PROKRAFT®
Wood working & Woodturning Supplies

A GUIDE TO MAKING SALT & PEPPER MILLS

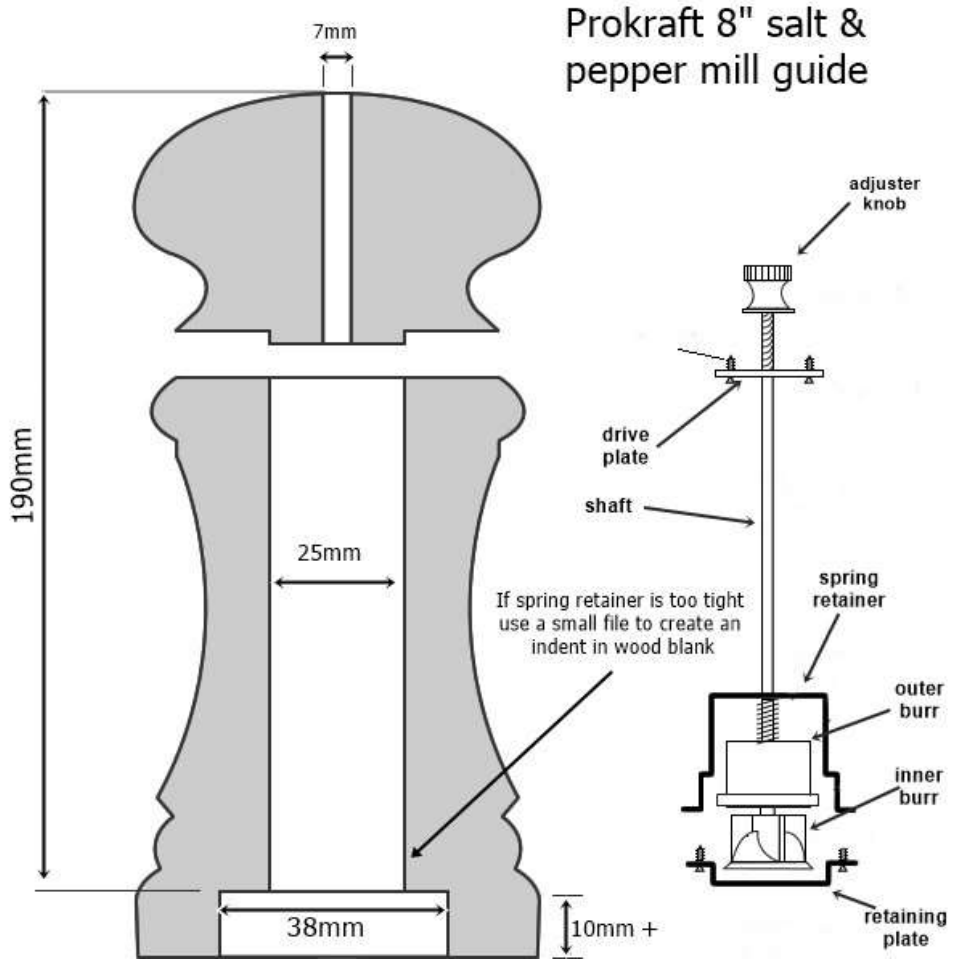
This guide is aimed at dispelling the myth that making mills is difficult, they are very easy and great fun to make and provide the opportunity to get some really unique designs.

Unlike making pens (probably the most common kits to be made) with most mills they can be easily reused in the event of an error. Most parts will simply unscrew and can be put into another blank – no disassembly tools or spare parts required.

There are many different types of mills made out of different materials, what we are covering in this guide are traditional type mills with the grinder at the bottom and an adjuster knob on the top.

Please remember wherever there is a rule there will be an exception.

First of all have a look at the diagram below and identify the parts of the mill you will be fitting:



SHAFTS

There are generally 2 different types of shafts:

1] Aluminium – this is usually a square section with a thread at the top and a flattened section at the bottom. It is a soft malleable metal and aluminium shafts are easily cut shorter and a gentle tap with a hammer on the bottom of the shaft will get back the flattened part – this is the bit that stops the inner burr (grinding part) from falling off. NEVER cut off the thread end unless you are an engineer and can re-cut accurate threads.

2] Stainless steel shafts – these are harder and shinier and often round in profile with sections that are flattened by machine under substantial pressure. We do NOT recommend ever attempting to change these shafts, you would need some very special equipment to do it.

THREADS

At the top of the shaft is a small thread that the adjuster knobs screws onto. These are not all the same and different manufacturers use different threads – they can be difficult to identify, some are imperial and some are metric. At Prokraft we use several different manufacturers of mills and not all the threads are interchangeable.

BURRS

These are the bits that do the grinding and you will generally see the following different types:

1] Plastic burrs: these are only suitable for salt and have poor wear characteristics – they don't last long and their only advantage is that they are not affected by salt and they are cheap. They are NOT suitable for grinding pepper.

2] Stainless steel burrs – these will grind salt & pepper & spices and many people think these are the best – surely they will last the longest? No, they will be affected by salt (salt corrodes most metals unless it is specifically formulated to withstand it) it also wears away in use – slowly but it does.

3] Ceramic, usually alumina ceramic are inert and extremely hard. They are suitable for salt, pepper herbs & spics and have the best wear resistance out of the commonly used materials. They are not affected by water for cleaning purposes. Their only drawback is that they will break or chip if dropped or ground too hard against each other. We believe when installed correctly ceramic burrs are the best option.

4] Cast metal – this could be any number of metal based materials or alloys usually dark in colour as they are iron based, they are only suitable for pepper, they rust and are difficult to clean and you will probably never get spare parts for them. In contact with salt they will likely have a life of months at the most.

SPRING RETAINERS

What are these? They are the part that stops the spring in the mechanism going all the way up the shaft – without one you would need a spring as long as the main body. In conjunction with the spring they keep the inner burr away from the outer burr.

There are generally 2 types - stainless steel and plastic. Prokraft kits use stainless steel wherever possible for one main reason – they are really easy to fit. Once you have a 25mm hole in the bottom of the body these normally just slip inside without any further adjustment. They are thin and malleable – they bend but don't generally break. This is why we call our kits easy-fit.

The plastic retainers are normally tapered from 27mm down to 25mm they are just a bit awkward and have to be turned manually to the correct dimensions on a lathe.

WHAT DO I DO NOW I'VE CHOSEN MY MILL KIT?

The first step is to make sure you have a blank big enough – traditional style mills normally have two measurements in common
A] The shaft size – 25mm – this is the long hole through the middle
B] The retaining plate which requires a 38mm rebate.

We would usually start with a blank at least 50mm in width but the bigger the blank the more you will be able to build your unique design.

The length of the mill chosen is usually determined by the length of drill you have but drilling can be done from both ends – as long as the top hole and bottom hole/rebate are level with each other what happens in the middle doesn't really matter – it will just be full of peppercorns.

Be careful about the wood used, we cannot cover all woods here but we would avoid woods such as yew and laburnum as these species are notoriously poisonous. Beech is the most commonly used wood because it has natural antiseptic properties, it is low cost and it is also easy to turn. All manner of embellishments can be added to it to make interesting designs.

HOW BIG SHOULD THE TWO PARTS BE?

This is the point where we cannot provide “instructions” because it is very much up to you and your design. There is no reason at all why you cannot make a mill 50% body and 50% top but it would be unusual and the smaller the body the less peppercorns it will hold.

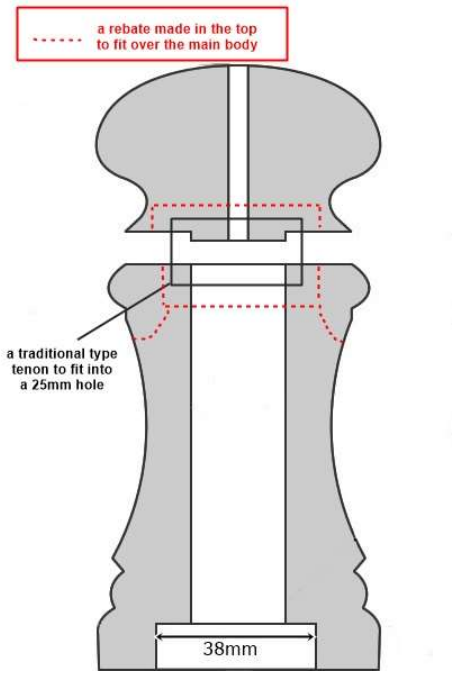
You will see if you look at our dimension diagrams the length of the entire finished piece is shown. With kits such as crank-top mills it is easier because the size of the top is already decided for you.

So an 8” kit will make an 8” mill? - not necessarily – you can rebate the bottom with your 38mm drill as far as you like to make it longer. Just be aware the deeper it is the more difficult it will be to screw in your retaining plate.

HOW DO I GET THE TOP IN THE CORRECT PLACE?

This again is down to the design, if you have a 25mm centre hole you can make a tenon in the top around 24mm so it seats inside the hole.

You can also make a rebate in the top slightly wider than the outer body dimension so the top is guided by the outer body not the internal hole.



Either method will work, each way will affect your design and the finished appearance of your mill.

NB: If you are turning a rebate give consideration to the size jaws you have to hold the part for turning later.

IS IT DIFFICULT TO GET THE MEASUREMENTS CORRECT?

Not really but you do need to measure accurately.

The top adjuster knobs normally have an adjustment range of approx 10mm, whereas the burrs will only move approx 3mm – this gives you a little room for error.

Always make the wooden parts on the bigger side – you can always trim some off – you can't stick it back on again!

HOW DO I HOLD THE PARTS FOR DRILLING?

This depends very much on the equipment you have, you can drill on a lathe, on a pillar drill or even with a hand drill. What is important is that the drilling is level.

The top of the mill MUST be level with the burrs at the bottom.

Why? Because if your parts are not level the inner burr will sit at an angle to the outer burr and you will get uneven grinding.

What tends to happen with uneven grinding is that there is a temptation to tighten the burrs to get a finer grind and one part of the inner burr starts to rub directly on the outer and there is a risk they may chip and break.

HOW BIG CAN I MAKE THE INSIDE?

Usually as big as you like – you will need a 25mm hole at the base to accommodate the burrs but anything above that you can make whatever size you like.

TURNING THE MAIN BODY

This is the fun bit – once you have drilled the parts the correct size the body can be mounted between centres and turned to your design.

We usually use a dead centre at headstock end (a scrap of wood in a chuck turned to a point does this) and a wide live centre at tailstock.

TURNING THE TOP

This is usually done by holding the part in a chuck either with contracting jaws if you have made a tenon or with expanding jaws if yours is a design that has a rebate over the body section. The top can be drilled during the turning process to allow the drive shaft to pass through it. When finished it is just a case of screwing on the drive plate – the part that fits around the shaft to provide the drive when rotated.

FINAL ASSEMBLY

We recommend a test fit first – assemble all the parts loosely and check they have the correct movement and are aligned properly. For the final part it is really only a case of lining up the burr, spring retainer and retaining plate and screwing them in. Ensure the retaining plate is in the correct way so that the inner burr can move up and down – if you put it on upside down it will prevent adjustment.

There are small indents in the side of the burr to allow room for the screws – make sure they are in the correct place and drill a pilot hole for the screws.

A TIP ON SMALL SCREWS: Very small screws have minimal strength simply due to their size so it is important that a correct pilot hole is used.

When we fit the retaining plate we position it first with the parts located correctly and then use a fine point awl to mark the centre, we then drill a pilot hole 0.5mm smaller than the shaft of the screw (2mm screw requires a 1.5mm pilot hole).

If you make an error drilling or fitting the screws the whole mechanism can be rotated and you can have another go – your original holes will be covered – nobody will know!

Always use the correct screwdriver our screws us a Philips head (PH) size one.

Do NOT use pozi drive screwdrivers these will damage the heads. If you look after your screws and use the correct pilot they can be re-used many times with ease.

FINISHING

You can use any finish on the outside of your mill as you prefer.

We get lots of questions about the finish we use on the inside and we simply don't use any, we do not think it is required as long as the dust from turning is removed (an air compressor is a great tool for this).

As always the process of explaining each step and part is somewhat long-winded but we hope by splitting it down into different sections you can select any aspect that you need clarification on.

Above all these mills not only provide the opportunity to create great designs (please look up Jens Quistgaard for some inspiration), make a useful item that is in everyday use above all they are enormous fun to make.

We hope we have guided you on your mill journey.