

**WALTER HALL**



Walter Hall is a woodturner who has specialised in making pens and pencils for more than 20 years. Based on the beautiful Northumberland coast

in the UK, Walter sells his bespoke pens and pencils through local craft centres and via his website.

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**EQUIPMENT**

- Pressure cooker
- Vacuum supply fittings: vacuum gauge, valves, four-way connector, straight connector, adaptor
- 20mm-thick sheet of Perspex
- Pair of dividers
- Pillar drill with 3.5mm drill bit
- Bandsaw with a narrow blade
- 3.5mm woodscrew
- Abrasives
- Polishing compounds
- ¼in BSP tap in a tap wrench
- PTFE tape

**MATERIALS**

- Sheet of plywood for a jig
- Pen blanks for testing
- Resin

# A home-built vacuum chamber

Walter Hall makes his own vacuum chamber for stabilising pen blanks

Before I begin to explain how I made my own vacuum pot, for those who are unfamiliar with the concept of stabilising wood or perhaps even why we might want to do so, a brief explanation is in order. Often as pen makers or woodturners we may come across an attractively figured or spalted piece of wood that would make a beautiful pen or other turned item but the wood is so soft and punky that it would be difficult or perhaps even impossible to turn and finish. Stabilising the wood by impregnating it with resin hardens it up so that it can be turned successfully.

A number of different chemicals are available for this purpose, some of which need to be mixed with a catalyst before use and heat treated after vacuuming while others come ready mixed and require only a drying out period to prepare them for use. It is beyond the scope of this article to give detailed instructions for the correct use of each type of resin, but comprehensive instructions are supplied with the products and further extensive advice is often available on suppliers' websites.

To test my vacuum pot I used Drechseln und Mehr Stabi 17 B Vakuumharz (Vacuum resin), which does not require heat treatment after vacuuming. Full instructions for use are available on the website – [www.drechselnundmehr.de](http://www.drechselnundmehr.de) – but you will need to translate them from German using an online translator such as Google Translate.

I had been considering stabilising my own blanks for some time but had been deterred by the high setup costs of a pressure chamber and a suitable vacuum generator or pump so decided to reduce the costs by building my own chamber based upon a retired domestic pressure cooker. This will be large enough for me to stabilise several pen blanks at a time and even to stabilise small bowl blanks. The vacuum is provided by a HoldFast vacuum generator intended for vacuum chucks but will eventually be replaced by a vacuum pump, which will enable a more complete vacuum to be achieved. Useful advice on the selection of a vacuum pump for stabilising is available on the Turntex Woodworks website – [www.turntex.com](http://www.turntex.com) – who are the suppliers of Cactus Juice stabilising resin.



**1** I removed the lid and handles from a domestic pressure cooker and used the cooker's body as the basis for my chamber. Do not use ordinary cooking pots as they are not made of heavy enough material to withstand the vacuum and may deform or implode. While this is unlikely to cause any danger, it will not result in a working chamber so don't waste time going down this route. Don't ask how I know this!



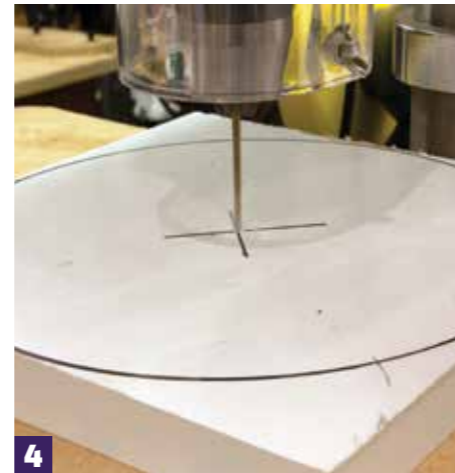
**2** The fittings for connection and control of the vacuum supply are all 1/4 BSP components readily available online or from specialist vacuum, plumbing or hydraulics suppliers. They consist of a vacuum gauge, two valves, a four-way connector, a straight connector and an adaptor to fit the inlet hose from the vacuum supply



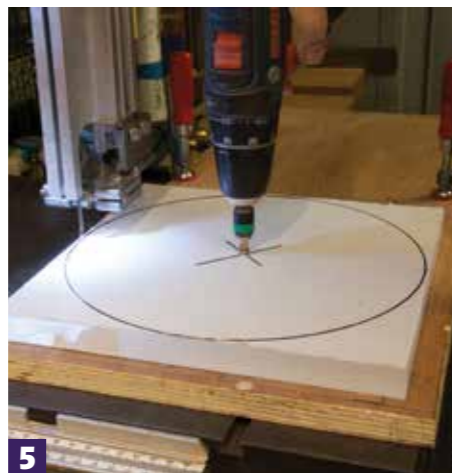
**3** The lid of the pressure cooker must be replaced with a sheet of thick, clear Perspex or similar clear acrylic material so that we can see what is happening inside the chamber. I recommend a minimum thickness of 20mm. I tried some 12mm material at first and, while this worked, it deflected rather too much under vacuum for my liking so I upgraded to 20mm. A local sign maker or plastics supplier may be able to provide you with an inexpensive offcut. I could have left it square but opted to turn it down to a more attractive circular shape. After finding the centre, mark out the shape with a marker pen taped to a pair of dividers



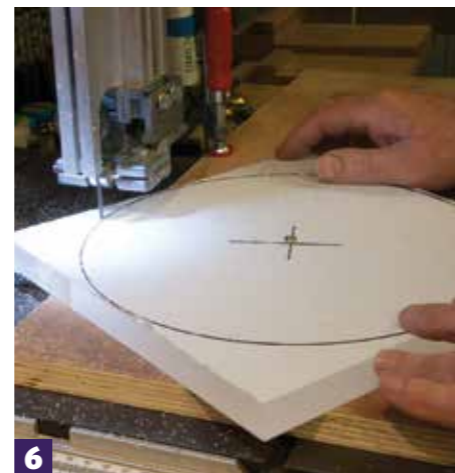
**4** Using a 3.5mm drill bit in a pillar drill, bore a hole in the centre of the workpiece so that it can be attached to a jig on the bandsaw to be cut to shape. A narrow blade is needed in the saw to follow the curve without binding



**5** You could follow the line freehand, but setting up a simple jig ensures much greater accuracy. This simple arrangement consisted of a sheet of plywood clamped to the bandsaw table to which I was then able to screw the workpiece using a 3.5mm woodscrew through the hole pre-drilled in the centre. Careful alignment with the blade is required



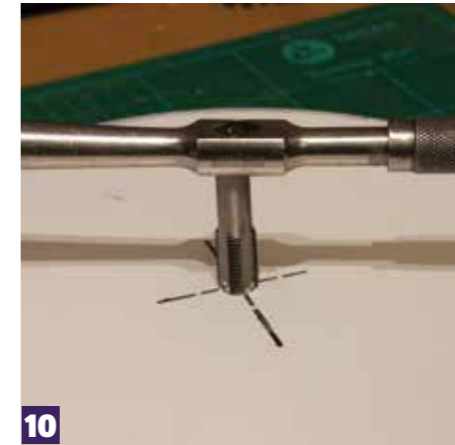
**6** With the workpiece secured to the jig, turn on the saw and slowly turn the work into the blade to cut a perfect circle. Take care to keep your fingers well clear, turning the work by holding it at the side furthest from the blade



**7** After completing the cut and removing the work from the saw, mount the Perspex on the lathe using the 3.5mm woodscrew as a mounting mandrel in a set of engineer's jaws fitted to a scroll chuck and supported by a revolving cone centre in the tailstock. You can then tidy up the sawn edges with the wing of a bowl gouge or whichever tool you prefer



**8** Sand the edge through the grits from 240 through to 600. I used Abranet, but any



good quality abrasive will do. The sharp edges can be rounded off too at this stage

**9** You could leave the edge with a matte finish from the sanding, but I decided to go for a more professional polished look so brought the Perspex to a clear, glass like finish, with Farecla 300 and 500 polishing compounds

**10** Remove the workpiece from the lathe and return it to the pillar drill to be drilled out to 11.8mm and then tapped by hand using a 1/4in BSP tap in a suitable tap wrench

**11** The male threads of all the components are wound with a few turns of plumber's PTFE tape to ensure good airtight joints. Wrap the tape in the direction of the thread

**12** Begin the assembly by threading the straight connector into the tapped hole in the Perspex lid. Tighten it with a spanner sufficiently to ensure an airtight seal

**13** The remaining components are then assembled as shown in the photograph. I found it easiest to assemble the components to the cross piece first and then attach the completed assembly to the connector already fitted to the Perspex lid. The lid is then fitted using the original seal from the pressure cooker as a gasket

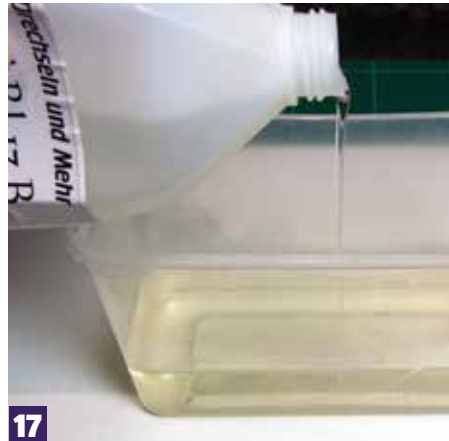
**14** Connect the vacuum supply and run up to its maximum to test the completed chamber. Then close the inlet valve, turn off the air supply to the vacuum generator and leave the assembly to stand to see if the vacuum holds up

**15** After 24 hours the vacuum in my chamber had dropped from 25inHg to about 10inHg so in order to achieve a better seal I replaced the original seal with a flat rubber sealing washer of the type used for industrial pipework. These are readily available in a wide range of sizes from specialist suppliers. You can omit this step if the original seal on your chamber is good enough

**16** All that now remains is a trial run with some punky timber to test the equipment. I decided to use a couple of pen blanks that had been cut from some soft horse chestnut (*Asculus hippocastanum*), which was quite crumbly to turn



**17** For larger pieces such as bowl blanks you could put the resin directly into the body of the chamber, but for these pen blanks I used a plastic container to hold the resin, thus reducing the amount needed and making cleaning up less of a chore. You only need sufficient resin to cover the blanks, too much and it may overflow from the container under vacuum



**18** Make sure to use a container that is resistant to the chemicals you are using. The blanks will need to be weighted down to stop them from floating. I used an offcut of steel angle that I had in the scrap bin



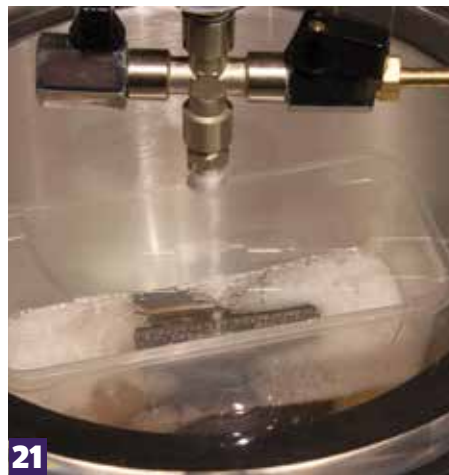
**19** The container is then placed into the chamber, the lid is replaced and we are ready to apply the vacuum



**20** With both valves on the vacuum chamber closed, the airline and vacuum pipes are connected to the vacuum generator and the generator is turned on



**21** The inlet valve can now be gradually opened to allow the vacuum to evacuate any air from the timber and replace it with resin. This should be done by adjusting the inlet valve gradually until full vacuum is achieved. You will see air bubbles coming from the blanks, I have opened the valve fully in the photograph so the bubbles can be seen more clearly, but gradually increasing the vacuum will avoid excessive foaming



**22** Once the maximum vacuum has been achieved the inlet valve may be closed and the blanks left in the vacuum for the time specified by the manufacturer of the resin you are using. The vacuum generator can be turned off but left connected in case the vacuum needs to be topped up. After the specified time the vacuum is released by opening the outlet valve, the wood can then be removed and treated in accordance with the instructions for your stabilising product ●

