than one with a smaller edge angle.

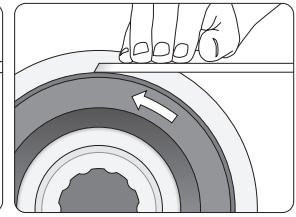
Grinding and honing



Grind towards the edge using the Tool Rest fitted on the Universal Support placed vertically.

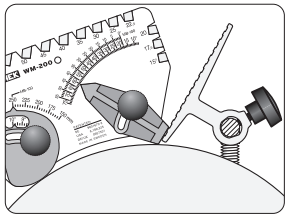


Move the Universal Support and the Tool Rest to the honing wheel. Hone the bevel at the same angle as at the grinding.

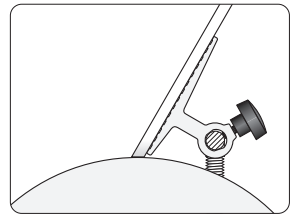


Hone away the burr and polish the top face. Hold the tool as a tangent to the wheel.

Edge angle

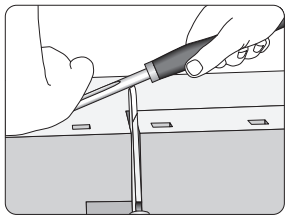


If you grind a new tool you should change the edge angle to 60° or less. The AngleMaster is an aid to set the Tool Rest.

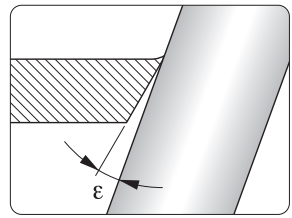


If you are satisfied with the existing edge angle, set to exactly the same angle and the sharpening is completed quickly.

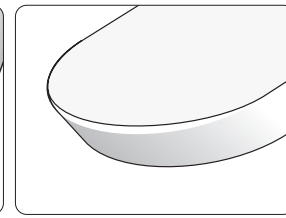
Ticketing



Clamp the scraper in your workbench and press with an HSS bowl gouge. Support your left hand on the bench.

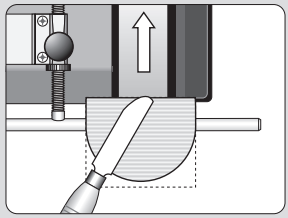


Press the gouge on the bevel at an angle (ε) of approx. 5°.



You can clearly see how the ticketing compressed the tip of the edge to a smooth and shiny surface.

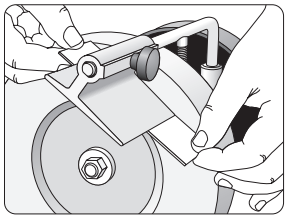
The function of the scraper depends on how large a hook you put on the edge. The size and shape of the hook depends on the edge angle of the scraper, the ticketing angle (ε) and how hard you press the ticketing tool. You should not put a too large hook on the scraper, as the tool then is difficult to control and you can get digs. Remember that you now have a cutting tool instead of a scraper!



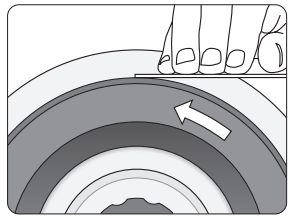
Tip *The jig is made with a large supporting surface for good control even when grinding long tools. For short tools, you can trim the jig surface as necessary to clear the handle.*

Cabinet Scrapers

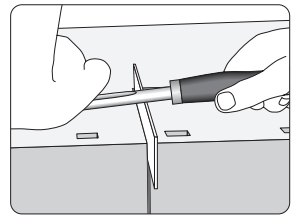
Straight and curved cabinet scrapers are easily squared on the machined outside flat surface of the grinding wheel. Hone away the burr carefully on the Leather Honing Wheel. Create the micro hook using a burnishing or ticketing tool.



Keep the scraper in close contact with the rest while sliding it back and forth so you use most of the area of the wheel.



Hone away the burr on both sides. Hold the scraper as a tangent to the Leather Honing Wheel.

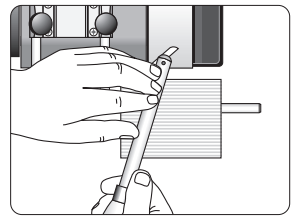


Clamp the scraper in your workbench and press with a hard steel rod or burnishing tool along the edge to create a micro hook.

Note *Use a light pressure only at the burnishing and do 5–8 strokes. Apply grease or thick oil so that the rod runs smoothly.*

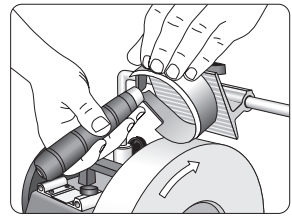
Hollowing Tools

1. Mount the tip on the shank as shown. Position the Tool Rest as closely as possible to the wheel.
2. Set the edge angle by adjusting the Tool Rest.
3. Hold the fingers closely to the grinding wheel and press downwards ensuring that the shank stays in contact with the Tool Rest. Follow the shape of the tip.



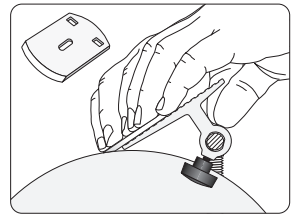
Scorps and Inshaves

These woodcarving tools are ground with the Universal Support positioned in the vertical sleeves. Position the tool as shown in the pictures. Rest the flat, back surface on the Tool Rest and the rotation of the grinding wheel will help to press the tool towards the Tool Rest.

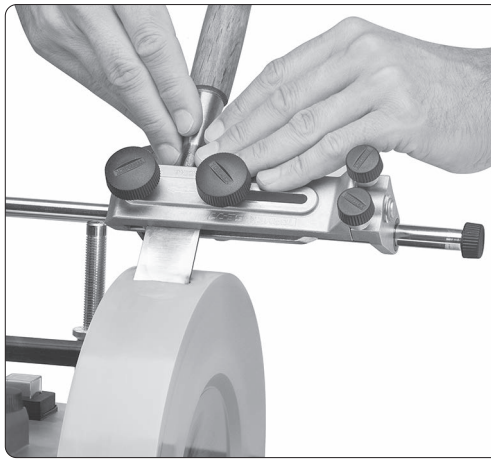


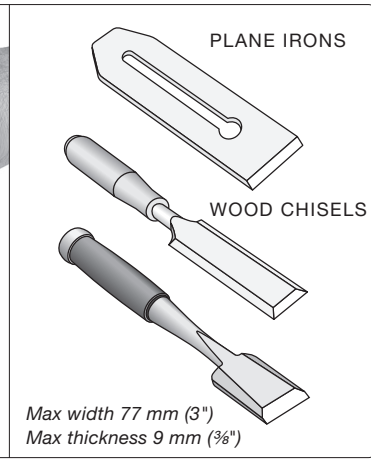
Spoke Shave Blades

Place the Tool Rest as shown. The rotation of the wheel helps to press the tool towards the Tool Rest.



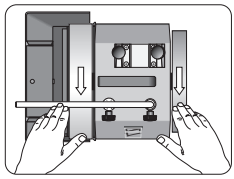
Square Edge Jig SE-77



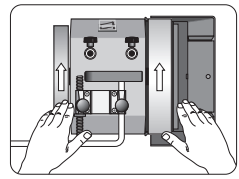


SE-77 is a further development of SE-76. The jig now has an adjustable side.

Positioning of Machine



Grinding direction: Towards the edge.



Honing direction: Away from the edge.

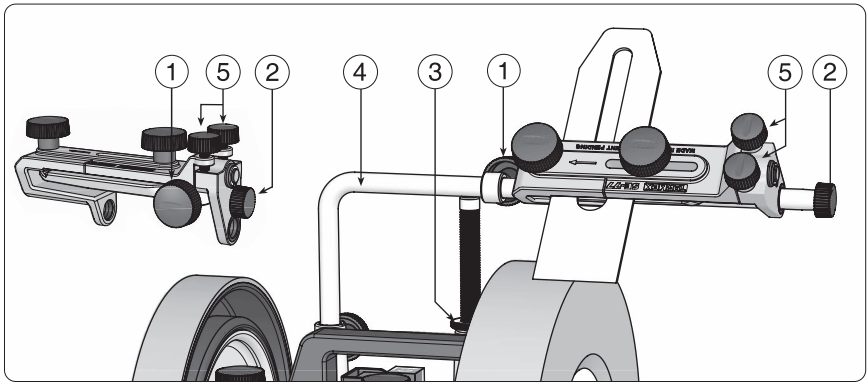
Design

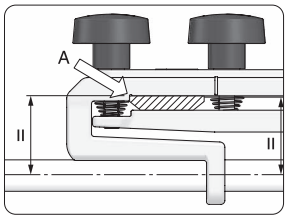
See illustration on the next page. The jig comprises an upper base with a lower clamp and two locking knobs for fixing the tool. The jig slides on the Universal Support on nylon bushings across the grinding wheel. The edge angle is set with the Micro Adjust (3) on the Universal Support (4).

There are two safety stops to prevent the tool from slipping off the wheel when grinding. One inner stop (1) to be positioned according to the width of the tool and one outer stop (2) mounted on the end of the Universal Support.

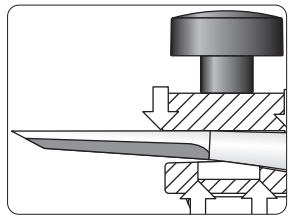
The jig lines up the chisel to its upper flat side, making it easier to mount it correctly (not twisted). Conventional jigs need manual alignment.

The lower clamp has a ridge in the centre enabling shorter tools with a tapered shank to be firmly mounted, e.g. Japanese chisels. The upper base, which lines up the tool, is designed so the clamping pressure is distributed to the ends and the tool mounts firmly without a heavy tightening of the knobs.

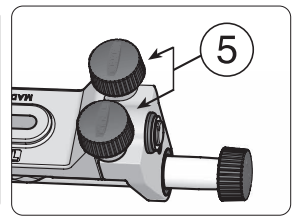




The jig lines up the chisel to its upper and flat side. Thanks to the shoulder (A) it is easy to mount the tool correctly at 90°.

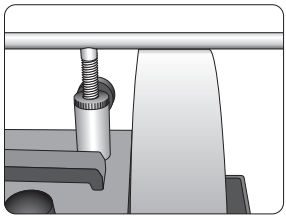


The clamping pressure from the ridge in the centre is distributed to the edges. This gives a firm mounting, even with tapered chisels.

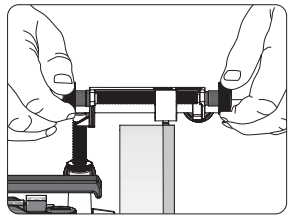


SE-77: The two smaller adjustment screws (5) are used if you need fine adjustment to achieve a 90° angle, or if you want a slightly convex shape (page 126).

Preparations



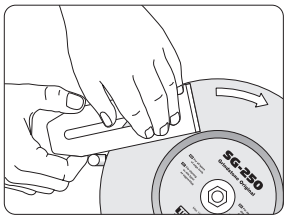
Before you start grinding, check that the stone is true by letting the Universal Support touch the stone.



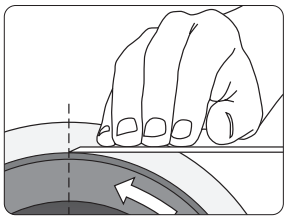
If necessary, true it with the Truing Tool TT-50 so the surface is flat and parallel to the Universal Support.

Flatten and hone the back of the tools

To achieve a really sharp and durable edge, both of the two converging surfaces must be smooth. If we sharpen and hone the bevel to perfection but the back is not equally flat and smooth, you will never achieve a satisfactory result. On most new tools, the back has visible grooves from the manufacturing process. These should be removed and the surface honed and polished. This work only needs to be done once, when you start using the tool. It is a good investment in your quality tool and will last its lifetime.

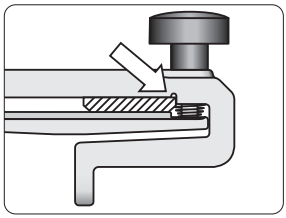


Carefully position the tool against the wheel. The edge must not touch the wheel before the heel! Flatten the back of the tool by holding it flat to the grinding wheel while moving it slightly. Otherwise the tip can cut into the wheel and be rounded off. Let the side of the tool rest on the Universal Support, which should be placed close to the wheel as shown. You do not need to smooth the tool more than 25–30 mm (1–1¼") from the edge.



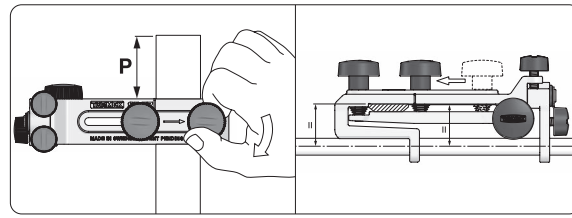
Working freehand, hone and polish the surface on the leather honing wheel. Hold the tool so it is a tangent to the wheel.

SE-77 and SE-76



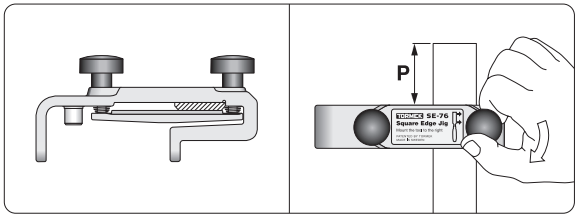
Tools with parallel sides must rest on the shoulder. For mounting tools without parallel sides, see page 125.

SE-77: Mounting the tool



Mount the tool protruding (P) approx. 50–75 mm or 2–3". Lock the tool by tightening the movable knob about 5 mm from the tool.

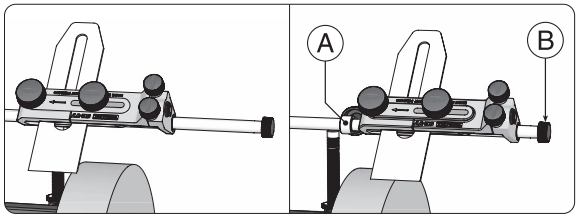
SE-76: Mounting the tool



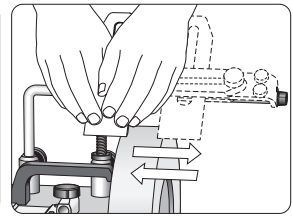
Open the clamp to the thickness of the tool and approximately parallel to the base. Mount the tool protruding (P) approx. 50–75 mm (2–3"). Lock the tool by tightening the knob nearest to the tool only.

Setting the safety stops

The safety stops ensure security when using the wheel's full width and should be used when sharpening plane irons, since these are partly moved outside the wheel. The inner stop (A) is removed when sharpening blades wider than 60 mm or 2⅜".



First mount the inner, movable stop (A) so the tool rests with approx. 6 mm or ¼" on the wheel. Then mount the outer stop (B), which is fixed and independent of the tool width.

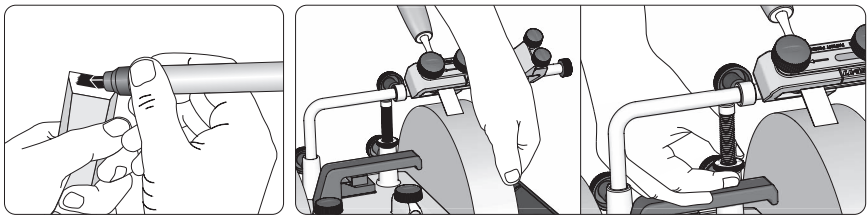


Move the tool continuously between the two stops. Spend more time sharpening the sides.

Setting the edge angle

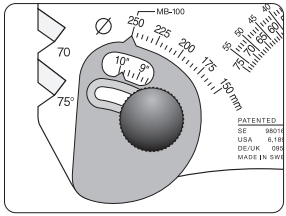
The height of the Universal Support determines the edge angle. This can be set in two ways. Either you can exactly replicate the existing angle using the Marker Method or you set to a new angle according to your choice using the Tormek AngleMaster WM-200.

Sharpening an existing edge angle

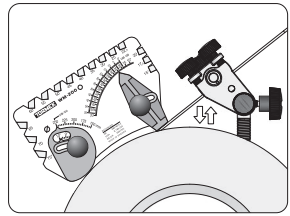


Colour the bevel with a marker. Turn the grinding wheel by hand and check where the grinding will take place. Adjust with the Micro Adjust until the wheel touches the entire bevel from the tip to the heel.

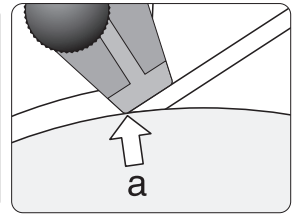
Sharpening a new edge angle



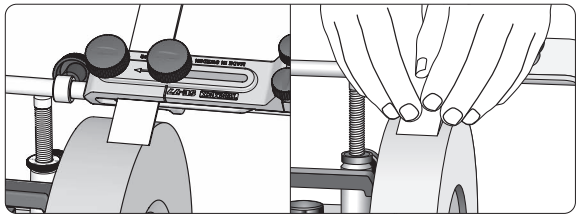
Set the AngleMaster WM-200 to the diameter of your wheel.



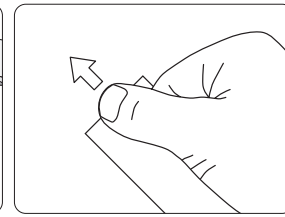
Set the height of the Universal Support with the Micro Adjust.



Note! The entire base should rest on the tool with the corner (a) on the wheel.



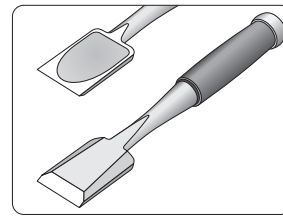
Move the tool sideways to use the whole width of the wheel. Do not move more than approx. 2 mm (5⁄64") outside the wheel. Press with your fingers close to the edge for best control. A higher grinding pressure means faster steel removal. Lighten the pressure at the end of the sharpening and you will obtain a finer surface.



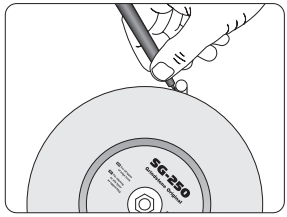
Sharpen until a burr develops on the entire bevel. You can feel it with your finger.

Important *You control with your hands – the pressure and grinding time – where the grinding takes place. Check the shape frequently and grind more where it is needed.*

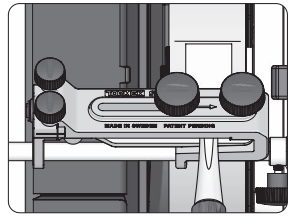
Japanese Chisels



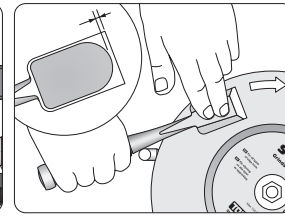
These differ in shape from the Western style chisels. The rough shape from the forging is retained without machining, the sides are usually not parallel and the blades are shorter. This means that you cannot use the alignment shoulder in the jig for an exact 90° alignment. The clamp is designed so tools with a tapered shank can also be firmly mounted (page 122). Be cautious when sharpening Japanese chisels! Compared to longer Western style chisels there is a limited amount of available steel, so you should set carefully to minimize the removal of expensive steel. The back has a hollow, which moves closer to the edge at each sharpening. After some sharpenings you might need to flatten the back, so the hollow does not reach the edge. Then use the side of the wheel.



Draw a pencil line on the stone using the Universal Support as guide.

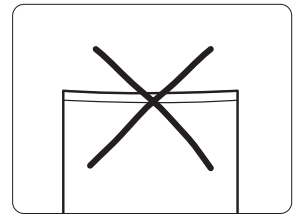


Align the tool to the line when mounting.



Ensure that the hollow does not reach to the edge. If neccessary, flatten the back on the side of the grinding wheel. Important! Bring the tool to the wheel carefully when flattening the back. The edge must not touch the wheel before the heel.

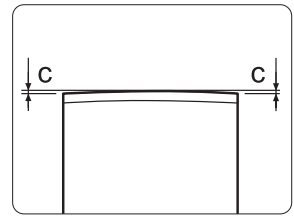
Factors that influence the result



To get a 100 % straight edge when sharpening wide tools such as a plane iron, you need to pay attention to a couple of factors that influence the result. The grinding jig gives the tool a constant edge angle towards the stone but the shape achieved depends on how much *pressure* you apply on the right or left side. Also the *time* you spend sharpening on each side influences the shape.

If you press equally on both sides and move the tool evenly across the stone, you will get a concave and not a straight edge. This is because the middle part is exposed to a longer sharpening time than the sides. Compensate for this effect by spending more time sharpening on the sides.

Camber Shape

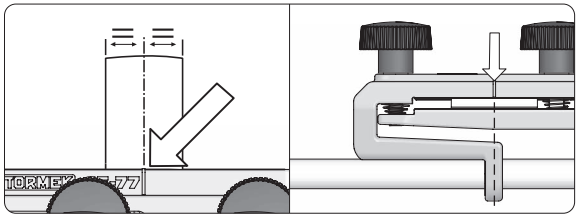


Most types of plane irons should have a slight convex shape or a camber. The degree of camber depends on type of plane and should be approximately the same as the thickness of the shavings. The camber (c) varies from 0.8 mm (1/32") for a jack plane down to 0.05 mm (0.002") for a smooth plane.

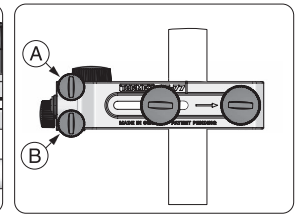
The camber is achieved by pressing harder on the sides. A longer protrusion of the blade in the jig will facilitate this effect, as most plane irons are a bit flexible. On a thick, stiff tool you create the camber shape by spending more time sharpening on the sides.

SE-77 Adjustment screws

For tools with a larger convexity you can use the adjustments screws, see below. If you need additional convexity, sharpen free hand with the Tool Rest SVD-110.

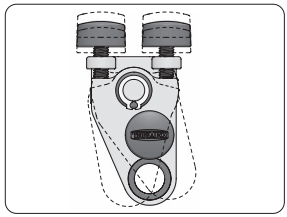


Center the tool under the jig's center line, marked with a line. Ensure that the tool is mounted perpendicularly by drawing a line along the Universal Support (page 125).

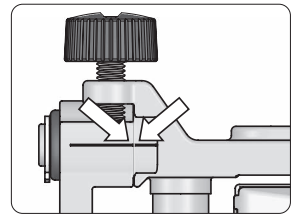


Loosen equally on the adjustment knobs A and B. The side then gets a pendulum motion. The more you loosen the knobs, the greater pendulum motion you get, which increases the convexity.

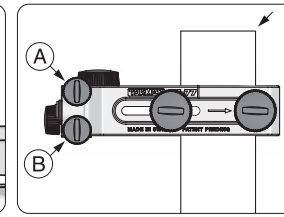
SE-77 Fine adjustment



The adjustment screws create a movable side which allows fine adjustment. They can be used if you do not get a 90° angle.



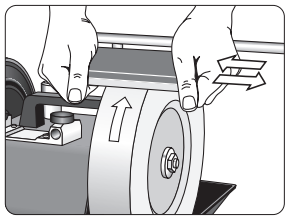
When the lines meet, the jig is in its neutral position.

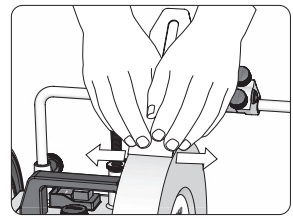


For increased sharpening pressure on the tool's right side, loosen knob A and tighten knob B. Do the opposite for increased sharpening pressure on the left side. Adjust approximately ¼ turn until you get a desired result.

Finer Surface with the Stone Grader

You can refine the tool surface by grading the Tormek Original Grindstone with the fine side of the Tormek Stone Grader SP-650. Pressing the Stone Grader firmly towards the grindstone refines the grindstone surface so it acts like a 1000 grit stone. If you are replicating an established edge angle, you can go directly to this finer surface of the stone.



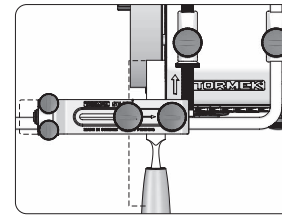


Press the fine side of the Stone Grader onto the stone for about 45 seconds. Use a fair amount of pressure.

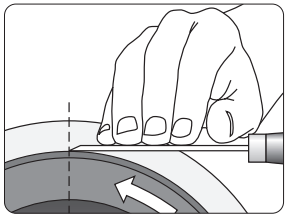
Use the same setting and fine sharpen for 30–40 seconds. Do not press too hard.

Honing on the leather honing wheel

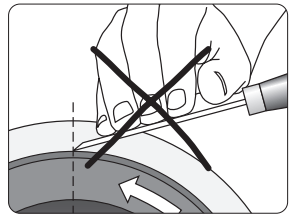
Turn the machine around so that the honing wheel rotates away from you. Move the Universal Support to the honing wheel side and mount horizontally. Set to the same honing angle as the grinding angle. Use the *Bevel Marker Method* or the AngleMaster WM-200 for the setting, see page 124. Remember to change the AngleMaster's diameter to ∅ 220 mm. The jig gives you full control of the honing angle on the T-8 model. Hone the back of the tool without the jig.



The safety stops are not used when honing – they are designed for use on the grinding wheel. Therefore, check that you do not slide the jig too far sideways. A part of the blade must always be in contact with the wheel.



Hone the back free hand. Hold the tool so that it is at a tangent to the wheel.



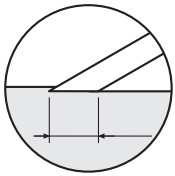
Do not hold the tool at a steeper angle than the tangent! The tip will be rounded off.

Secondary Bevel?

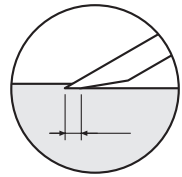
Some people recommend that you should put a secondary bevel (or microbevel) on your plane irons and wood chisels. The reason is that the honing work after the grinding is quicker since you do not need to hone the entire surface of the bevel, just the smaller new bevel at the tip.

For wood chisels there is a drawback with a secondary bevel since you do not have the support of the large original bevel to control the cutting in the wood.

Since the grinding and honing of the entire bevel with the Tormek method is an easy and fast operation, there is no need for a secondary bevel. With a single bevel, you can set exactly the angle that you want and easily maintain it at every grinding and honing.



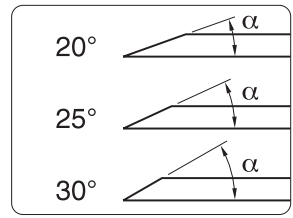
Support length with a monobevel.



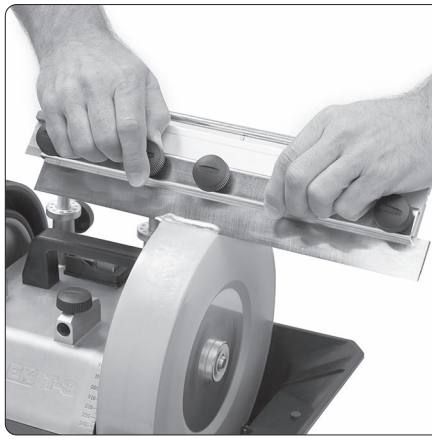
Reduced support length with a secondary bevel on a wood chisel.

Edge Angle

Plane irons, wood chisels and spoke shave blades are usually ground with a 25° edge angle (α). If you need to work delicate details with a wood chisel in soft wood, you can decrease the edge angle down to 20°. If you work in hard wood and when using a mallet, you must increase the edge angle to 30°.

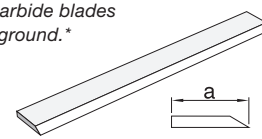


Planer Blade Attachment SVH-320

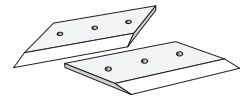


HSS PLANER BLADES

Copes with any length.
Min width (a) 13 mm (½").
*Tungsten carbide blades cannot be ground.**

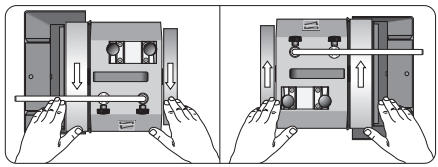


MITRE GUILLOTINE BLADES

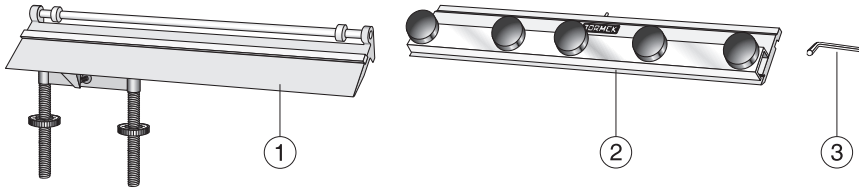


** The Tormek Blackstone Silicon SB-250 can touch up carbide.*

Positioning of Machine



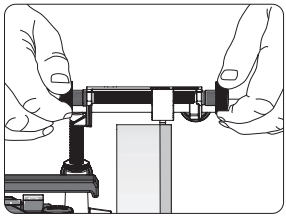
Grinding direction: towards the edge.



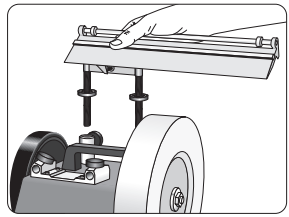
Design

The attachment comprises *support* (1), *blade holder* (2) and *Allen key* (3). In this attachment the tool is guided precisely and ground flat along its whole length to a pre-set fixed depth. This is not the case with the other Tormek jigs, where your hand decides where the grinding occurs and the depth of grinding. It is important that the grinding angle is set with great accuracy. If you follow the detailed step by step instructions carefully, you will be satisfied with the results.

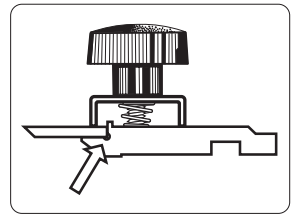
Preparations



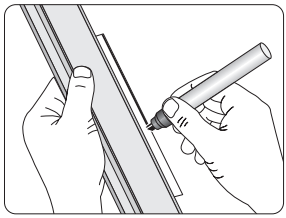
Check that the grinding wheel is exactly round and that the grinding surface is even. Adjust if necessary with the Tormek Truing Tool TT-50.



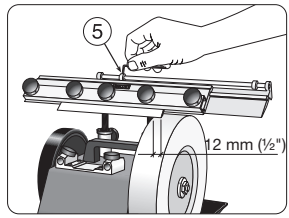
Remove the Universal Support and place the support in the sleeves of the machine. If required, remove the honing wheel.

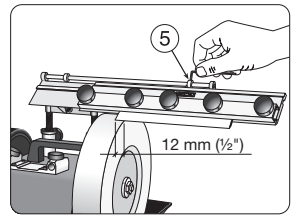


Clamp the blade in the holder. Make sure that it rests on the stop along the entire length. Always commence with any damaged blade in the set.



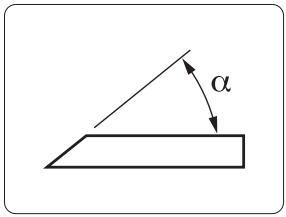
Colour the grinding bevel with a marker pen so that you can see where the grinding occurs when setting the edge angle.



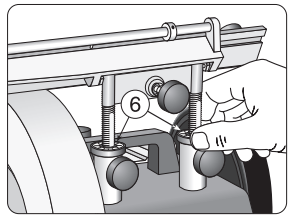


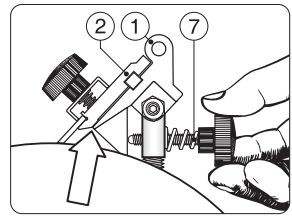
*Place the blade holder on the support. Set the grinding length to the length of the blade to ensure that the blade does not run off the edge of the stone during grinding. This is done by adjusting and locking both stops (5). Blades longer than approx 270 mm (10½"), you move in the holder and grind in two steps.**

Setting the edge angle and aligning the jig



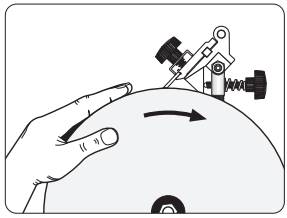
Grind the blade at exactly the original edge angle (α).



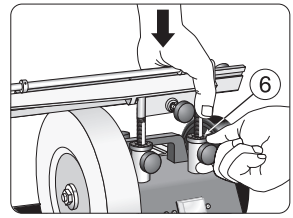


Make an initial height setting with the wheels (6). Set the edge angle with the adjusting screw (7). Make fine adjustments to the height with the wheels (6). The bevel should now lie flat on the stone and the holder (2) should touch the support (1).

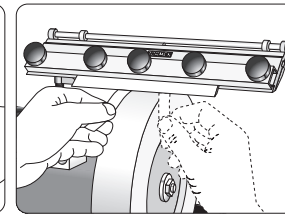
** You can sharpen blades up to 310 mm in one step, but make sure to use the Stone Grader SP-650 during sharpening so that the stone maintains a flat surface. (The small uneven wear that occurs during sharpening will otherwise make it difficult to sharpen the blade at the edges.)*



Check the angle setting by turning the wheel by hand. The wheel should make marks on the whole bevel, from the tip to the heel.



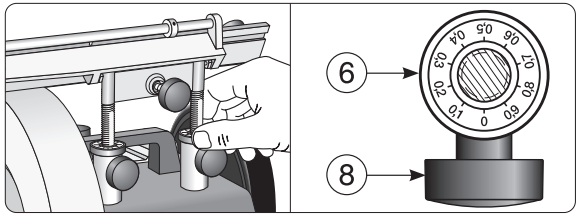
Press down the grinding jig while locking with the locking screws so that the two wheels (6) rest on the base without any gap.



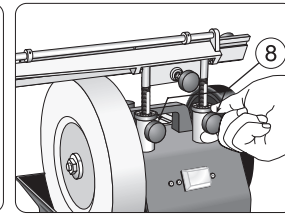
Make sure that the blade makes contact along the whole width of the wheel – a thin piece of paper simplifies this check. Adjust if necessary with the wheels (6).

Important *Do the angle setting with care to get exactly the same edge angle as the existing one. If you set the jig to grind the heel of the bevel, the operation will take unnecessarily long time.*

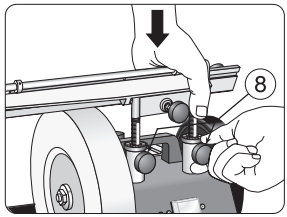
Setting the grinding depth



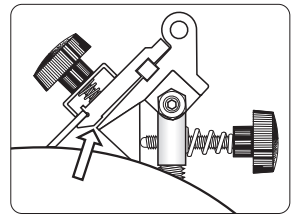
Set the grinding depth by raising the wheels (6). Turn the wheels equally in order to retain the parallel setting. The grinding depth is shown on the two wheels (6) which are graduated for each 0.1 mm (0.004"). The numbers on the wheels (6) do not need to be synchronised.



Unlock the two locking screws (8) and allow the support plate to lower by the amount you have raised the wheels (6).

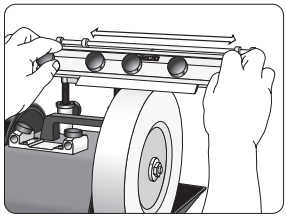


Lock the support plate – while it is pressed down – with the two locking screws (8).

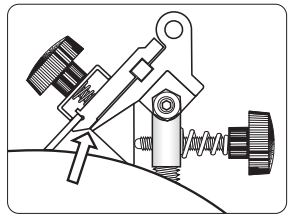


There is now a gap between the blade holder and the support.

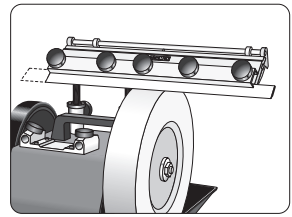
Grinding



Grind by moving the holder with even pressure from side to side between the side stops.

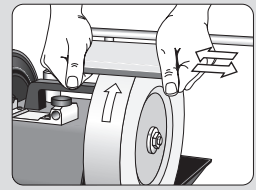


You must grind until the blade holder rests against the support along the whole length. Grind the other blade with the same setting.

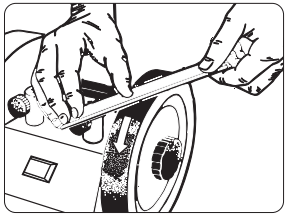


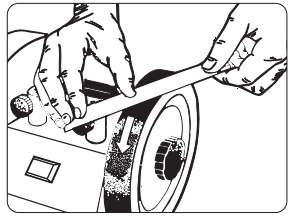
For longer blades more than 270 mm (10½"): Move the blade in the holder and grind in two steps. Make sure that the back of the blade rests on the stop.

Important *If the grinding effect of the stone decreases during the operation, reactivate the stone with the Tormek Stone Grader SP-650.*
New grinding grains are then brought into operation.
Use the corners of the grader for best effect.



Honing

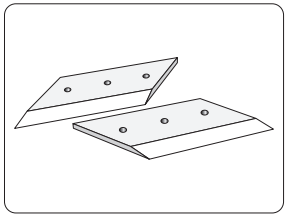




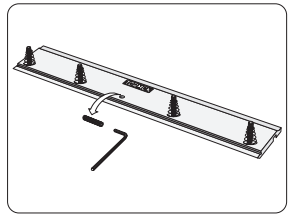
Hone away the burr gently on the leather honing wheel. Start with the reverse side and then the bevel and repeat this a couple of times. Important: Always hone away from the edge!

Mitre Guillotine Blades

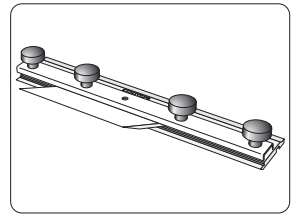
To mount these wider blades you need to remove one (or two) of the screws in the blade holder. Use a 3 mm Allen key. The sharpening instructions are the same as for planer/jointer blades. Re-mount the screws when grinding planer/jointer blades.



A set of mitre guillotine blades.



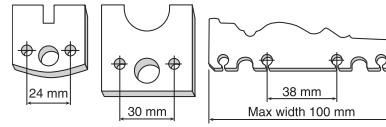
Use a 3 mm Allen key to remove one of the screws.



Mount the blade so the edge is parallel to the blade holder.

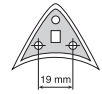
Moulding Knife Attachment SVP-80

MOULDING KNIVES

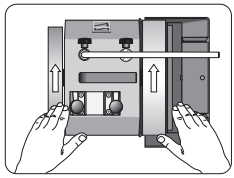


Sharpens knives with 24, 30 or 38 mm distance between guide hole centres. Not suitable for knives without guide holes.

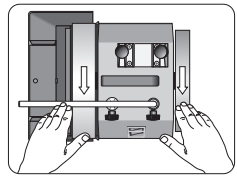
PROFILED PAINT REMOVAL BLADES



Positioning of the Machine



Setting the jig



Grinding

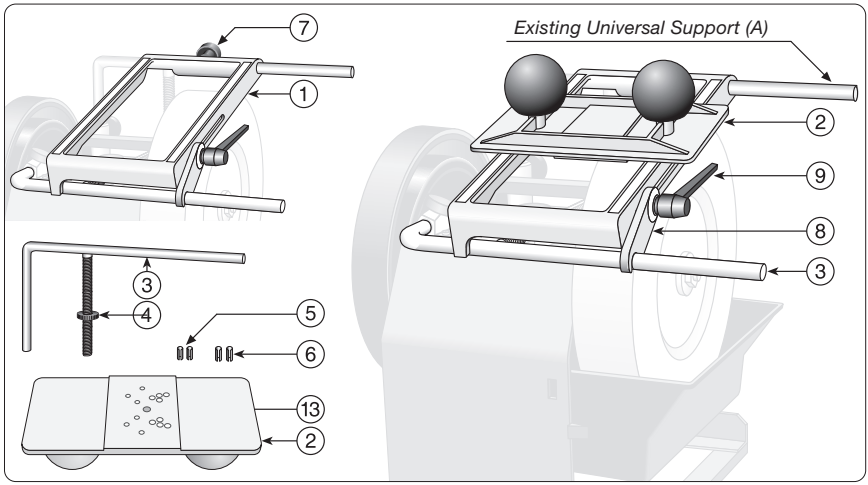
Design

See illustration on the next page. The jig comprises a base (1), a knife holder (2), an extra Universal Support (3) with micro adjust (4) and two pairs of hollow pins (5 and 6) for the knife holder.

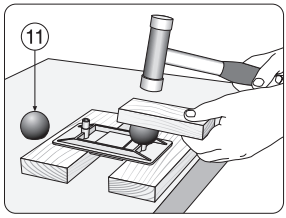
The base is mounted on this extra Universal Support and on the existing Universal Support of the machine. The base is locked with the screw (7). An arm (8), which is locked with an adjustable hand lever (9), stabilizes the construction.

The knife is placed on the pair of hollow pins on the knife holder. A magnet (13) keeps the knife in place. The holder has holes to fit various knife standards. Two pair of pins (∅ 4 and ∅ 5 mm) come with the jig.

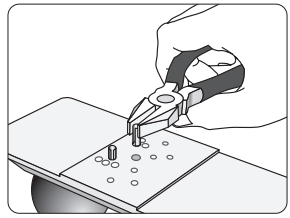
The knife holder (2) glides on the base (1), which has PTFE surfaces to minimise the friction. The knives are ground on the face. Adjusting the nut on the horizontal Universal Support sets the grinding depth.



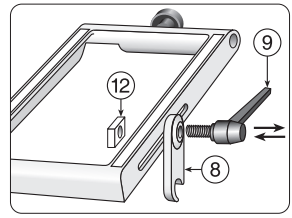
Mounting the jig



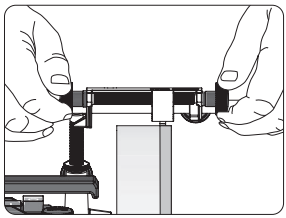
To minimise the packaging, the two knobs (11) are not mounted. Mount them by a light knock with a hammer. Be sure to have a flat support under the holder.



Use the pair of pins which fit the hole diameter of the knife and mount them in the two holes which fit the knife. Compress the pins with a pair of pliers and push them fully into the holes.



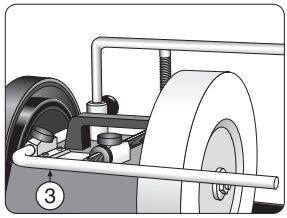
Mount the arm (8) with the hand lever (9) and the nut (12). Adjust the lever to the most suitable position.



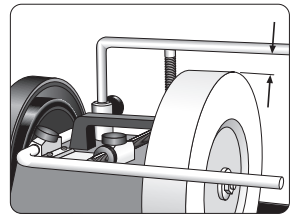
Checking the Grindstone

Check that the grinding wheel is exactly round and that the grinding surface is even. Adjust if necessary with the Tormek Truing Tool TT-50.

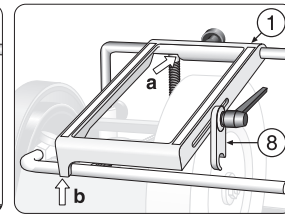
Mounting and setting the jig



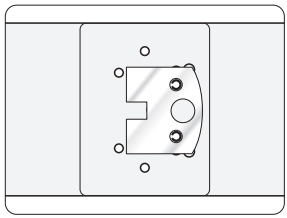
Mount the extra Universal Support (3) in the horizontal base and the original Universal Support (which on older machines does not have a micro adjust) in the vertical sleeves.



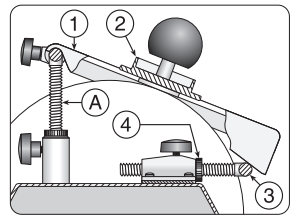
Lock the vertical Universal Support approx. 25 mm (1") from the stone. This is valid for a 250 mm (10") stone diameter. For a smaller stone diameter, the distance should be reduced.



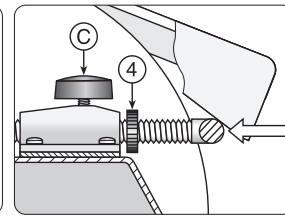
Slide the base (1) onto the vertical Universal Support until it touches the leg of the support (a). Let the lower part (b) of the base rest on the horizontal Universal Support. The arm (8) should be inactive at this stage.



Place the knife on the knife holder and the magnet will keep it in place.

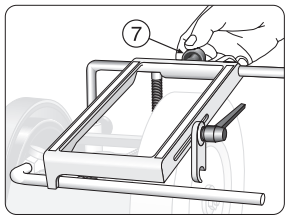


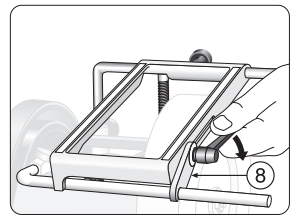
Position the knife holder (2) in the middle of the base (1) with the knife clear of the stone. Adjust the Universal Support (3) with the micro adjust (4) so the knife lightly touches the grindstone.



Set the grinding depth (see below) by loosening the micro adjust (4) and moving the Universal Support towards the machine. Secure with the locking knob, c.

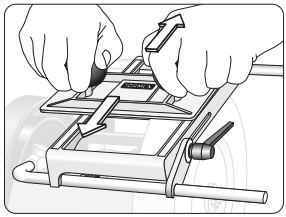
Note *Start with a grinding depth of 0.05 mm (0.002"). This corresponds to a turning of the micro adjust (4) by one mark. If necessary increase the grinding depth by turning the nut another mark.*



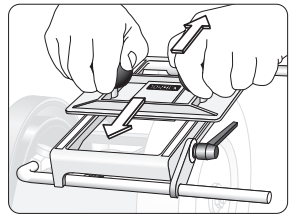


Lock the base with the screw (7) and stabilize it by locking the arm (8), so that the base lies steadily without any play on the horizontal Universal Support.

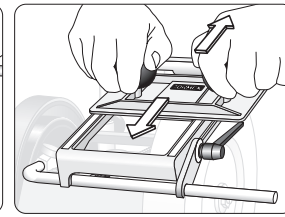
The two Universal Supports now work in unison and make the assembly stable.



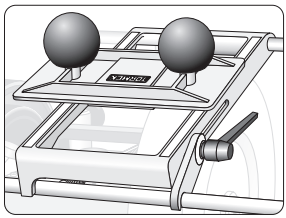
Grind the knife by sliding the holder up and down covering the full width of the knife.



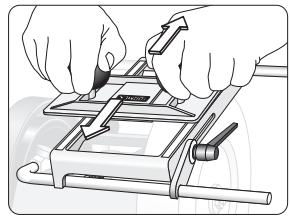
Move the holder sideways gradually while still moving it up and down between the left and right hand stops in the base.



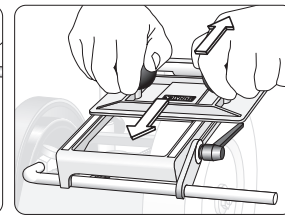
Note *The up and down movement should be made without too much pressure. Move the holder rather rapidly at the end of the sharpening – approx. one stroke per second – and you will get the most even surface. Continue sharpening until almost no steel is being removed.*



Rotate the knife holder 180°.



Continue sharpening. Move the knife holder between the left and right hand stops in the base. Now the whole knife should be evenly ground.



Note *When the first knife has been ground, you do the other knife without changing the setting.*

Max Reduction of the Knife Thickness

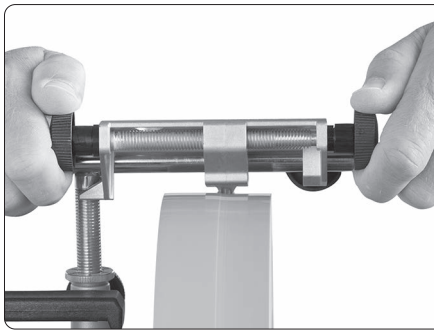
The knife must not be ground so many times that it becomes too thin and loses its strength. It should not be decreased more than 0.3 mm (0.012") from its original thickness. A normal grinding reduces the thickness with 0.05 mm (0.002"). This means that you can sharpen a knife 6 times before it becomes too thin.

Honing

The burr, which remains on the bevel side, should be honed off free hand on the leather honing wheels. Always hold the knife so that the honing wheel runs *away* from the edge. Hone the face and the bevel alternately on the large honing wheel and on the small, profiled wheel so far as the profile of the knife allows, until the burr disappears. A properly honed edge leaves a cleaner, finer surface on the wood and the sharpness of the knife lasts longer.

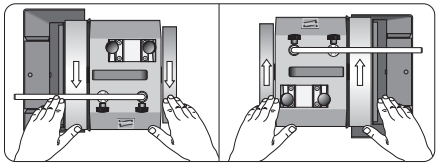
Accessories

Truing Tool TT-50



- *Trues the stone exactly round and flat.*
- *An easily operated built in feeding device leaves an even surface to the stone.*
- *By feeding the diamond more quickly you can leave a coarser surface and increase the steel removal rate of the grindstone.*
- *Convenient setting of the cutting depth using the Micro Adjust on the Universal Support.*

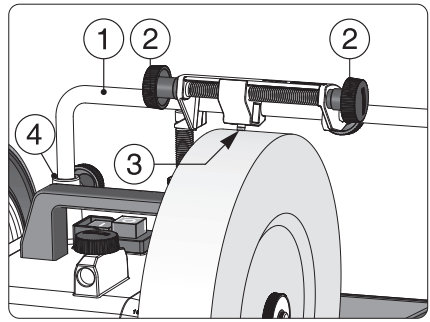
Positioning of Machine



Note *Owners of older machines, which have a Universal Support without Micro Adjust, would need to set the depth manually.*

Design

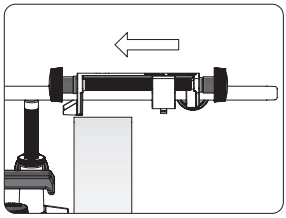
This unique and patented Truing Tool turns your grindstone exactly round and flat while it is mounted on the machine. The truing is guided by the Universal Support (1), which also guides the jigs. This ensures that the surface of the stone is always parallel to the tool fitted in the jig.



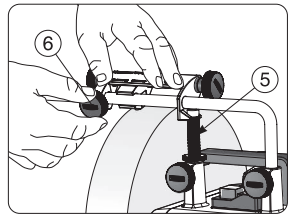
The tool has a built in feeding device (2) for convenient control of the diamond cutting tip (3) across the stone. You can set the desired cutting depth by means of a scale (4) on the Universal Support. A suitable depth is between 0.25–0.75 mm (0.01–0.03").

The cutting tip consists of diamond grains embedded in a cylinder of copper. The grains are positioned irregularly like “raisins in a cake”. During use, the soft copper will be worn and the diamond grains will stick out as peaks on the copper surface. Worn grains will after a period of time be replaced by new ones. This design gives a long life to the tip.

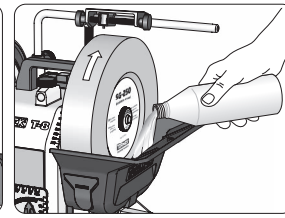
Truing



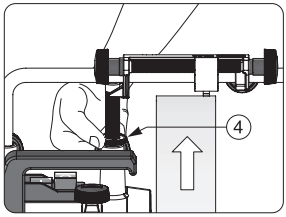
Set the height of the Universal Support so the Truing Tool can be positioned.



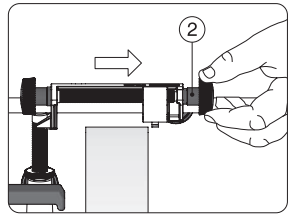
Press the Truing Tool towards the leg (5). Lock it with the locking knob (6).



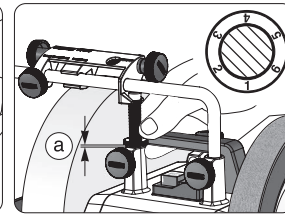
Start the machine and fill water in the trough.



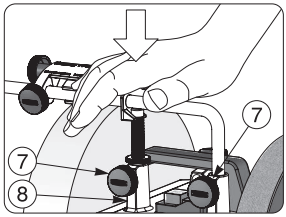
Lower the Universal Support with the Micro Adjust (4) until the cutter touches the highest spot on the stone.



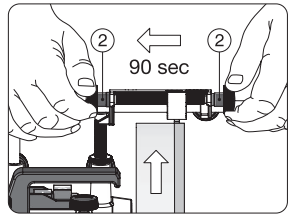
Stop the machine. Move the cutter sideways with one of the knobs (2), so it is outside the stone.



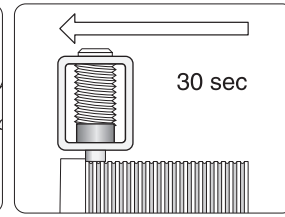
Set the desired cutting depth (a) by raising the Micro Adjust which is graduated for each 0.25 mm (0.01").



Press downwards so the Micro Adjust again rests on the sleeve (8). Lock with the two locking screws (7).



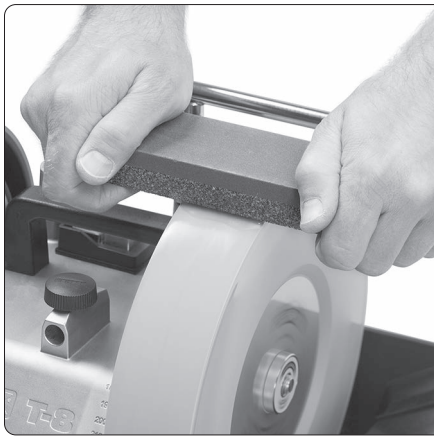
Start the machine. Feed the cutting tip by turning the two knobs (2) alternately. Use approx. 90 seconds to move across the stone.



You can cause the stone to grind faster by feeding the tool faster. Take 30 seconds to cross the stone. Use max 0.25 mm (0.01") cutting depth.

- *Max cutting depth 0.75 mm (0.03").*
- *Do not feed too slowly as vibrations can occur.*
- *True the grindstone immediately if you notice any unevenness. This will increase the life of your grindstone. Even a slight unevenness will automatically be increased if you continue grinding. Do **NOT** use the TT-50 Turning Tool on a Diamond Wheel. There is no need to true that wheel.*
- *The copper material between the diamond grains in the cutter tip will immediately wear down to a level just under the points of the diamonds. This can look as if the cutter tip is faulty, but this is normal.*

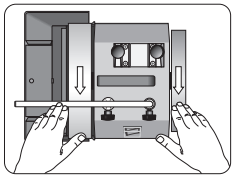
Stone Grader SP-650



Made of silicon carbide, one side with a very fine grit and the other side with a coarse grit.

- *The fine side adjusts the grindstone to grind more finely.*
- *The coarse side restores the grindstone to normal fast grinding.*
- *Re-activates a glazed grindstone.*

Positioning of Machine



Note *For truing a grindstone to an exact roundness you must use the Truing Tool TT-50.*

Properties of Grindstones

Expressed simply, a grindstone with water cooling can be constructed to grind fast leaving a coarse surface on the tool or to grind more slowly leaving a finer surface on the tool. The fast grinding stone is “soft”, which means that the grains are loosely bound. Old, worn grains can easily leave the stone enabling new fresh and sharp grains to come into operation. A stone for fine grinding is “harder”, which means that the grains are tightly bound in the stone. The hard stone wears less than the soft stone.

The Tormek Grindstone has been specially developed to grind fast while still having a long life. The grit is 220. Grindstones with finer grit could be made but then you get the drawback of a decreased grinding effect and a longer grinding time. You cannot get both the benefits (fast grinding and the finest surface) in the same grindstone.

One way is to make the first grinding, where the tool is shaped, on a coarse fast grinding stone and then switch over to a finer and slower grinding stone to achieve a finer surface; however this way is inconvenient and expensive. Besides that you would need to work with two stones or possibly two machines and the jig setting would need to be made twice as the diameter of the two stones would not be exactly the same.

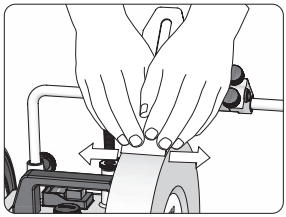
Properties of the Tormek Grindstones and Stone Grader

The Tormek Original Grindstone and Tormek Blackstone Silicon are constructed so that they can be treated with the Stone Grader to change their property from fast grinding to fine grinding, i.e. sharpening. This has obvious advantages. You can make both the first fast grinding and the sharpening on the same grindstone and the same grinding machine and with the same setting of the jig. Besides being a very fast method, you achieve a perfect edge as the fine grinding is done in exactly the same position as the first fast grinding.

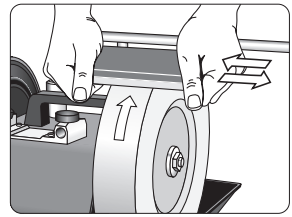
The grading of the grindstone is made by pressing the fine side of the Stone Grader onto the grindstone, which makes it work as a fine grit stone (approx. 1000 grit). When pressing the coarse side onto the grindstone, the smoothened surface is returned to its normal condition (220 grit). This process does not place excessive wear on the grindstone and can be repeated any number of times.

On the Japanese Waterstone the fine side of the Stone Grader is used for cleaning the surface. Do not use the SP-650 Stone Grader with Tormek's Diamond Wheels.

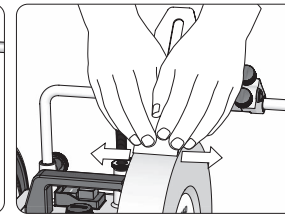
This is how it works



Grind the tool as usual. The picture shows a plane iron in the SE-77 Square Edge Jig.

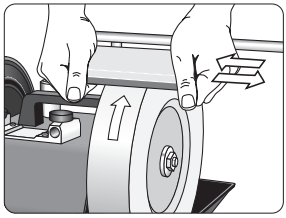


Grade the stone by pressing the fine side onto the stone for 20–30 seconds. Use a high pressure.



Grind again with a light pressure on the graded stone. The plane iron remains in the same position in the jig.

To return the grindstone to normal fast grinding

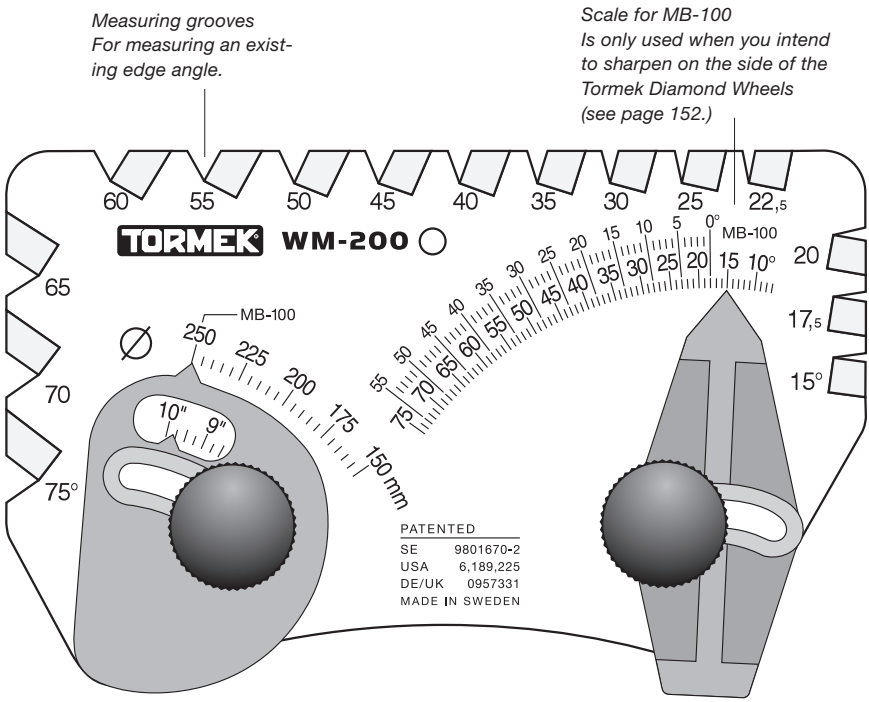


Press the coarse side of the Stone Grader onto the stone for 20–30 seconds while moving it sideways across the stone. The stone has now returned to normal fast grinding.

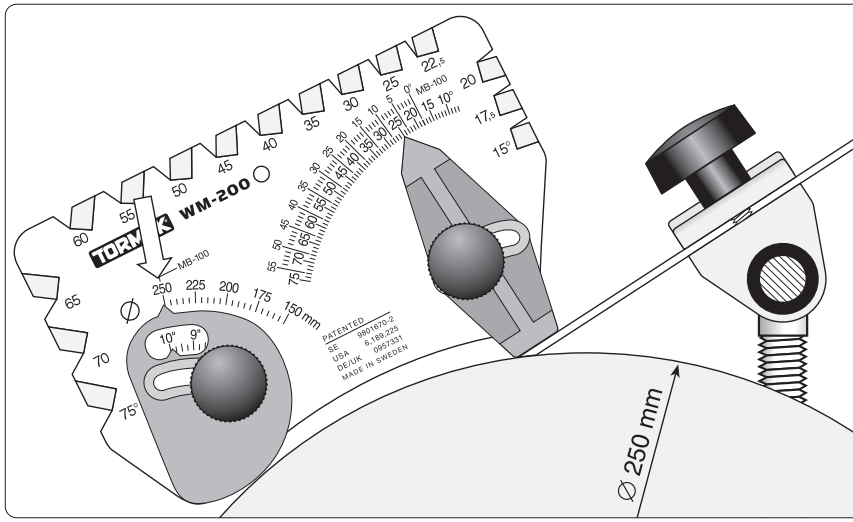
Note *Do not let the Stone Grader rest directly on the Universal Support as it could wear the Universal Support. Use the Stone Grader with your wrists resting on the Universal Support as illustrated.*

AngleMaster WM-200

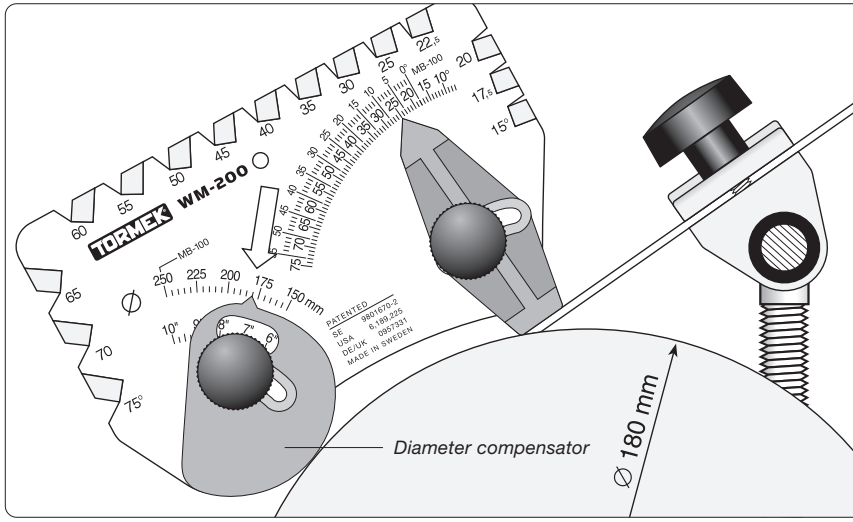
This patented AngleMaster has two functions: You can use it to set the jig to the grinding wheel so that it grinds your tool to any desired edge angle from 10° to 75° and you can use it to measure an existing edge angle on a tool. It is designed to work on any grindstone diameter from 250 mm (10") down to 150 mm (6"). You achieve an exact setting irrespective of the degree of stone wear. The AngleMaster has two magnets for convenient fixing onto the housing of the machine (Tormek T-8, T-7 and T-4 only).



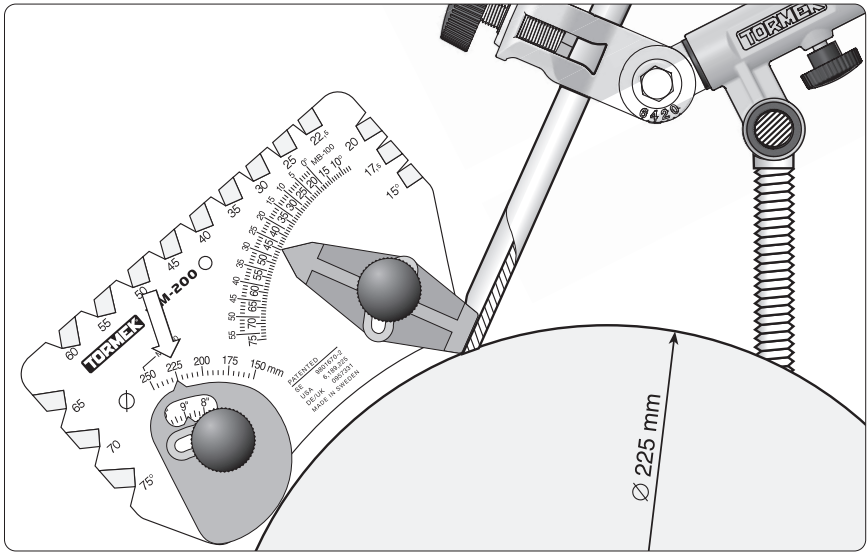
Setting the edge angle



Setting a plane iron with a 25° edge angle on a 250 mm (10") grindstone.



The same edge angle on a stone worn down to 180 mm (7"). The wear of the stone is compensated by setting the diameter compensator to the stone diameter.

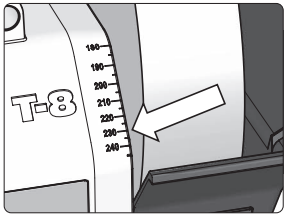


Setting of a bowl gouge at 45° edge angle in the SVD-186 R jig. Grinding wheel diameter 225 mm (9").

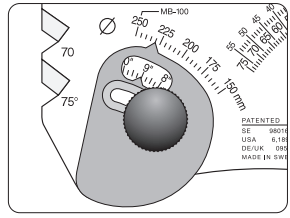
Note *To learn how to set the angle when sharpening on the side of Tormek's Diamond Wheels, see p.152.*

Measuring the Grinding Wheel Diameter

When setting the diameter compensator to match the diameter of the grinding wheel, you do not need to measure the wheel. There is a scale on the machine label, which shows the diameter in metric mm, which you easily can transfer to the diameter compensator of the AngleMaster. This is on the model Tormek T-8 and T-7 series only.

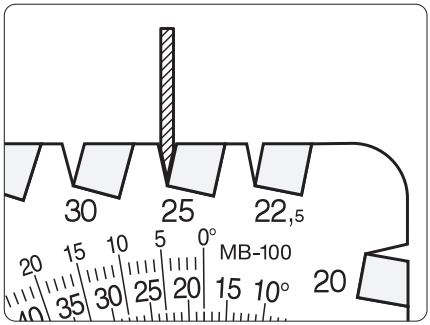


The scale shows that the grinding wheel's diameter is ∅ 230 mm.

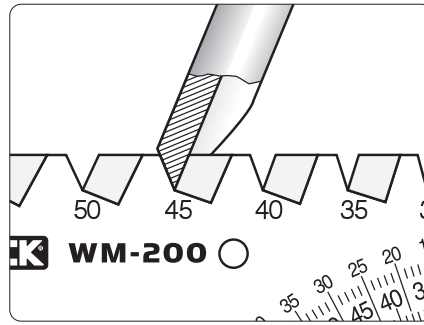


The diameter compensator is set on ∅ 230 mm.

Measuring the edge angle



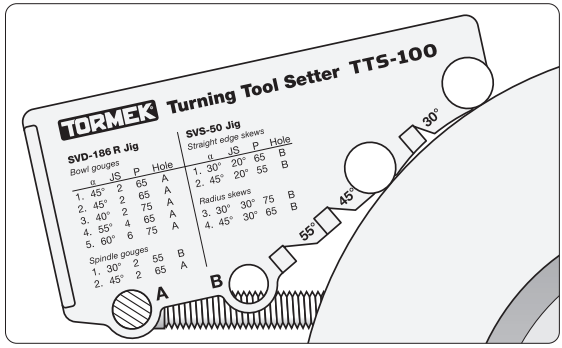
Measuring the edge angle of a knife.

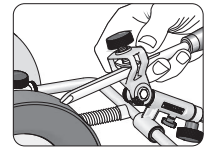


Measuring the edge angle of a bowl gouge.

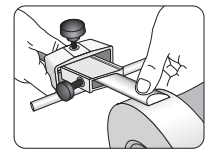
Turning Tool Setter TTS-100

The patented Turning Tool Setter is the key to the Tormek Sharpening System for woodturning tools. It enables you to exactly create and replicate the edge on your bowl and spindle gouges as well as on your flat or oval skews with either a straight or a curved edge. It works in conjunction with the Gouge Jig SVD-186 R and the Multi Jig SVS-50.





Gouge Jig SVD-186 R

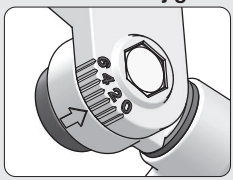


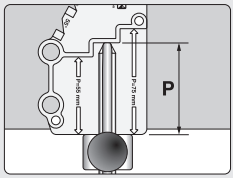
Multi Jig SVS-50

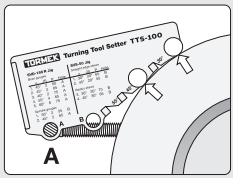
How Does It Work?

Three factors determine the shape of a gouge or a skew; the jig setting (JS), the protrusion (P) and the distance of the Universal Support from the grinding wheel (hole A or B). By controlling these factors and repeating them at each sharpening you will get an exact replication of the shape and edge angle every time.

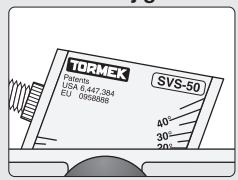
The SVD-186 R jig

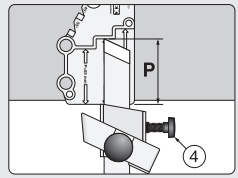


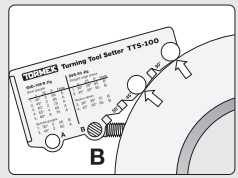




The SVS-50 jig



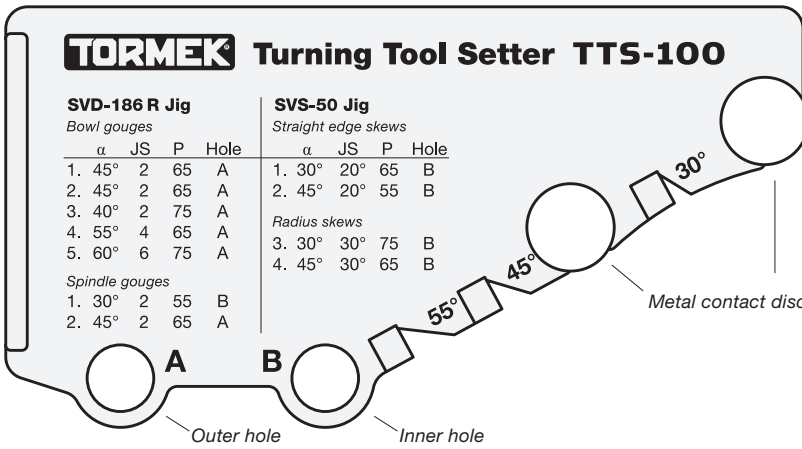




JIG SETTING = JS

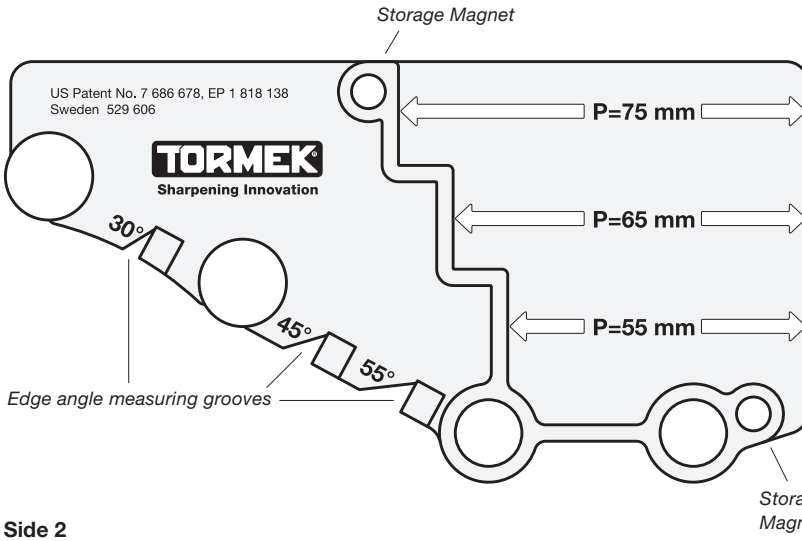
PROTRUSION = P

DISTANCE TO GRINDING WHEEL



Side 1

There are two holes for the Universal Support, A and B.
The type of tool and profile you require decide which hole to use.



Side 2

This side has stops for the recommended protrusions of the tool in the jig (P).

Selected Shapes and Edge Angles

There are quite a few manufacturers of turning tools and the shapes and edge angles vary considerably. For example there are factory made skew chisels with skew angles from 15° to 30° and the edge angles vary from 25° to 40°. Factory made bowl gouges have edge angles from 30° to 60°. The wide range of shapes is the reason why Tormek up until now, has not made recommendations for setting the shape and edge angle. Instead we have offered the technique and left to each turner to find his or her own geometry, i.e. shape and edge angle.

However, after having been in contact with many turners around the world, we now see the need for an aid to a quick setting of the jig and also for advice about some suitable shapes and edge angles. The Tormek Turning Tool Setter offers both.

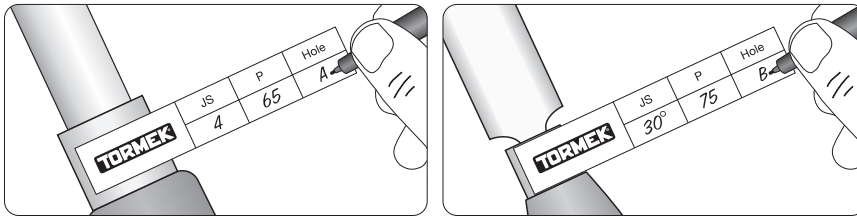
The Selection Chart on the next page shows geometries recommended by experienced woodturners and recognized woodturning training workshops around the world, e.g. Glenn Lucas Woodturning in Ireland, Nick Agar's "Turning Into Art" in the UK and Drechselstube Neckarsteinach in Germany.

Since a tool can have an unlimited number of combinations of shapes and edge angles, a new tool has a more or less different shape compared to any of the shapes on the chart. Therefore, you firstly need to shape your tool to one of these geometries; then the following sharpenings will be an easy task and done in less than a minute.

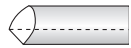
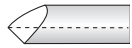
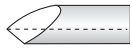
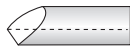
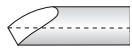
Tip *Stick to the shape you have chosen. Altering the shape even slightly, takes unnecessary time away from your turning. If you want a different shape for a different type of work, buy an additional tool and keep the unique shape permanently rather than changing it each time you change your work. In the long term, this will save you much time and also money. Your tools will last for your lifetime since you just touch up the edge when sharpening.*

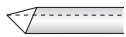
Profile Labels

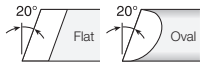
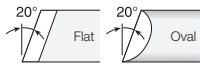
Note the settings on a Profile Label, which comes with the TTS-100 Setter and put it on the ferrule of the tool. Now you have control of the three factors and you can exactly replicate them every time.



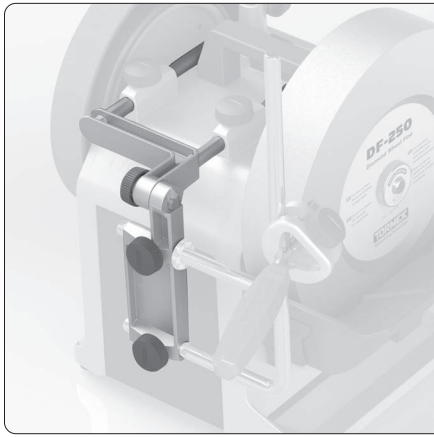
TTS-100 Selection Chart

Bowl gouges			
1	α=45° 	**JS 2** **P 65** **Hole A**	Standard profile. Only lightly swept back wings. For turners of all skill levels.
2	α=45° 		Irish profile. Swept back wings. Swing the tool 180° from side to side.
3	α=40° 	**JS 2** **P 75** **Hole A**	With long swept back wings. Somewhat aggressive. For professional level turners.
4	α=55° 	**JS 4** **P 65** **Hole A**	The larger edge angle is beneficial when turning deep bowls.
5	α=60° 	**JS 6** **P 75** **Hole A**	“Ellsworth” shape. Wings are pronounced convex.

Spindle gouges			
1	α=30° 	**JS 2** **P 55** **Hole B**	For tight spots, detail work and finest finish. For professional level turners.
2	α=45° 	**JS 2** **P 65** **Hole A**	Standard profile. For turners of all skill levels.

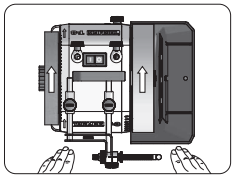
Skews			
1	Straight edges α=30° 	**JS 20°** **P 65** **Hole B**	For tight spots, detail work and finest finish. For professional level turners.
2	Straight edges α=45° 	**JS 20°** **P 55** **Hole B**	For broad application. Easier to control than a 30° edge angle.
3	Radius edges α=30° 	**JS 30°** **P 75** **Hole B**	For tight spots, detail work and finest finish. For professional level turners.
4	Radius edges α=45° 	**JS 30°** **P 65** **Hole B**	For broad application. Easier to control than a 30° edge angle.

Multi Base MB-100

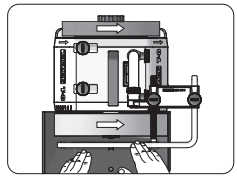


- *With the MB-100, you can sharpen on the side of Tormek's Diamond Wheels to achieve a flat grinding bevel.*
- *Can be used with the Tormek jigs for knives, axes, woodturning tools, carving tools, chisels and plane irons.*
- *Can be used in both the horizontal and vertical locations.*
- *Fully adjustable so you can find the optimal position for each tool.*

Positioning of Machine



When MB-100 is mounted horizontally.



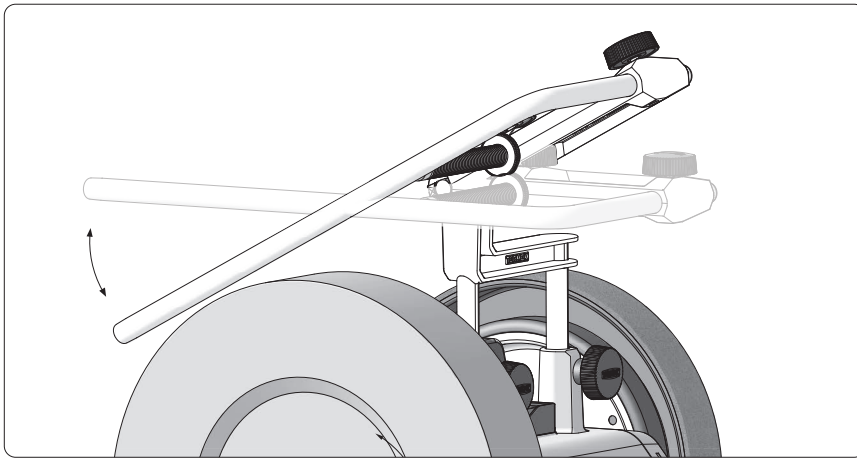
When MB-100 is mounted vertically.

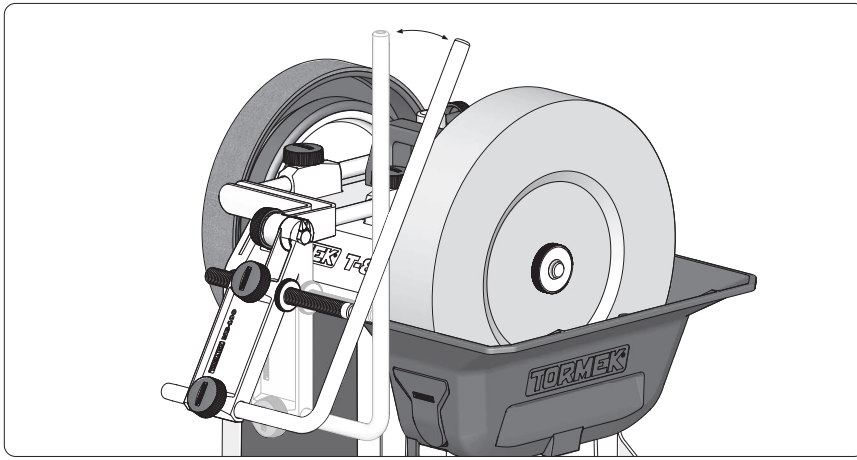
With the Multi Base MB-100, you can sharpen on the side of the Tormek Diamond Wheels, thus creating a completely flat bevel that is preferable in some applications. The MB-100 has an adjustable joint that allows you to fix the sharpening position based on the optimal setting for each tool and jig. For convenience, the MB-100 can be mounted either vertically or horizontally.

The MB-100 can be used with the Tormek jigs: SVM-45 Knife Jig, SVM-140 Long Knife Jig, SVM-00 Small Knife Holder, SVX-150 Scissors Jig, SVA-170 Axe Jig, SVS-38 Short Tool Jig, SVD-186 R Gouge Jig, SVS-50 Multi Jig, SE-77 Square Edge Jig and SVD-110 Tool Rest.

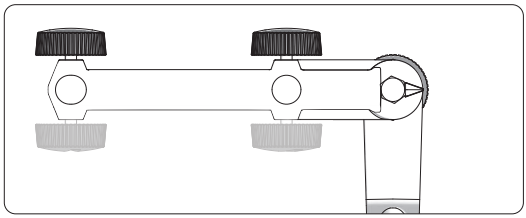
Note *The MB-100 is only designed for sharpening with Tormek Diamond Wheels. It is not suitable for grinding stones as they would require truing which is not possible on the side.*

Sharpening position





With the vertical and horizontal mounting, the sharpening position can be adjusted. This will never affect the angle setting.

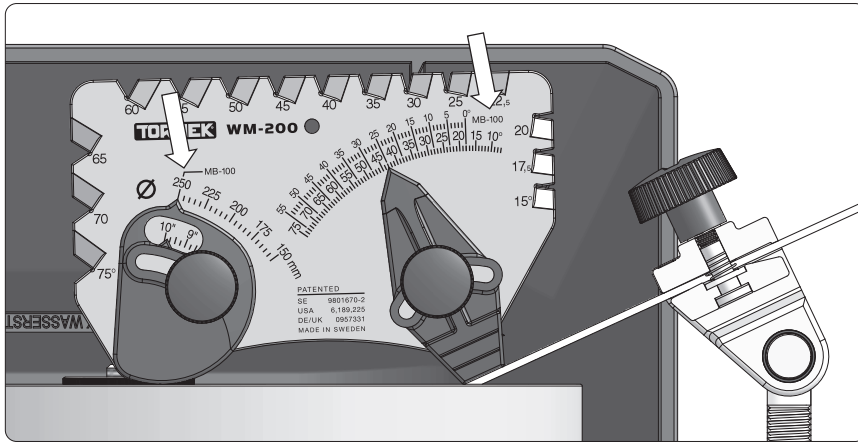


Move the locking knobs and mount on any side of the Multi Base to facilitate locking in the vertical and horizontal positions.

Setting the Edge Angle

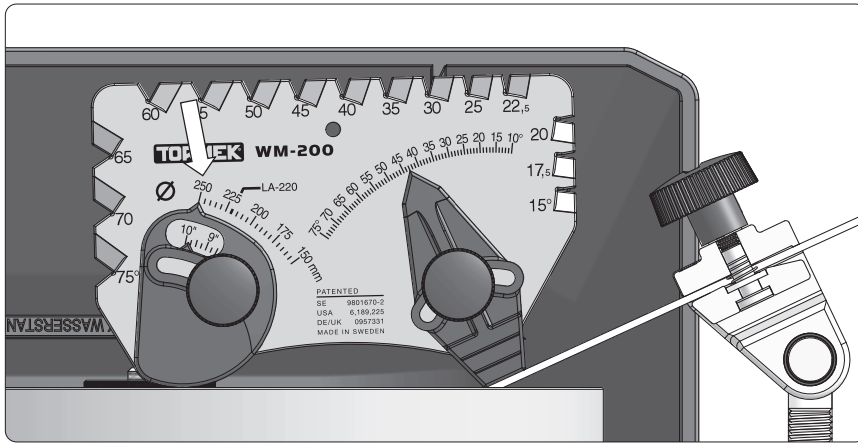
When setting the sharpening angle with the updated WM-200 AngleMaster, use the top angle scale, marked with MB-100 (1). When setting the sharpening angle with the previous WM-200, add 18° to your preferred angle (2). For example, if you are going the sharpen a chisel to a 25° angle, add 18° on the AngleMaster, i.e. 43°. **Always** set the wheel diameter compensator on WM-200 to 250 mm when sharpening with the MB-100.

1. Setting with the updated WM-200



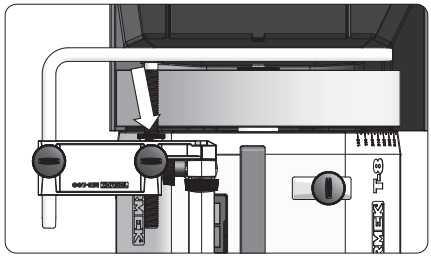
Use the top angle scale, marked with MB-100.

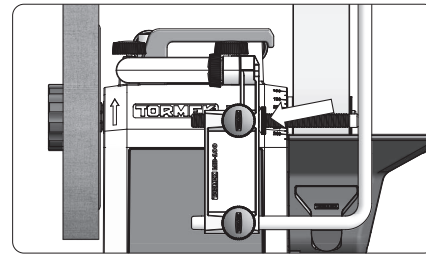
2. Setting with the previous version of WM-200



Add 18° to your preferred angle.

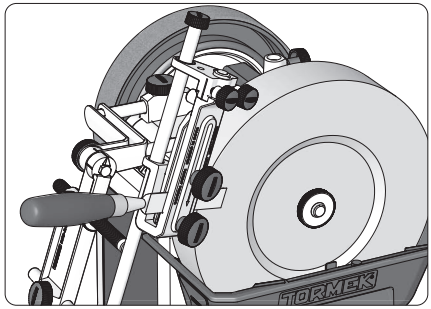
Micro Adjust



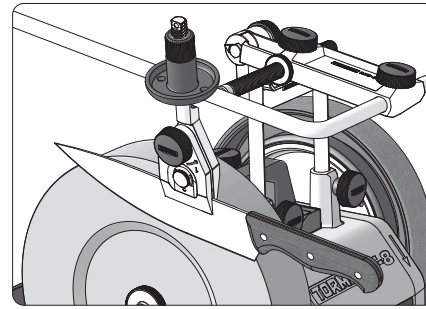


The edge angle is set by using the Micro Adjust on the Universal Support. Other settings on the MB-100 does not affect the angle.

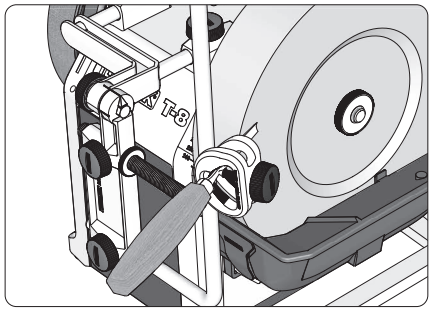
Sharpening



Example shows sharpening a chisel with the SE-77 jig.



Example shows sharpening a knife with the SVM-45 jig.



Example shows sharpening a V-tool with the SVS-38 jig.

Tip *When sharpening with Multi Base MB-100, it can be beneficial to work closer to the Diamond Wheel for better control. Try and adjust the height of the machine if necessary or sit down when sharpening.*

Tormek Grindstones

The Tormek Original Grindstone has been developed over the years to combine an efficient steel removal, smooth surface finish and a long life. Since it is not possible to incorporate the fastest steel removal and the finest surface finish in a single stone, we have developed two optional stones to cope with special needs; the fast grinding Blackstone Silicon and the fine Japanese Waterstone. The instruction manual is based on the Original Grindstone but it is applicable to the Blackstone Silicon as well. The Japanese Waterstone has a different composition, since it is made to create the finest surface. It has a limited steel removal capacity and cannot be used for shaping a tool.

Tormek Original Grindstone SG-250 and SG-200

It copes with all types of tools and steel qualities including HSS. It grinds effectively whilst also giving a fine finish to the bevel. The grit is 220. It gives you two different cutting actions in one stone. From its normal 220 grit condition, it can be graded with the Stone Grader SP-650 to work like a 1000 grit stone. This is a great advantage, since you can do the fine sharpening with the same setting of the jig as used for the first shaping of the tool with the stone in its normal 220 grit condition. You save time and the cost for an extra stone.

Tormek Blackstone Silicon SB-250

This is available only for the models T-8, T-7 and 2000 (SB-250). It has been developed for HSS and other exotic alloys. Its faster steel removal is an advantage especially when grinding tools with a large bevel surface, where the grinding pressure is limited, e.g. planer blades and woodturning skews. The SB-250 does not offer faster steel removal on ordinary carbon steel. The Tormek Blackstone Silicon can also touch up tungsten carbide. The grit size is the same 220 as the original Tormek SG-250 stone. Thanks to its sharp and relatively small grains, the Blackstone removes hard steel efficiently even at low grinding pressure. Like the Tormek Original Grindstone, the Tormek Blackstone Silicon can be graded with the Stone Grader SP-650.

Tormek Japanese Waterstone SJ-250 and SJ-200

This is available for the models T-8, T-7 and 2000 (SJ-250) and for the T-4/T-3 and 1200 models (SJ-200). The grit size is 4000 and the stone delivers a mirror finish with hardly any visible grooves. It has been developed for sharpening hand tools, when the shape and edge angle are already established but you need an extra fine surface. It is ideal for carving tools, knives, scissors, plane irons and wood chisels. The surface left by the Japanese Waterstone is so fine that the tool should not be honed on the leather honing wheel. Use a light pressure at the end of the sharpening for the finest surface.

You should clean the stone surface of steel particles every minute or so with the fine side of the Stone Grader SP-650. Do not use the coarse side of the Stone Grader on the Japanese Waterstone.

Tormek Diamond Wheels

Tormek has developed three diamond wheels designed for use with the Tormek Water Cooled Sharpening System. The Tormek Diamond Wheels offer an exceptional durability and the ability to sharpen on the periphery as well as the side. When sharpening on the side of the Diamond Wheels, we recommend using the Tormek Multi Base MB-100 with the appropriate jig developed for your specific tool.

The quality of the diamond surface provides a constant sharpening ability and a grinding wheel that always remains a full size diameter. Tormek's low speed sharpening make it ideal to use diamond for edge tool sharpening since no heat is generated.

The Diamond Wheel's Structure

Tormek's Diamond Wheels are constructed with a precision machined steel frame. The frame is coated with a single layer of diamond grit that is electrolytically anchored with nickel. When the coated abrasives are touched by the filings of metal from your tool, they will reach the steel frame through the pores that occur in the nickel coating and exposing the steel core. Therefore, always use the ACC-150 Anti-Corrosion Concentrate in the water when sharpening with water to prevent rust on the grinding wheel. Add 10 ml of concentrate to 250 ml water (~4 %).

We recommend to always use water when sharpening with the diamond wheel, as it prolongs the life of the wheel and provides a finer surface. Since diamond wheels do not absorb any water, you do not have to fill to the max water level line inside the water trough. Start filling until the diamond wheel's surface runs in water, then fill more if needed. It is also possible to sharpen without water.

Important *When wet grinding, always use the ACC-150 Anti-Corrosion Concentrate in the water to prevent rust on the grinding wheel. Add 10 ml of concentrate to 250 ml water (~4 %). If you want to save the mix overnight, remember to lower the water trough.*

The diamond wheels come in three different grades; Coarse, Fine and Extra Fine. Each of the Tormek Diamond Wheels is suitable for all types of material, incl. steel, ceramic and carbide.

Diamond Wheel Coarse DC-250

This coarse wheel gives an efficient steel removal and rapidly repairs a dull or damaged edge. The grit size is 360. For all types of material, incl. steel, ceramic and carbide. Fits Tormek models T-8, T-7 and previous models with a 250 mm wheel diameter.

Continues on the next page

Diamond Wheel Fine DF-250

This ultimate all-round wheel combines efficient steel removal, smooth surface finish and long life. The grit size is 600. For all types of material, incl. steel, ceramic and carbide. Fits Tormek models T-8, T-7 and previous models with a 250 mm wheel diameter.

Diamond Wheel Extra Fine DE-250

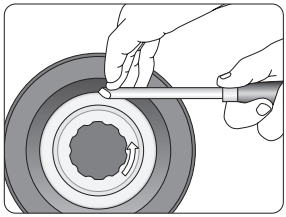
This wheel gives an extra fine surface finish and is especially suited for carving tools and knives when the need for steel removal is minimal. The grit size is 1200. For all types of material, incl. steel, ceramic and carbide. Fits Tormek models T-8, T-7 and previous Tormek models with a 250 mm wheel diameter.

Important when using:

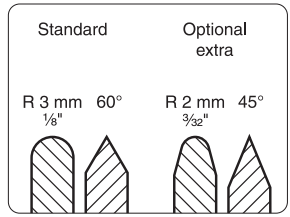
- *Always apply a low pressure when sharpening. Apply a **very low** pressure when sharpening with a new diamond wheel. The diamond grits on a new diamond wheel are very sharp and sensitive to high pressure. This is even more important at the edge of the wheel where the force gets higher to the surface.*
- *At first usage, the diamond surface will seem aggressive, so you should expect to feel and hear that some diamond grits stand out. After a short break-in period, the diamond crystals will stabilize to a uniform level to give a finer surface. This process normally takes 2–5 sharpenings.*
- *Do **NOT** use the TT-50 Turning Tool on the Diamond Wheel. There is no need to true the wheel.*
- *Use less water compared to when you are grinding with a grindstone (diamond wheels do not absorb any water.)*

Profiled Leather Honing Wheel LA-120

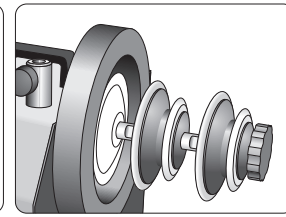
This honing wheel removes the burr and polishes the inside on gouges and V-tools. It has two exchangeable discs, one with a 3 mm (⅛") radius and one with a 60° point. There is a set of Optional Narrow Profiles (LA-124) with a 2 mm (3⁄32") radius and a 45° tip.



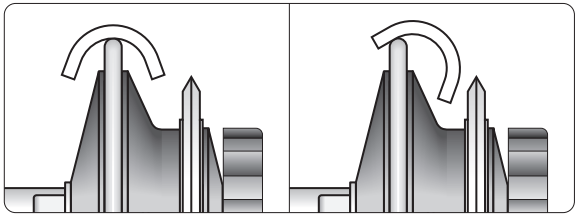
Hold the tool so the flute is at a tangent to the wheel.



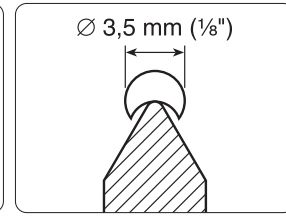
Exchangeable discs. Full scale.



You can mount an extra wheel if you want both sets available.



The Profiled Leather Honing wheel LA-120 copes with all size of gouges. The generous space between the discs allows honing even of large roughing gouges, here size 32 mm (1¼").

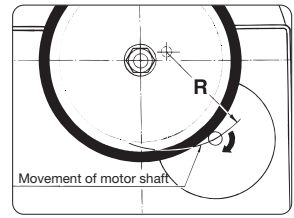


For micro tools you can use a disc with a point. Scale 2,5:1.

Maintenance and Tips

Reduction Gear

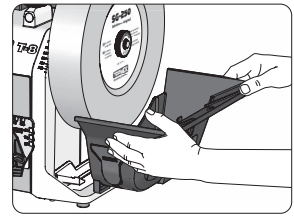
The reduction of the rpm from the motor to the grindstone is achieved by Tormek's special friction drive. The more load you put on the stone, the more the motor shaft is pressed against the rubberized friction wheel, which prevents any slippage. This design, which is developed by Tormek is simple, reliable and has an endless life. The friction wheel should be protected from water, grease and fine wood dust, which can cause the motor shaft to slip.



If the machine is used and stored in a dusty workshop you should cover it to prevent fine wood dust to come into the machine. Tormek can supply you with a custom made cotton cover.

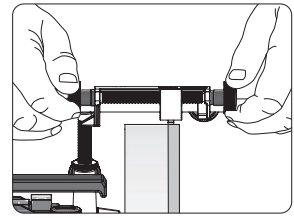
Water Trough

Empty and clean the water trough regularly, otherwise worn particles from the tool and the grindstone will form a compact mass on the bottom of the trough. Do not put the residue down your sink. It could congeal and cause problems with the plumbing. For Tormek T-8, use the scraper, see page 37.



Keeping the Stone Running True

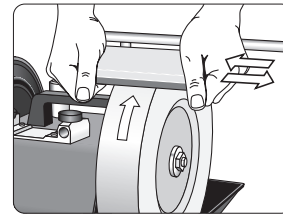
All grinding wheels – dry wheels as well as wet wheels – will sooner or later run out of true. This is a fact that cannot be avoided. With the Tormek Truing Tool you can easily keep it running true. Please see the chapter TT-50. It is easier to grind on an even and true running stone and you achieve a better result.



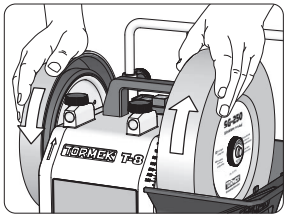
Note *A slight out of trueness will automatically be increased when working on the grindstone as your tool has a tendency to dig in to the low spot of the stone. Therefore, as soon as you notice any lack of trueness, you should immediately re-true the stone. Your grindstone will last longer, if it is frequently slightly trued instead of heavily trued once in a while.*

Re-activating the Stone

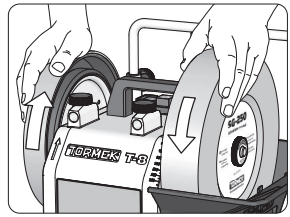
The grinding effect of the stone can be reduced if you grind a hard steel with a large grinding area (e.g. grinding of a planer blade). The stone can be re-activated by pressing the coarse side of the Tormek Stone Grader onto the stone. The old worn grains are removed, thus exposing fresh new ones. Apply a high pressure for 20–30 seconds and use the corners for best effect.



Exchanging Grinding Wheel



Dismounting: Turn the grinding wheel clockwise by hand and the EzyLock washer nut will automatically become loose.



Mounting: Put the grinding wheel onto the shaft and turn the EzyLock anticlockwise by hand. When sharpening, the grindstone will automatically tighten to the right torque. You need no tools.

Lifetime of the Stone

It is not possible to predict how much grinding can be done or how many hours a grindstone will last. It depends upon the tools being ground and how much each tool is ground. As an example, a professional grinder has ground 2.000 food knives on the ∅ 250 mm (10") stone, by which time it had worn to 200 mm (8"). If you shape gouges in HSS steel, it wears the stone more quickly. When sharpening an already shaped tool the stone wear is very limited.

We recommend that the stone is changed before it wears down too much. You should not allow it to be less than approx. 180 mm (7") in diameter in order to ensure a satisfactory grinding performance. The smaller T-4 stone should not be less than 150 mm (6").

Important *If the stone tends to run out of true, true it immediately with the Truing Tool TT-50. This will prolong the life of the stone.*

Important *Grinding a turning gouge to its final shape will wear a groove in the stone if the tool is held on the same spot. Therefore you should move the tool sideways across the stone so that you utilize the whole width and spread the wear of the stone.*

Bearings

The main shaft runs in special nylon bearings. They are designed to have a radial play of 0.1–0.2 mm (0.004–0.008"). This has no influence on the running of the grinding wheel, as the load is always downwards. The bearings are greased at the factory. We recommend that you re-grease them every year or so. Use any type of “ball bearing grease”. Remove the grinding wheel and pull out the main shaft with the honing wheel and apply grease on the shaft and in the bearings.

Possible Problems and How to Solve Them

Our machines are carefully built, and we test-run every machine before it is approved to leave our factory. However, it is a long way from our factory to you, and we have no control over what happens during this journey. Therefore we ask you to check that the machine has not been damaged in transit. If so, the damage should be reported to the dealer immediately. Here are listed possible problems which you can probably handle on your own. If not, please contact your Tormek dealer or our national agent.

The Stone is Not Running True

The stone should run true radially (up and down) within ±0.2 mm (total 0.4 mm or 0.016"). The axial (sideways) tolerance (which has no influence on the grinding result) is max ±0.5 mm (total 1.0 mm or 0.04").

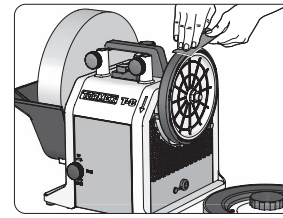
1. If the runout exceeds these tolerances, check that the shaft has not been bent. Replace the shaft if necessary.
2. If the stone has run out of true after a period of use, or if you want less tolerance than above – true the stone with the Tormek Truing Tool TT-50.

There is a “bump” on the Leather Honing Wheel

The leather honing wheel is made with a strip of leather glued onto a plastic rim. This strip has a glued joint, which is sanded down at the factory to the surface of the leather. After a period of use, when the leather has become depressed, the glued joint can remain above the leather surface. You can easily sand away this thin layer of glue by carefully using sanding paper mounted on a wooden piece.

The Motor is Running But Not the Grinding Wheel

Remove the honing wheel and check that the motor shaft is not slipping on the rubber wheel. If it does, it is caused by water, oil or wood dust on the rubber wheel.



- Clean the motor shaft with a grease solvent, e.g. petrol.
- Freshen the rubber surface by holding an emery cloth or sandpaper towards the wheel while running for some seconds. Start with low pressure so that the wheel does not slip and increase pressure gradually until the rubber surface is gripping. If you stop the grinding wheel from turning the drive shaft should also stop.

On models without the EzyLock you should check that the nut on the grinding wheel is properly tightened. If not, tighten it by tapping a 19 mm (¾") wrench a few times gently with a hammer. The nut has a right hand thread.

> ***Tip*** *The Tormek Machine Cover will protect your machine and the drive wheel from wood dust (page 167).*

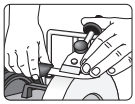
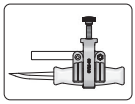
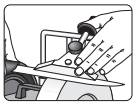
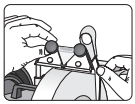
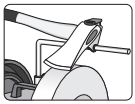
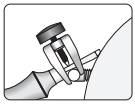
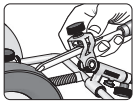
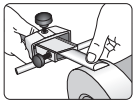
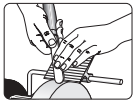
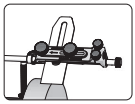
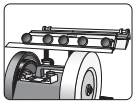
The Motor is Running Hot

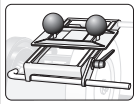
The heat developed by a single phase motor is considerable – even when idling, when it actually reaches its highest temperature. Our motors are designed for continuous operation (except model T-4 which is rated for 30 minutes/hour), and there is no risk of overheating. The electrical insulations are rated to operate at a temperature up to 135 °C (275 °F) with a safe margin against overheating.

This means that the surface temperature of the motor can be quite high, approx. 70 °C (158 °F), which means that you will burn yourself if you touch it. This temperature is normal and there is no risk of overheating.

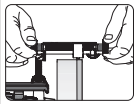
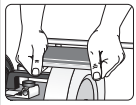
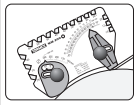
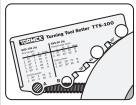
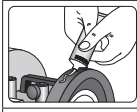
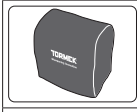
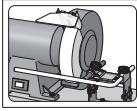
The Tormek Programme

Grinding Jigs

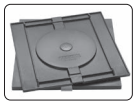
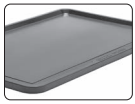
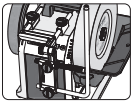
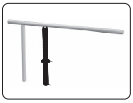
 **SVM-45** **Knife Jig**	For most knives. Minimum blade length 60 mm (2⅜"). Carvers drawknives.	0.20 kg 0.44 lbs
 **SVM-00** **Small Knife Holder**	Enables you to sharpen the smallest knives like chip carving knives and pocket knives. Works in conjunction with SVM-45.	0.11 kg 0.25 lbs
 **SVM-140** **Long Knife Jig**	Stabilizes a thin blade. Minimum blade length 160 mm (6¼").	0.27 kg 0.60 lbs
 **SVX-150** **Scissors Jig**	For scissors and shears. Also for portable electric hand planer blades.	0.43 kg 0.94 lbs
 **SVA-170** **Axe Jig**	For carving and carpenter's axes. Max. axe size 170 mm (6½").	0.16 kg 0.35 lbs
 **SVS-38** **Short Tool Jig**	For straight shanked tools down to 45 mm (1¾") length. Also for power carvers. Max tool width 38 mm (1½").	0.17 kg 0.38 lbs
 **SVD-186 R** **Gouge Jig**	For fingernail shaped turning gouges. Bent carving gouges and curved V-tools. Max. width 36 mm (1⅜"). Also for turning cutters.	0.48 kg 1.05 lbs
 **SVS-50** **Multi Jig**	For turning skew chisels, parting and beading tools and roughing gouges. Straight shanked carving gouges up to 50 mm (2") width. Carving chisels.	0.26 kg 0.58 lbs
 **SVD-110** **Tool Rest**	For turning scrapers, screw drivers, cabinet scrapers, hollowing tools and spoke shave blades.	0.27 kg 0.59 lbs
 **SE-77** **Square Edge Jig**	For plane irons and wood chisels. Aligns the tool automatically to its upper and flat side. With safety stops. Max tool width 77 mm (3").	0.63 kg 1.38 lbs
 **SVH-320** **Planer Blade Attachment**	For HSS blades of any length. Min. width 13 mm (½"). Also for mitre guillotine blades.	1.85 kg 4.10 lbs

	**SVP-80** **Moulding Knife Attachment**	Sharpens all makes and shapes of moulding knives with 24, 30 or 38 mm distance between guide hole centres. Max width 100 mm (4").	1.22 kg 2.69 lbs
	**DBS-22** **Drill Bit Sharpening Attachment**	For sharpening drill bits. 4-facet point for highest precision and efficiency. Separate instruction comes with the product.	3.30 kg 7.28 lbs

Accessories

	**TT-50** **Truing Tool**	With screw feed. Trues the stone exactly round and flat.	0.26 kg 0.58 lbs
	**SP-650** **Stone Grader**	For grading the grindstone to a finer grit. Also for renewing a glazed stone.	0.40 kg 0.88 lbs
	**WM-200** **AngleMaster**	For setting and measuring of any edge angle from 10° to 75°. For any stone diameter from Ø 250 mm (10") down to Ø 150 mm (6").	0.063 kg 0.14 lbs
	**TTS-100** **Turning Tool Setter**	For an exact replication of the shape and edge angle on your gouges and skews when using the SVD-186 R and the SVS-50.	0.19 kg 0.42 lbs
	**PL-01** **Profile Labels**	Set of 9 extra labels for noting the geometries on your gouges and skews.	0.01 kg 0.02 lbs
	**PA-70** **Honing Compound**	For the leather honing wheels.	0.09 kg 0.20 lbs
	**MH-380** **Machine cover**	For protecting the machine from wood dust.	0.15 kg 0.33 lbs
	**HB-10** **Handbook**	"Water Cooled Sharpening of Edge Tools."	0.35 kg 0.77 lbs
	**BGM-100** **Bench Grinder Mounting Set**	For using the turning tool jigs SVD-186 R, SVS-50 and the Tool Rest SVD-110 on a bench grinder.	0.80 kg 1.76 lbs

Continues on the next page

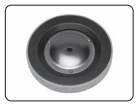
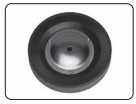
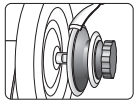
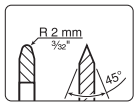
	**RB-180** **Rotating Base**	Enables you to easily rotate the machine 180° and lock it with complete stability.	0.71 kg 1.57 lbs
	**RM-533** **Rubber Work Mat**	With the Tormek Rubber Work Mat you get a water proof yet non slip surface.	1.62 kg 3.58 lbs
	**MB-100** **Multi Base**	Enables sharpening on the side of Tormek's Diamond Wheels.	0.71 kg 1.56 lbs
	**ACC-150** **Anti-Corrosion Concentrate**	Is always used in the water to prevent rust when sharpening with Tormek's Diamond Wheels.	0.18 kg 0.40 lbs
	**US-430** **Universal Support Extended**	Extended Universal Support for sharpening long tools, such as long knives, cleavers and machetes.	0.87 kg 1.92 lbs

Grinding Wheels

	**SG-250** **Original Grindstone**	For the T-8/T-7 model. Ø 250×50 mm. Developed to combine efficient steel removal, smooth surface finish and long life.	5.06 kg 11.16 lbs
	**SG-200** **Original Grindstone**	For the T-4/T-3 model. Ø 200×40 mm. Developed to combine efficient steel removal, smooth surface finish and long life.	2.60 kg 5.73 lbs
	**SB-250** **Blackstone Silicon**	For the T-8/T-7 model. Ø 250×50 mm. Delivers fast steel removal on HSS, exotic alloys and tools with large bevel area. It can also touch up carbide. 220 grit.	4.23 kg 9.33 lbs
	**SJ-250** **Japanese Waterstone**	For the T-8/T-7 model. Ø 250×50 mm. Provides an extra fine surface finish on hand tools where a minimum of steel removal is needed.	5.23 kg 11.53 lbs
	**SJ-200** **Japanese Waterstone**	For the T-4/T-3 model. Ø 200×40 mm. Provides an extra fine surface finish on hand tools where a minimum of steel removal is needed.	2.70 kg 5.95 lbs
	**DC-250** **Diamond Wheel Coarse**	For the T-8/T-7 model. Ø 250×50 mm. Gives an efficient steel removal and rapidly repairs a dull or damaged edge. 360 grit.	3.79 kg 8.36 lbs

	**DF-250** **Diamond Wheel Fine**	For the T-8/T-7 model. Ø 250×50 mm. The ultimate all-round wheel. It combines efficient steel removal with smooth surface finish. 600 grit.	3.79 kg 8.36 lbs
	**DE-250** **Diamond Wheel Extra fine**	For the T-8/T-7 model. Ø 250×50 mm. Gives an extra fine surface finish. Especially suited for carving tools and knives when the need for steel removal is minimal. 1200 grit.	3.79 kg 8.36 lbs

Honing Wheels

	**LA-220** **Leather Honing Wheel**	Gently removes the burr which develops during grinding and polishes the bevel. Fits Tormek T-8, Tormek T-7 and Tormek 2000.	0.54 kg 1.19 lbs
	**LA-145** **Leather Honing Wheel**	Gently removes the burr which develops during grinding and polishes the bevel. Fits Tormek T-4, Tormek T-3 and 1200 models.	0.16 kg 0.35 lbs
	**CW-220** **Composite Honing Wheel**	Suitable to use in clean environments since it has integrated polish to remove the burr. Fits Tormek T-8, Tormek T-7 and Tormek 2000.	0.68 kg 1.50 lbs
	**LA-120** **Profiled Leather Honing Wheel**	For inside honing and polishing of gouges and V-tools. With exchangeable leather discs. One with 3 mm (⅛") radius and one with a 60° tip.	0.26 kg 0.57 lbs
	**LA-124** **Set of optional narrow discs**	One with 2 mm (3⁄32") radius and one with a 45° tip.	0.068 kg 0.15 lbs

PRODUCT INDEX