

Lathe Handout



This is a lathe. Note that it's clean. Note that the floor is clean. This is how your lathe should look after you have used it. As you can see, we've provided a dust pan and hand brush for you to clean your lathe. Vacuums are also available.

Each lathe has a cabinet. Every cabinet has a set of collets on top of it, and a set of cutting tools in the drawers.

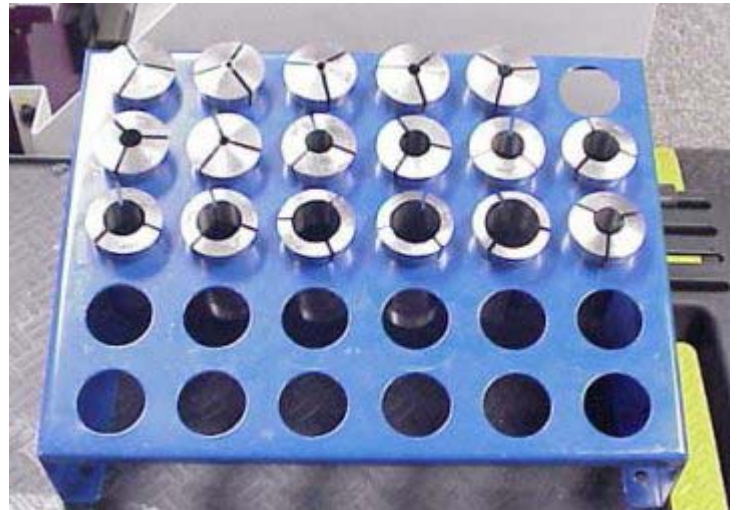


This is a front view of the lathe. Note the on/off lever and the foot brake.



These are collets. Be nice to the collets. They're your friends. Anyone caught using a hammer on a collet will be forcefully ejected from the shop.

Collets are the most effective means of fixing your part to the lathe. Collets are easy to use, but it would be extremely difficult to describe the proper use of a collet here, so if you've never used a collet before, please ask for help.



These are the speed controls. Using them you can adjust the rpm of the spindle and the feed rate of the lathe. Always stop the lathe before adjusting its speed. To change settings, position the lever so that the tip of its red arrow is pointing towards the correct marking. In the case of a dial, turn the dial until the little white line points at the desired setting. Don't forget to set the A/B/C/D knob to the correct position. It is located around the corner from the speed control panel.

There's a little bit of a trick to getting the levers to lock into position, so ask for help the first time you do this.

Note: A speed selection chart has been provided below for your convenience. It contains some recommended spindle rpm and feed rates for use with different materials. Note, however, that this chart is for reference only. It is based solely on empirical experiments. Therefore, if at anytime you feel uncomfortable with the way in which the lathe is interacting with a piece of stock, shut off the lathe and seek the assistance of one of the machinists.



These speed recommendations are not absolute. Speed selection is driven by part material, tool material, and tool velocity relative to the surface being cut. A natural consequence of this is that turning speed is inversely proportional to part diameter. In other words, all other things being equal, turning speed should increase as part diameter decreases. These are just rules of thumb for dealing with parts in the 2.007 kit. Consult [Machinery's Handbook](#) (page 987-1002) for a more thorough discussion. More information is also available from the department's [Lathe Lecture*](#). The main thing to remember is to ask for help if the lathe starts to complain. You'll know when this happens.

Turning Speeds by Material

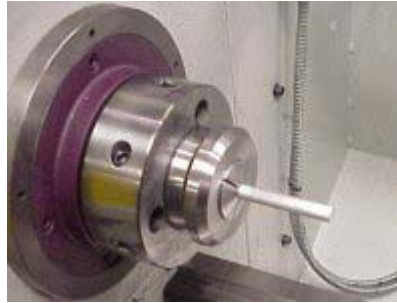
Materials

Steel

Aluminum

Plastic

Picture



Speed

315 rpm

630-1000 rpm

1000 rpm

Comments

The tail stock is used to provide additional support to this long piece.

A part fixtured to the lathe acts much like a beam in bending, and will deflect under cutting loads

Always use a center drill. It will keep the drill from walking off center.

Turning Speeds by Operation

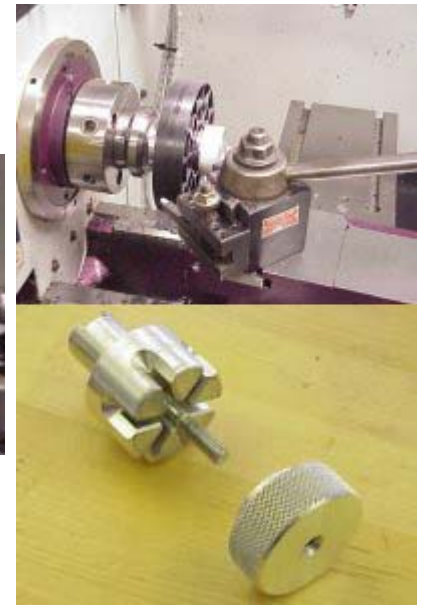
Operations

Reaming

Three Jaw Chuck

Wheel Fixture

Picture



Speed

315 rpm

less than 2000 rpm

1000 rpm

Comments

A reamer makes a better hole than a drill bit. It's more round and the diameter is more accurate. Reamers can only remove a few thousandths of material.

Use a three jaw chuck to fixture parts too large to fit into collets. Only one of the lathes has a chuck on it.

Use this fixture to reduce the diameter of your wheels and to crown them.

Speed Selector Chart - This chart is for reference use only, and is based on empirical data alone. If at anytime you feel uncomfortable with the way that the lathe is reacting, shut off the lathe and seek the assistance of one of the machinists.

Material	Stock Diameter	Recommended RPM	RPM Setting	Feed Rate Setting (Rough Pass)	Feed Rater Setting (Finish Pass)
6061 Al, Delrin, & Lexan	.1" - 2"	1000	Red, Gray II	AFGJN	CEGJM
	.25" - .5"	1000	Red, Gray II	CEGJM	CEGJM
Steel	1" - 2"	1000	Red, Gray II	AFGJN	AFGJN
	.25" - .5"	1000	Red, Gray II	CFGJM	CFGJM
Stainless Steels	1.5" - 2"	1000	Red, Gray II	AFGJN	AFGJN
	.25" - 1"	630	Yellow, Gray I	CEGJM	CEGJM