



## So You Want a Vacuum System

After a turner has been in this “Spinney Thing” for about a year or so, I often hear them say, “How do I go about putting together a vacuum system? There are probably as many different answers as there are turners, so, let me add another to the list in hopes it will help someone make it through the process smoothly. I will attempt to give an answer that will fill all the gaps I found when I was going through the process. Keep in mind this is not the only way, but it worked out well for me. I spent a lot of time reading every article I could Google that had to do with the subject. Quite honestly, the more I read the more confused I became. I wanted to do it right and not “Mickey Mouse” the project, but I didn’t want to spend another grand for this set-up. I did receive some great help and support from the Turners at [Sawmill Creek Woodworker’s Forums](#)

First, let’s break this down into the basic categories of items that you are going to need.

### I. Vacuum Pump



After a good bit of research I found that the recommended pump and best for this application, but certainly not the only one that can be used, was the **Gast 0523 Rotary Vane Vacuum Pump** I looked at all types of pumps and spent a good bit of time on ebay watching what the different pumps sold for and which ones moved the quickest.

The pump you will need for this purpose

needs to conform to the following for best results:

- Oil less
- Rotary Vane
- Will pull 24 to 26 pounds of vacuum (CFM)
- Thermally sealed motor
- Continuous Duty
- 230/220-240 Volt. Some folks want to convert to 110 but with this motor you are better off running 220. This may require wiring for 220 in your studio or shop if you don’t already have it. In my opinion it is well worth the effort and cost.

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I ended up purchasing mine at [Surplus Center](#) and was very pleased with the service. Even though it doesn't say in the specs, it met the CFM requirement. Mine pulls 25 lbs of Vacuum.

### II. Filters



Two filters were needed. The first, 1/4 NPT STANDARD PARTICULATE BOWL TYPE FILTER was attached directly to the vacuum pump on the intake opening as shown here. I also chose to use a shielded model for protection of the glass bowl. Some might say that this filter is a bit of overkill but then I just wanted something durable. Something less would work just as well.

←

The second is a plastic air intake filter used on the regulator assembly. It just keeps dust

from entering the system. →



Both of these filters were purchased at Surplus Center.

### III. Muffler



The muffler is placed in the exhaust port of the pump and does a great job of muffling the sound during operation. Again, a Surplus Center purchase.



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### IV. Vacuum Regulating Set-up and Switch

I choose to have my regulating controls and power switch where I could easily access them from a turning position. In order to do that, I needed a big gauge, 4 inch, purchased from Surplus Center. Also, a pole and platform was made. It was all stock lying around the garage.

I purchased my brass fittings and valves at Lowes (see *parts list*). My yellow spiral vacuum hose is from Harbor Freight on sale.



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### V. Vacuum Adapter

My vacuum adapter is not home brew. It was purchased from [Robust](#) and it works perfectly.

There are many options to adapters and for various lathe setups. Some of those options are available through purchase and others are home brew. Just be sure whatever you choose is leak free and good for the long haul.





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### VI. Vacuum Chuck



When building my chuck bowls I wanted to have something solid and versatile as well as keeping the cost down somewhat. Because I use the Faceplate System from [Craft Supplies USA](http://www.craftsuppliesusa.com) I wanted to utilize that system with my vacuum chucks also. I find it to be very convenient and versatile. I made the back plate from  $\frac{3}{4}$ " MDF and the actual bowls are PVC Couplings. The plate is secured to the faceplate with allen head bolts and regular nuts that go completely through the MDF.

I like the coupling because it adds more flexibility in use. By using the coupling I am able to insert pipe lengths when I need extra length. This is handy, especially in the smaller sizes. You will notice that the couplings have a center stop line to insure good alignment. Your pipe cut must be straight however. I choose to cement the coupling into the groove that I cut into the MDF and then I poly-coat the seal and MDF. Using this approach I get no vacuum leakage. The threads of the faceplate and adapter give me no problems at all. I currently have couplings from 1" to 6" and will be going as large as twelve. I have finished 20" bowls using this 4" chuck. The red seal is closed cell foam purchased in the craft area of Wal-Mart.





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### VII. Mounting and Switch

To have an easily accessible switch was important to me. The regulator platform has proven to be perfect for me. Eventually I'd like to replace it with one that has a light to show power on but that is just a nice to have feature that is not critical. A good heavy duty 220 switch is a must.



I'm no expert in the electrical area and I had a lot of help from one of my fellow Creekers. He helped me to stay on the safe side and in code compliance as well.



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In order to keep the wiring and vacuum line out of the way and keep things as neat as possible I ran the line and wires down the center of the pipe stand. I also consider it a safety feature as they do not present a catch or trip hazard this way.



By using some angle stock, U bolts and allen-head bolts to secure the support brackets to the lathe, the assembly is very solid. I have placed the pump assembly on a steel stand that my Dad fabricated many years ago. This stand is next to, but not secured to, the lathe so it does not vibrate.

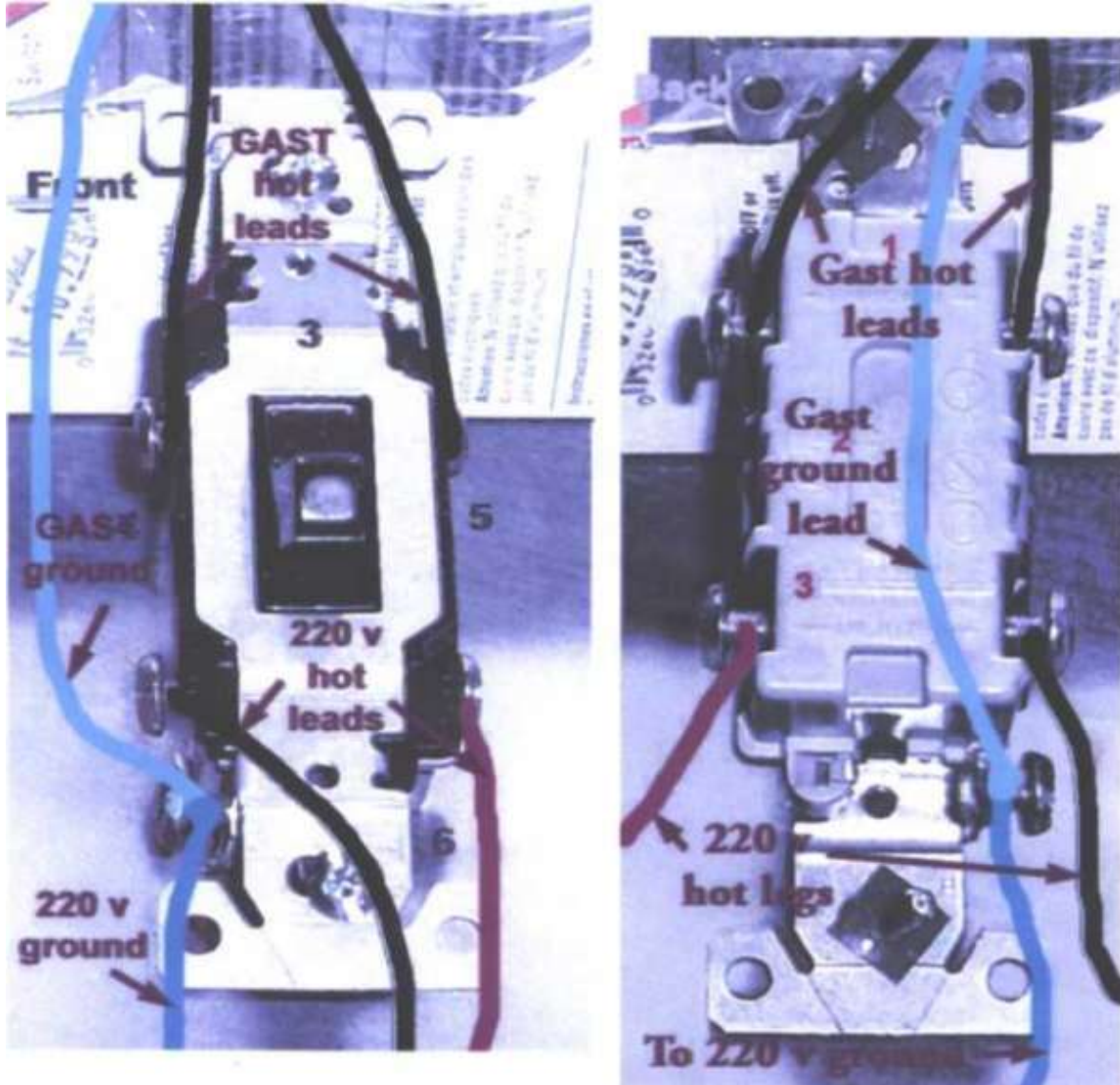
The pump itself is mounted to a steel base with rubber shock mounts and the junction box for the electrical connections is mounted there also.



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Shown here are pictures of the way to wire the switch for 220 uses. One of the 220 power leads is shown here as red and the other black. That is the color they need to be but in all likelihood the wires that you have are one black and one white. Since white is the color code for neutral you can use it as long as color code each end of the white wire using either red color electricians tape or permanent red felt tip marker (check that the color does not smear off). The reason for the need to color code the wire is for the safety of anyone working on the system in the future. If the wire were not properly marked the miss-coding could lead to the person accidentally being electrocuted. (Compliments of a fellow Creeker)

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**VIII. Parts List and Prices**

<i>Item</i>	<i>Units</i>	<i>Price</i>	<i>Total</i>
Vacuum Pump	1	89.95	89.95
Bowl Filter	1	12.95	12.95
Plastic filter	1	2.50	2.50
Brass Muffler	1	2.75	2.75
¼ NPT "90" Elbow	2	2.25	4.50
¼ NPT "T"	2	2.95	5.90
¼ NPT 1 ½" nipple	2	2.75	5.50
¼ NPT Hex Nipple	2	.89	1.78
¼ NPT Push-on Hose Barb	2	.39	.79
30 in.Hg 4.5 LM DRY GAUGE	1	18.95	18.95
Ball Valve	1	2.99	2.99
Ball Valve	1	6.27	6.27
Brass Quick Coupler Set	2	3.99	7.98
½" Self coiling Air Hose	1	2.50	2.50

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<i>Item</i>	<i>Units</i>	<i>Price</i>	<i>Total</i>
Clear plastic Hose	<b>10 ft</b>	<b>8.00</b>	<b>8.00</b>
3/8" Adjustable Hose Clamp	<b>2</b>	<b>1.50</b>	<b>3.00</b>
Rubber Damper Cushion	<b>4</b>	<b>1.29</b>	<b>5.16</b>
Plastic Wall Switch Box	<b>2</b>	<b>2.49</b>	<b>4.98</b>
220 Wall Switch	<b>1</b>	<b>9.00</b>	<b>9.00</b>
Switch Plate	<b>1</b>	<b>1.25</b>	<b>1.25</b>
Solid Cover Plate	<b>1</b>	<b>1.25</b>	<b>1.25</b>
6' of 1 3/4" pipe	<b>1</b>	-	-
"U" Bolts	<b>3</b>	-	-
56" long Angle Iron	<b>1</b>	-	-
Steel Tray 8" X 16"	<b>1</b>	-	-
Heavy Gauge Electrical Wire	<b>15'</b>	<b>20.00</b>	<b>20.00</b>
Electrical Speed Nuts	<b>4</b>	-	-
MDF		-	-
<b>4" Faceplate System (Set of 5)</b>		<b>74.99</b>	<b>74.99</b>

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<i>Item</i>	<i>Units</i>	<i>Price</i>	<i>Total</i>
PVC Coupling	1	-	-
Allen Head Bolts and Nuts	4	-	-

*\*\*\*These are approximate prices as of date of publishing and are subject to change due to time, store product availability and various other reasons. This list is supplied as a guide to help someone have a rough idea of project needs and general overall cost.\*\*\**

I hope this has been helpful in some way to someone. If it has or has not please let me know by going to my contact page. Thank you, CKH