

Making Small Hollowing Tools

By Ed Malesky

Small scale hollowing tools for projects like Christmas ornaments and small hollow vessels are quite easy to make and very inexpensive. You also don't need many tools to make them, so they're worth giving a try. Most of these techniques can also be scaled up to produce a set of midi-hollowing tools as well, for work a bit larger.

Start by purchasing your steel. I have use both W1 and O1 steel to make my tools. W1 steels are quenched in water, while O1 tools are quenched. Other than the quenching method, the rest of the procedures are the same.

I get my steel from MSC Industrial Supply Co. You can search for W1 or O1 steel or use this link:

http://www1.mscdirect.com/CGI/NNPDFF?PMPAGE=1761&PMT4NO=45678747&PMT4TP=*ITPD&PMITEM=06061121&PMCTLG=00

The basics of their different steels is in the catalog on page 1745.

For the smallest hollowing tools I use 3/16" square stock. The square stock allows me to cut through a smaller opening and is more stable on the tool rest. For slightly larger tools I use 1/4" square stock. These tools have the end of the steel hardened as the cutting edge. If I am making tools with an HSS insert, then I use round stock, most commonly known as drill rod.

Steel from MSC comes annealed, or soft, so it can be cut easily with a hacksaw or cut off tool.

Step one is to cut the steel to length.

- Right angle tool – 4"
- Longer bent tool – 6 1/2"
- Straight tool – 6"

Here I'm using a Dremel, but you can use a hacksaw.

Generally I use 3/16" stock for the small bent and right angle tools, but 1/4" for the straight tool



Once cut off, do a preliminary shaping of the nose on the grinder. Then heat the steel where you want to do the bend. You can use a propane torch or MAPP gas.



Use a hammer to put in the bend on either an anvil or a machinists vise, which generally has a small anvil table. The picture is for longer bent tool, which is easy to bend. You'll need to make a sharper bend for the right angle tool, smarting the bend about 5/8" from the end of the tool.



Now you're ready to harden the steel. You need to heat the steel to 1450° F. You can either heat to red hot for 7 minutes/1/4 of cross section, or to heat until a magnet will not stick to the steel.

I generally put the steel in the vise while heating or you can hold in vise grips.



As soon as the steel has been heated for the correct time, quench it. Use a metal container (not like the plastic in the picture) to hold the quench solution; water or brine for W1 and olive oil for O1.

Swirl the steel around in the quench solution.

For brine - Mix 1/4 cup of salt to a quart of water to end up with something close to a 7% solution.



The steel will now be hard and brittle and needs to be tempered for use.

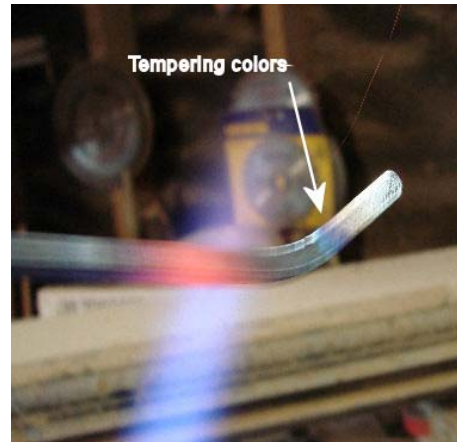
Clean off the oxide by using some fine sandpaper. You need to have at least one side clean and shiny so that you can see the tempering colors.



Now you're ready to temper.

Hold the tool in some vise grips and begin to heat the steel pretty far away from the tip. As the steel heats you'll begin to see the tempering colors develop.

As the steel continues to heat the colors will move toward the tip. You need to quench the steel **as soon as** the straw color hits the tip.



After quenching grind the final profile on the tip and turn a handle for the tool.

