

# Vacuum-Dyed Wood

By Butch Schultz

*All you need is a vacuum pump, a few pipe fittings and a pot. In short order, you will be changing the color of every type of wood imaginable.*



Vacuum-dyed wood is the perfect way to add brilliant colors and enhance the visual appeal of your project without losing the beautiful grain and pattern of the wood. First, vacuum-dyed wood is unique. Second, it's easy with the right equipment. And third – it's a heck of a lot of fun. Red is my favorite, and it works well with any wood. Red walnut is stunning.

But before you get started, know that the true secret to successful vacuum dyeing is all about the pot, drawing a strong vacuum, and maintaining it. Work safely – and keep in mind that good equipment is first priority.

My first inspiration to vacuum-dye wood came shortly after purchasing some high-priced bloodwood, purpleheart and Brazilian mahogany. Short of matching the beauty of the exotics, my original intent was to do something interesting

with wood and color, and maybe save a little money.

I tried soaking wood in dye, but that took too long – months, in fact. Standing on my deck one day, I began to wonder about the process involved in pressure-treating lumber. I visited several websites to learn how they do it, but they weren't talking. No sir. That's proprietary stuff. But it made sense to me that the process had to be very fast and very cheap, and that they had to be using vacuum – and maybe some air pressure in the end to give it a final push.

## Getting Started

I got lucky. Right about this time a friend threw out a paint sprayer pressure tank and I scooped it up. It was relatively clean, had an 80-psi max rating, still held pressure and the lid included five pipe-threaded holes. Perfect. This



will serve as my pot. I dug up an old pneumatic PIAB vacuum pump; bought some ball valves, pipe fittings and a vacuum gauge. To insure a perfect seal, I cleaned the pipe threads with acetone and

used high-quality silicone as a sealant.



The dye that I ended up with is TransTint, a 2 fluid ounce concentrated dye solution available at woodworking stores. Mixed with 2 quarts of isopropyl alcohol, it gives a brilliant color and dries quickly without distorting the wood, and within a few days you can be doing your glue-ups. I experimented with powdered and liquid Ritz clothing dye mixed with alcohol, but the viscosity just wasn't there for total penetration. Besides that, the wood felt gooey and sticky.

Fixturing the wood in the pot is critical. The wood must be held down below the fluid level during the process, with minimal contact with the fixturing and the pot. I fabricated fixtures made with plastic pins. Three pins support the wood underneath, and three pins hold the wood down. The idea is to have minimal contact with the wood so that the wood can be completely surrounded by the

dye solution. I glue the pins vertically to a sheet of plastic, set the plastic sheet on the bottom of the pot, set the wood pieces on top of the vertical pins, and then insert another sheet of plastic (with pins) into the pot on top of the wood. The ceramic cups are placed on top to weigh everything down and to keep the wood from floating during the process. Plastic and ceramic cleans up great with soap and water, and you don't have to worry about rust and corrosion as you would with metal nails, for example.

If you are using a pneumatic vacuum pump, a good-sized air compressor is a bonus. A small, one-gallon compressor will give you the same results, but it will require more cycles before you reach maximum vacuum. With a one-gallon and a five-gallon compressor, the maximum vacuum that I have been able to achieve is about 22 inHg, or 75 kPa. That's not much compared to the industrial big boys or what's possible in the research lab, but it's still a heck of a lot of vacuum and it works very well.

### **The Process, and the Wood**

Poplar is a relatively soft, porous wood and accepts the dye in short order. With poplar, I use what I call the 2-2-2 method: The first stage is two hours under vacuum with no dye or alcohol; second stage is 2 hours under vacuum with dye, and the third stage is two hours under 80 psi of air pressure, with dye, to "push it in". A harder, denser wood such as walnut

is 12-12-12, and with hard maple I go 48-48-48.

The first stage is simply to remove the air from the wood. In order to get total dye penetration, you want to get all of it. Adding the dye to the pot for stage two is easy – The pot is not opened to add the dye, it is added with a plastic tube that is attached to a valve on the pot. The other end of the tube is inserted into the dye and alcohol storage bottle, the valve is opened, and the vacuum in the pot sucks it right in. (You'll lose a tiny bit of vacuum when adding the dye, but try hitting it with the vacuum pump once more to "top it off".) For the third stage, I simply release the vacuum (slowly to avoid fluid turbulence) and immediately pressurize the pot with about 80 psi. I use the gauge on my air compressor for my reading.

When it is finished cooking, it is just a matter of releasing the air pressure (slowly) and opening the pot. On first inspection, the first thing you will notice is that the wood remains below the fluid level – on its own. It does not float! The wood is completely saturated, and all of it is lying on the bottom of the pot. Set the wet wood up on three vertical nails to air dry for a few days, top off your dye bottles with fresh alcohol, clean up with soap and water and you're ready for the next color.

Before you start gluing up, cut about an eighth of an inch off of each glue surface to insure

that the glue surface is flat and to remove any uneven coloring. With my segmented vase projects, I pre-cut my segments oversized, vacuum-dye them, cut them to size and then glued them up into rings. The ring-stacking process and the turning on the lathe will trim the remaining surfaces.

What's next? How about vacuum-varnish? Try turning a poplar bowl and then vacuum-varnish it with 50-50 varnish and mineral spirits. I tried this, it works well, but I still have a few details to iron out, for instance, I want to try 50-50 varnish and isopropyl alcohol. Mineral spirits takes forever to dry and it stinks up the place.

In closing, I don't know exactly where I'll end up with this vacuum-dye-varnish adventure, but I'm having fun finding out. Another thought is food coloring and isopropyl alcohol. Or, how about a vacuum-Stetson Cologne bowl for your sweetie? You can play on her perfume-laced love letters of yesteryear. She'll smell it before she opens the gift-box (like you smelled her letters within 30 feet of the mailbox), and it will smell forever! What a perfect way to put a final seal on your love and commitment!

## **Resources**

Paint sprayer pressure tank – [www.mcmaster.com](http://www.mcmaster.com)

TransTint concentrated dye solution – [www.woodcraft.com](http://www.woodcraft.com)

Plastic pins for fixturing – Order a large pizza and look inside the box.

P.S. McMaster-Carr is one of the best industrial supply houses out there. They've got it all. They have good stuff, the prices are competitive, and they deliver fast. You want ball end mills for making your own lathe tools? Check them out.