

A Beginners Guide to Router Bits.

A quick look at any router cutter catalogue shows the myriad of shapes and sizes available, this abundance can be confusing for the beginner, so I thought I might try to demystify it a bit.

Shank diameter.

Cutters can come in a number of different shank diameters, the common imperial sizes are 1/4 " and 1/2", whilst in metric they are 6mm, 8mm, and 12mm. It is important that the shank diameter is correct for your router collet. Usually this is fairly obvious, you can't get an 8mm shank in a 6mm collet, but it is possible to fit a 6mm cutter in a 1/4" collet. This is not safe, 1/4" is 6.35mm and the extra 0.35 can mean the cutter is not held properly in the collet, this could be dangerous to you or your work piece.

Larger shank diameters usually mean less vibration so the quality of cut is better. Larger cutters will only come with 12mm or 1/2" shanks because smaller shanks would break or deform.

It is possible to change the collets down from the maximum size for your router, change from 1/2" to 1/4" for instance. But replacement collets are expensive, so an economy alternative is the reducing sleeve. There can be draw backs to this in greater cutter vibration and the risk of cutter slippage, so I would only recommend this for very occasional use.

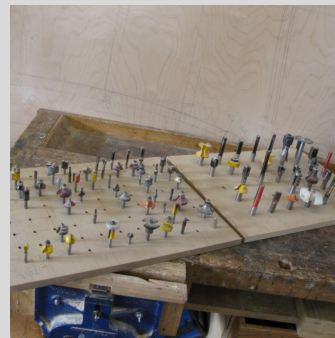
Cutter material.

Most cutters nowadays have tungsten carbide (TC) tips, some are solid TC, spiral cutter for instance. TC is very hard so it lasts longer in manmade materials such as MDF and chip board (the metal particles in chip-board are particularly damaging to cutters). However it is also very brittle so never keep them loose in a container as the knocking together will blunt them. I keep mine either in the plastic containers they arrive in or vertically in a holed board.

High speed steel cutters used to be available for use in solid wood but these seem to have been superseded by TC.



Straight flute cutter with Tungsten carbide tips.



A selection of my cutters stored in a hole board.

Cutter Care

Clean off the resin build up on cutters either using a proprietary cleaner or an oven cleaner (cheaper), I use Mr Muscle! Also make sure the shank and collet are clean before inserting the cutter. Vibration leads to a bad cut and any dirt on either can cause this. Vibration can also be caused by uneven sharpening. If a cutter is blunt it can be touched up a little with a diamond slip stone but be careful to apply the same number of strokes to each cutter to ensure balance. Dress the front face not the outer face, dressing the outer face will change the profile or diameter of the cutter. Touching up only works a few times after that you can either get more costly cutters sharpened professionally or just dispose of the cheaper ones and buy new. I use Leitz Tooling for my sharpening . You get what you pay for with router cutters, cheap cutters do not usually hold their edge very well.



Diamond slip stone.



Sharpen the face, not the outside edge.

Cutter types.

You can spend many happy hours browsing through the Wealden catalogue which has many different categories of cutters. Here's my simplified categorisation:

- **Straight flute.** Smaller cutters can be single or double flute while larger ones (over about 6mm) are double flute as there would be problems with balance with single flute. Some larger cutters may not allow plunging cuts this is evident from the cutter not extending the whole width of the bottom of the bit. Cutter width can range from a minute 1mm to a chunky 40mm. Straight flute cutters are generally used for rebating and grooving. Cutter length can vary a lot, maximum length depends to some degree on width, long narrow cutters would break easily while long very wide cutters would not be stable. Around the 20mm width cutters can be up to 60mm long, good for morticing. Unless you need a very long cut shorter cutters are better as long cutters are less stable leading to vibration and reduced cut quality. Don't forget when grooving you don't need a cutter exactly the width of the groove. You can use a narrower one then move the fence to take a second cut.



Single flute on left, double on right



Cutter on left won't plunge, right one will.

- **Moulding.**

Moulding cutters come in a myriad shapes and within each shape there will be a number of sizes. It can be easy too get carried away and apply mouldings where they are not appropriate, so exercise caution. It is possible to combine different moulding bits to produce more complex shapes. The fielding cutter pictured is my largest cutter, too big for hand held work and must only be used on the router table.



Ovolo moulding cutters, bearing guided on right.



Fielding cutter, to be used only in router table.

- **Side cutting groovers and slitters**

These can be useful as they give a very clean cut. Different cutters and shims can be stacked on the same arbor to give different cutting widths. I use the 1.5mm slitter of the right to cut the lids on jewellery boxes.



Grooving cutters with additional cutter in centre.

- **Bearing guided.**

Most of the cutters described also come as bearing guided versions. This enables the cutter to follow an irregular shape, either a template, in order to form the shape, or following an already created shape to create a moulding. A useful cutter is the Easitip Multitrim from Wealden (on left in picture), this has replaceable blades and a bearing top and bottom, very convenient but not cheap.



Bearing guided straight cutters, note different bearing positions.

Changing the diameter of the bearing on some moulding cutters can alter the profile produced, adding or removing the quirk (the step between moulding and the face). Changing diameter on bearing guided rebate cutters can change the width of the rebate.

- **Scribing sets.**

I do not have much experience of these. They are used when making doors and frames with a decorative moulding. The moulding is carried through the joint so the shoulder of the rail is shaped to fit over the moulding on the stile. Useful if you are kitchen making.



This ovolo scribing set.....



.....would give a joint like this.

- **Spiral cutters.** These are solid carbide cutters ground in a spiral, either downward cutting or upward cutting depending on the direction of the spiral. Primarily developed for use in CNC machines they can also be useful in the small workshop. Downward cutting are good for inlay work as they give a very clean cut. Upward cutting are used when a good finish is required at the bottom of the cut.



Downward spiral cutter.