



How to Buy a Lathe

Congratulations on considering the purchase of a lathe. Like most anything else, you'll want to do your homework and buy the "right" machine for you. After all, this is supposed to be a one-time purchase, right? This article attempts to take the mystery (and expense) and out of buying a lathe for the first time. In general, and not surprising, the more you pay, the more you get when buying a lathe. The trick is to find your personal balance point between cost and benefit. Keep in mind, this is a personal decision, there is no "perfect fit" lathe for everyone.

Certificate of Accuracy. A good starting point is to ask if the lathe come with a Certificate of Accuracy. For a lathe, this is going to be a series of industry standardized alignment tests that details as to what standard, and how precise the lathe is built to. Why does this matter? Because the parts you ultimately make will be limited to how precise your lathe is built, no matter how developed your skillset becomes. Yes, anyone can find a cheap lathe on the internet or eBay. But no matter how low the price, the machine is not a deal if it doesn't cut true.

Imperial leadscrews. Turning the handwheels on your lathe causes the leadscrew to rotate, which in turn causes the carriage, cross slide or compound to move. On the handwheels, you will typically see that each increment is labeled as "0.002", which is imperial for two thousandths inches of movement per increment of movement. But while the handwheel might be labeled in imperial increments, the leadscrew that you're turning may be metric, not imperial. The reason for this is simple economics. Because the rest of the world uses metric leadscrews, they're more plentiful, and therefore it's typically cheaper for manufacturers to use metric leadscrews rather than imperial leadscrews. Okay, but what's the problem? The problem is that the conversion between metric and imperial is never exact - it never divides evenly. The end result is that for every revolution of an imperial handwheel connected to a metric leadscrew, a little bit of distance is "lost". A typical benchtop lathe takes 1 revolution of the handwheel to physically move the cross slide 0.1". Therefore, a 6 inch facing movement requires 60 revolutions of the handwheel. It's easy to see how the error can quickly accumulate. For this reason, it's always best to buy a lathe with imperial leadscrews on the carriage, cross slide and compound.

Variable speed motor. On the most basic of lathes, the speed at which the work turns is governed by a belt which rides in a series of pulleys. In order to change speed, it's necessary to stop the lathe, open the gearbox, loosen a plate called the "banjo", and physically move the belt to another smaller or larger diameter pulley as needed. Then the banjo must be re-adjusted for the proper tension, the gearbox door closed, and the lathe started up again. For a few dollars more, a slightly more expensive lathe will have a variable speed motor, which is controlled either electrically through a rheostat or an electronic controller. This means that the speed of the lathe can be changed immediately, while the lathe is still running. Additionally, it saves the operator from the time and inconvenience of having to change the belt, which is most assuredly an unpleasant task of moving the belt manually from one pulley to another.

Change gears. Right along the same topic of user convenience as having a variable speed motor is change gears. Change gears are used for threading, and control the ratio between the revolutions of the workpiece to the distance traveled by the carriage. The operator of a lathe *without* change gears must stop the lathe, open the gearbox door, and manually re-arrange a series of stacked, interlocking gears. While changing a belt "might" be a messy job, changing gears is guaranteed to get grease on the hands. In contrast, the operator of a lathe equipped *with* change gears simply turns a knob on the front of the machine to select which set of gears they desire. No more stacking greasy gears, and it's a lot more convenient, not to mention much faster too.

Brushless motor. A brushless motor doesn't have brushes to change, and is therefore maintenance free. Additionally, brushless motors are more efficient and offer more torque than a traditional motor. For all of these reasons, brushless motors are more desirable.

Size. Just as in racing, bigger is nearly always better. Larger, heavier mass machines are more stable, and will produce superior results. Of course, no matter how big a lathe you get, you'll eventually run out of room on at least one project!

Power cross slide. No matter how careful you may be, a powered cut will always be smoother than a manual cut. Having a powered cross slide allows you to make smooth, finish quality facing cuts.

Voltage. For most of us, having the machine wired to 120V will save you time and money. A machine that requires 220V will probably require you to add another circuit to your shop, and if the lathe is large enough, may even require a 3 phase 220V circuit. This, of course, adds even more time and expense.

Spindle Bore. The spindle bore is a measure of the largest diameter piece that will fit through the spindle (which is hollow). Fitting your workpiece through the spindle is often necessary when performing gunsmithing operations, such as chambering a barrel. Often times, the spindle bore is the achilles heel, or most limiting factor, of a lathe. Again, larger is nearly always better.

Your Project. Another consideration is what you're trying to make. Determining the rough dimensions of the parts you plan to work on, and the precision you'll need to hold, is perhaps the most important aspect of your lathe buying requirements. For example, if you'll be making press fit parts, such as those in gunsmithing or engine building, you'll want to ensure you get a precision machine that can hold the tolerances you need. Similarly, the size of your project will determine the size of the lathe you require. If you're making custom pens, you'll obviously not need the carriage travel of someone who's planning on chambering rifle barrels.

Well in this article we've tried to present what we consider to be the most important aspects when buying a lathe. Of course, keep in mind that everyone will naturally have a slightly different idea of what's the most important criteria for a lathe, but at least now you have a ready list of the primary factors to consider.

Congratulations, and enjoy your new lathe!

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