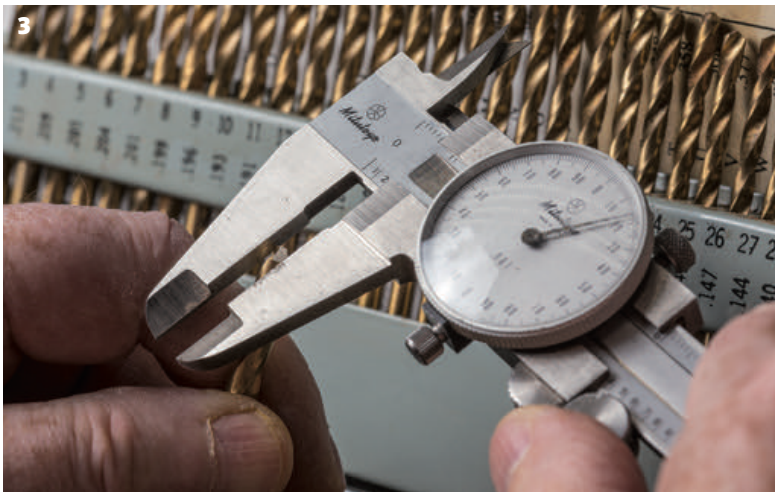
Kurt's clinic

Kurt Hertzog answers readers' questions

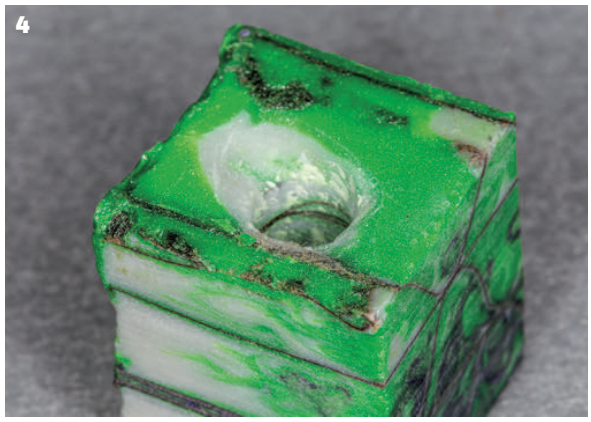
I remember you covering drills and the way to select them for an accurate size. Can you please review that again?

In a nutshell, depending on the quality of the drills you buy, they may or may not accurately reflect the size indicated on the drill body. Remember, everything in the world has a tolerance. Some tolerances are larger than others, with inexpensive products usually having the most. While critical sizing is not often required for woodturners, I suggest that if a hole size is critical to you, measure the drill size instead of believing the number stamped on the drill index. Rather than measuring the shank of the drill, measure the business end. The dimension across the flutes will usually be a bit larger and give a much more representative measurement of the finished hole size.

Since you'll be measuring the actual drill to be used, you can select from the index as needed. Never be afraid to perform a test drilling in a scrap of the same material and measure the result. Most of us aren't making rocket parts so the absolute number isn't usually important. It is most often a transfer or comparison measurement. This relieves you of expensive, accurate measuring tools and allows you to use repeatable measuring tools. Is this key to most woodturners? Perhaps not, but just a bit of real world. What is marked on the box, product, or promised isn't always the case. Just be aware.



1 Knowing the size of the shank of the drill tells you very little about the finished hole. Here a 7mm drill is just proud of 0.272in **2** In reality, it should provide a spot-on 0.277in hole. For pen kits, who cares about 5 thousandths? On occasion, when fitting custom parts, metal, plastic, or wood, I sometimes do **3** When they have sales at the discount auto suppliers, you can pick up a letter, number, and fractional combination drill index for a very nominal sum. Plenty of choice



PHOTOGRAPHY BY KURT HERTZOG

I'm having a terrible time drilling my plastic pen blanks. They are too loose for the tubes sometimes. I also have some of the brittle ones break while drilling. Any help is appreciated.

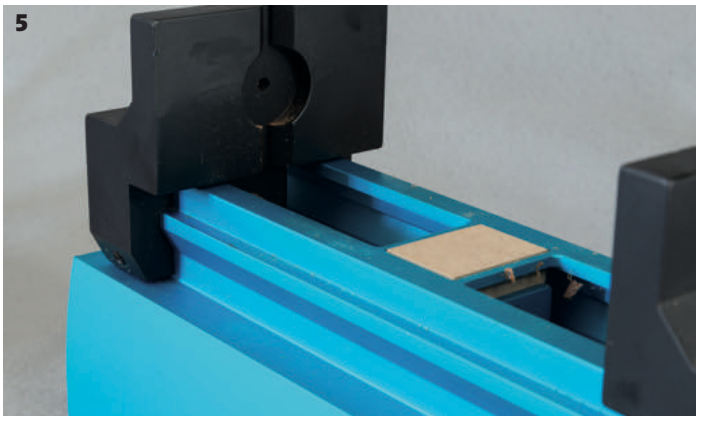
Probably the best place to start is with the material. The term 'plastic', while denoting a material, really doesn't discern from the many thousands of formulations of plastic. Like different species of wood, the different plastics each have their own material properties. These variations in properties will include brittleness and cutting characteristics.

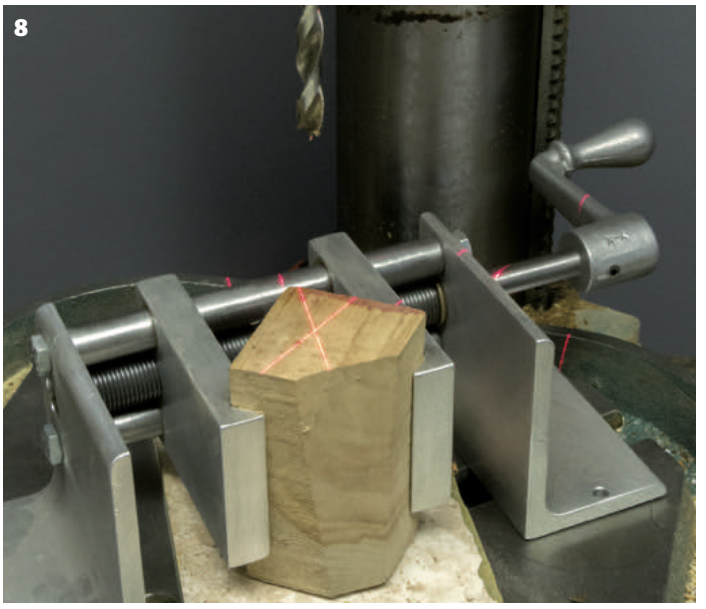
In woods, for example, you drill blackwood much differently to mahogany. The same is true with different plastics. The speeds and feeds of drilling and turning will vary between the different plastics you may find in your turning journey. I can only tell you that drilling a sample, i.e. an unneeded offcut of the material, will quickly inform you of the best speed and feed for unknown materials. Needs common to quality drilling of virtually anything, particularly heat-sensitive materials like plastics, certain species of wood such as snakewood, and natural products like bone and antler, is good drilling practice.

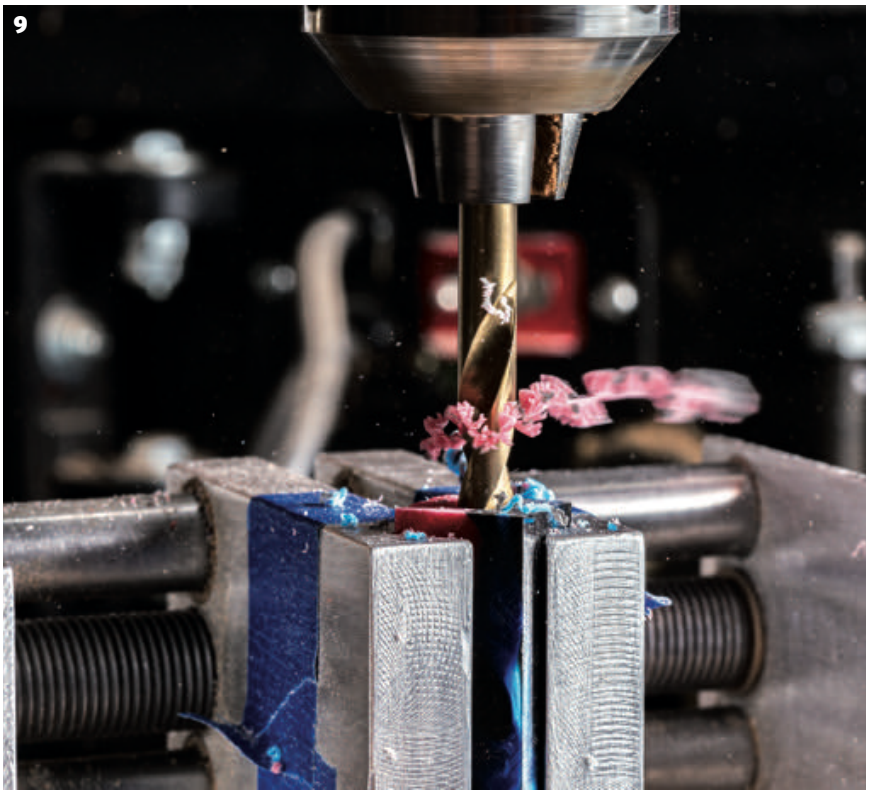
Sharp drills and letting the cutters do the work are key. Without sharp drills, you'll usually run the rpm too fast and use too much down-force trying to get things cutting. This polishing or burnishing of the hole really does little quality cutting and only heats up the material and drill. Use sharp drills and let the drill do the work as you feed it. Breaking the chip, as it is called, is reducing the down-force sufficiently for the chip being ejected to break and begin anew. Too much down-force or clogged chip ejection will overheat the drill, cause plastic melting, and often cause a blowout in the breakout side of the blank. The melting can cause improper sized holes, recast in the hole, and what you've experienced like the oversized holes from melting.

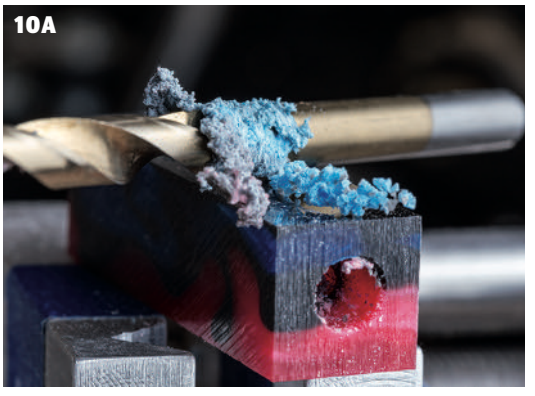
Undersized or very tight holes can be caused by melting, along with recast inside the hole. The best help I can offer is sharp drills, proper speeds and feeds by testing if needed, breaking the chip as needed, reduction in down-force as you approach and achieve breakthrough, and solid sacrificial support under the blank. You'll find the same learning about the turning characteristics. Some plastics are brittle and chippy. Others cut stringy and static charge attracts, and keeps, the debris attached to everything. Plastics are a wide range of materials to add to your repertoire and, like wood, understanding the characteristics of what you are using will help you be most successful.

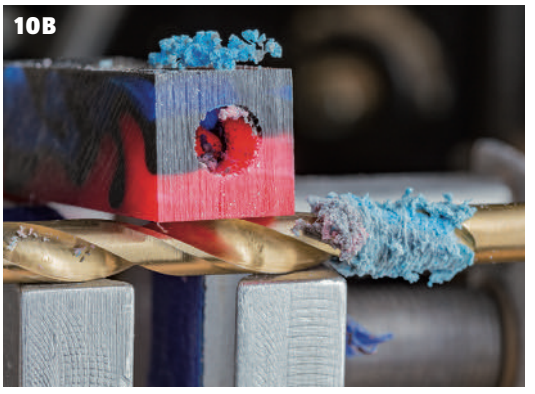
4 The 'blowout' you are experiencing is caused by too much down-force as the drill is about to break through the material and there's insufficient support underneath the drill area











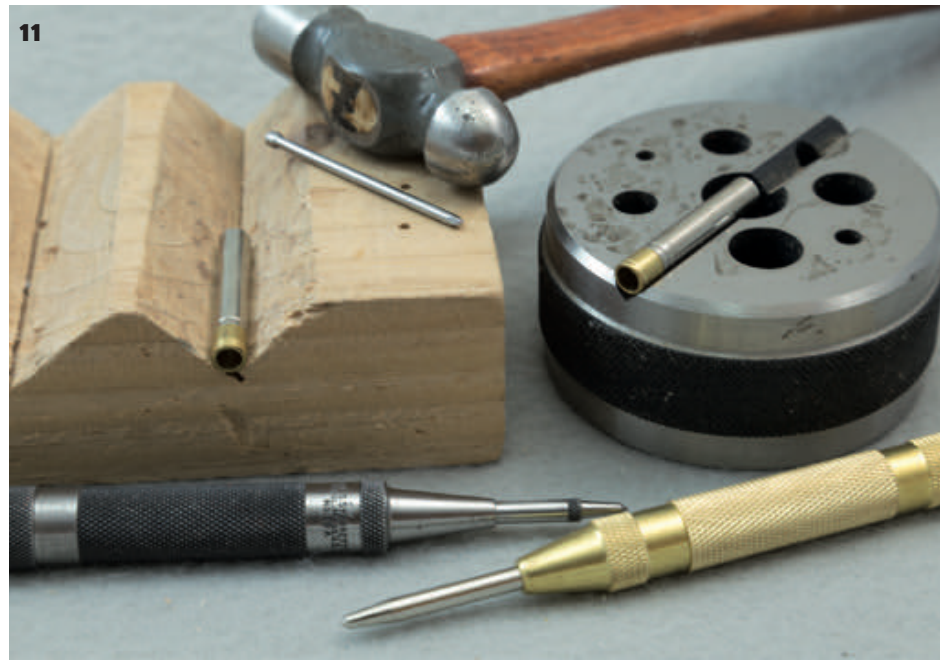
5 Many of the pen vices have a sacrificial and replaceable support underneath the pen blank hole drilling location. This can reduce blowout provided you still ease up the down-force **6** I suggest you jerry rig something for your homemade drilling fixtures. Use a hardwood blank that you can move to provide support as you continue to create holes **7** I use the same concept whenever I am drilling a hole, whether a pen blank or any other stock needing a through hole

8 Get into the habit of backing up any drilling. I find that scraps of excess flooring stock work great. Just remember to move it to provide the support **9** Sharp drills and proper speeds and feeds are critical for all drilling, but especially for plastics. You should be getting decent curls being ejected from the drill flute **10A/B** Flutes clogged with a melted mess is warning of melted holes with recast. Melting can cause size, shape, and final straightness problems with a hole in plastic

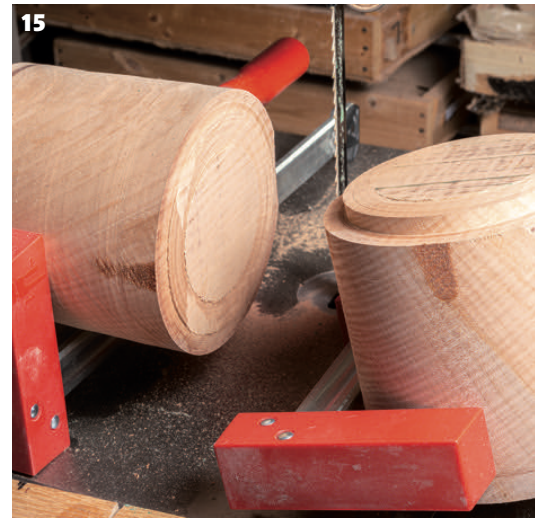
I keep hearing about V-blocks. Do I need one? Is it going to be a tool that almost always sits in the toolbox or will it be more useful?

I can't tell you how much you'll use a V-block or which one(s) to get. Personally, I think you'll need a V-block for safety if you drill into the sidewall of round stock or cut round stock in a bandsaw. Your V-block or blocks will depend on what you work with, the size, and the process.

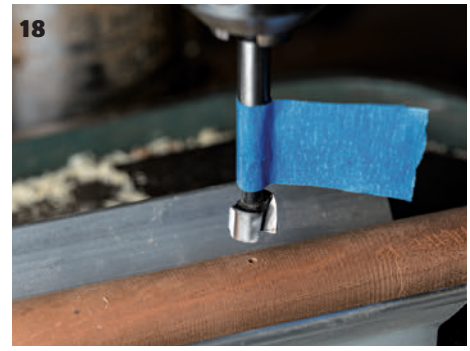
A V-block will assist you in keeping the stock from rotating while being drilled or cut. Either process, drilling or cutting off material, can get dicey in a hurry should the round stock rotate. You can find cast and ground machinists' V-blocks, extruded aluminium V-blocks, and moulded blocks. The straight V-blocks, obviously easier than the round machinists' bench V-blocks, are available with clamps to secure the stock in the V. A simple use explanation is the V-blocks that chain sawyers make and use to hold logs off the ground and keep from rotating. This is the same anti-rotational need that you'll have if you want to lop off some stock with your bandsaw. Don't ever feel you need to buy a V-block since they are easily made and can be sized as appropriate.



11 Drilling, punching, or other operations on round stock will greatly improve using a V-block. The safety aspects alone make having at least one V-block in the shop useful



12 Planning ahead for bandsaw work by leaving some flats for stability, you can round as needed with flats for allowing for safe bandsaw cutting of 'soon to be round' stock **13** Some of my V-blocks. Make your own from wood, use machinists' blocks, V-block extrusions, or see the trick on jerry rigging a V-block function **14** When you don't have V-blocks large enough for your stock, you can find ways to safely secure round stock to prevent rolling when cutting or drilling **15** Using the leading length of the rails to prevent stock rotation into the blade, round stock can be processed provided the clamps can grip the stock securely at the equator.



16 A side note... if you don't have a set of centre drills, get some. Very inexpensive when buying imports from the discount tool or auto stores. Great to spot your hole location **17** As an example, when you are trying to drill anything round, a V-block will let you easily position and safely drill either a spotting hole or drilled hole **18** Continuing the example, with a spotting hole located as desired, a Forstner bit can now be used to create a hole for gluing in another round component