

Getting Started with wood burning

First some terminology. Some folks use wood burning, some use pyrogaphy.

I consider wood burning to refer to decorating wood with burn marks.

Pyrography is the art of decorating wood or other materials with burn marks. Can be canvas, leather, gourds. The word pyrography translates from the original greek words to mean "writing with fire".

Whatever term you like to use, the burning of the material results from controlled application of a heated object.

The heated object is sometimes called a burning pen, sometimes called a burning tool. The pen or tool may use a solid tip or a wire tip.

Many solid tip tool use an electric element with a fixed amperage which means a fixed maximum temperature.

Many wire tip tools use a power supply which is frequently a variable output to allow control of the temperature and so more control on the burning.

If you want to purchase a commercial burning pen, this site has a good summary of the different brands on the market. A long page, scroll down to see the chart.

[Woodburning tools review chart](#)

The above site talks about wattage. Watts do not create heat. Amps create heat.

Watts = Amps x Volts, so Amps = Watts / Volts

Heat generated in a conductor = (Amps)² x R – amps squared x resistance of the conductor.

This means the temperature of a conductor will rapidly increase with increase in amps.

Note that the heat generated in a conductor is independent of whether the current is AC or DC.

Some commercial pens are designed to use AC, typically 120V for US market. These often have solid tips.

Some commercial pens are designed to used DC. The voltage depends on the

power supply connected to the pen. A number of pen manufacturers also sell wood burning power supplies. These are normally more expensive than other methods to build or purchase a power supply.

Before selecting/designing a power supply, you need to know or calculate the current requirement of the tool(s) you intend to use.

Solid tips are normally purchased from a wood burning tool company. They are typically designed for fixed current pens. The solid tips screw into the pen. Be careful screwing when hot, since it is easy to damage the threads.

The manufacturers will state the wattage of the pen. You need to divide the wattage by the volts to calculate the current if you will be using a power supply.

Solid tip wood burner example.

[30 Watt 120V wood burner](#)

Many wood burning tips are made from wire, normally nichrome wire, an alloy of nickel, chrome and in some cases iron. Nichrome wire is used in foam cutters, toasters, and many applications where heat is needing to be generated from an electrical source. The wire is screwed into two terminals on the pen.

The pens cost around \$10 - \$30. The tips cost a lot more. Commercial offerings from a mail order company. One example, many others. [Packard Woodworks woodburning products](#).

The pens are not listed separately. Have to click on a burner manufacturer then look for the pen and / or tips.

Pens are easy to make yourself. See the Graeme Priddle style wood vapourizer link below.

A home made pen based on Graeme Priddle design.

A piece of wood dowel drilled down the centre.

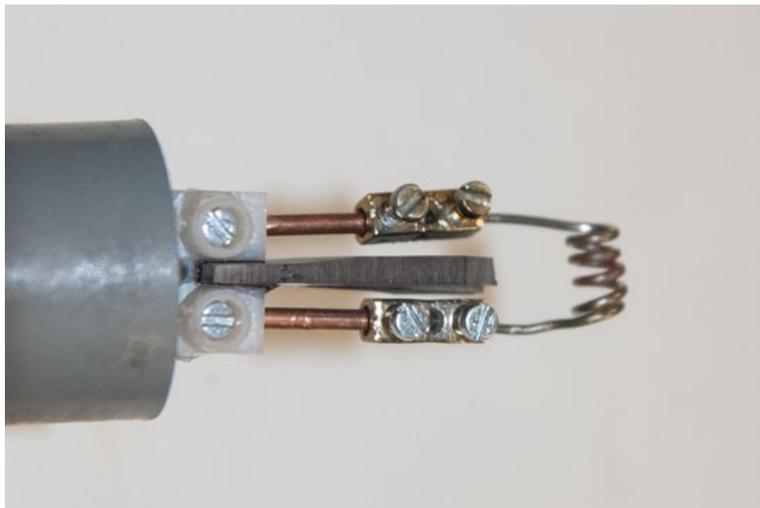
Terminal strips to connect the power cord to pieces of bare copper wire used to insulate the terminal strips from the heat of the burning wire.

The burning tip is screwed onto the bare copper wires.



After initial test burning I found the copper wire sections moved too much.

I shortened the copper and crimped flats on each end for better grip by the terminal screws. I also crimped the ends of the nichrome wire. A big improvement in rigidity.



Below are options for a power supply. I purchased a benchtop power supply.

This model has separate controls for voltage and current.

The voltage is just the voltage drop of the pen. I can reduce the voltage below the 1.8 V in the picture below, but this will also reduce the current.



The pen tip in the above picture is consuming 8.11 amp DC. Barely glowing red. The tip consumes more amps than I appreciated.

My test of the power supply and pen. Easily burning on this piece of pine.



If you want to calculate the current for a wire tip, this is a good on-line calculator.

[Jacobs nichrome wire application calculator](#)

I recommend to build or purchase a power supply with 10 amp capacity.

Wire gauge is not intuitive. Bigger gauge numbers are smaller wire diameter.

I would start with 18 or 20 gauge. Smaller wires (bigger gauge number) can be used for more delicate lines, but will also tend to bend under pressure.

Larger wires (smaller gauge number) are strong, but have less resistance since larger diameter so need more current to generate the same temperature as smaller wires.

Use the lowest temperature which will burn the wood. This should give the longest life for the burning tip.

Jacobs is a good place to purchase bulk lengths of nichrome wire. They sell anywhere from 10 ft length to 250 ft length. A 10 ft length of 20 gauge is \$4.50 which is a LOT less than purchased pre-made tips.

[Jacobs Nichrome 60 wire](#)

Copper is an excellent conductor, perhaps 1/50th the resistance of nichrome so will not heat up well, which is good in our house wiring but not good for burning.

A lot of different ways to make a tip depending on what shape is desired – line, dot, basket weave etc.

If you want to make a basket weave tip wrap the wire tightly around a nail. Experiment with nail size to give the width of weave desired.

If you want an open weave like the above picture, wrap the wire tightly around a coarse thread screw. Again experiment with diameter.

Alternate methods to make or purchase a power supply.

a) Commercial wood burner power supplies offerings from a mail order company. One example, many others.

[Packard Woodworks woodburning products](#)

b) Purchase a bench power supply. Less expensive than the wood burner and should work just as well. Often a bench power supply will allow separate variable

controls for voltage and current. Also may have meters for both. DC is not required for the pen, but it is common for variable power supplies. Likely to be useful for other purposes in the shop, even charging batteries.

[30V DC @ 10 amp bench power supply](#)

c) Build your own.

A good article to read before you embark on building your own power supply.
[Jacobs page on power supply design](#)

Good video on converting a battery charger to make a power supply. This one controls voltage on the DC side, so expensive magnetic dimmer. Full bill-of-material in the video. A battery charger typically shows output voltage, but does not show output current.

[Make a wood burning transformer](#)

This one controls voltage on the AC side, so can use inexpensive light style dimmer. Also shows how to make your own wood burning pen.

[Graeme Priddle style wood vapourizer](#)

Most of the sites show converting a battery charger. Remember, AC and DC amps generate the same heat. An inexpensive AC transformer which can be used with inexpensive light style dimmer.

[150 Watt AC transformer](#)

If you are adventurous you can convert a desktop computer ATX style power supply. Many videos on how to do this. Some methods are more complicated than others. Easier to purchase an external adapter so you can replace the old computer power supply if it fails, or if you later need a bigger power supply.

[ATX board adapter to create bench power supply](#)

If you make your own power supply, ensure that whatever transformer you use can be dimmed if you want a variable power supply.

If you purchase a transformer watch this video before you do the normal test that it is working. I had not appreciated some transformers only show output on analog meters and some also need a load due to the design of the electronics.

[Troubleshooting low voltage transformers](#)

This article is about getting the equipment for wood burning. How you use the wood burning tool is another topic. Not the same as writing with a pen. You need to work slower. Sand the wood first which will improve the lines. A smooth surface will produce a more consistent line than a rough surface.

As soon as the tool touches the wood, it will begin to cool. If it is not burning as desired, remove from the wood and wait for the tool/pen to warm back up to the desired temperature.

Read about cleaning the tips. Carbon and grime will build up fast. Avoid abrasive paper since it will remove metal from the tip as well as the carbon. Let the tip cool before cleaning.

There are many sites to provide inspiration and assistance.

Take a look at the LVW Member Galleries. Some terrific examples of burning and texturing by the club members.

[LVW Member Galleries](#)

One example of a well known wood burner,
[Molly Winton demonstration at Carolina Mountain Woodturners](#)

Mollys site so you can see her Gallery for more inspiration.

[Molly Winton site](#)

Graeme Priddle site has a number of handouts from his demonstrations. Also look at his Gallery.

[Graeme Priddle demonstrations and class information](#)

If you want to see some very detailed pyrography and ink texturing, Mike and Cynthia Gibson site is worth a visit

[Mike and Cynthia Gibson site](#)

Australian artist Sue Walters has a lot of information on her site. Wonderful artwork.

[Sue Walters site](#)