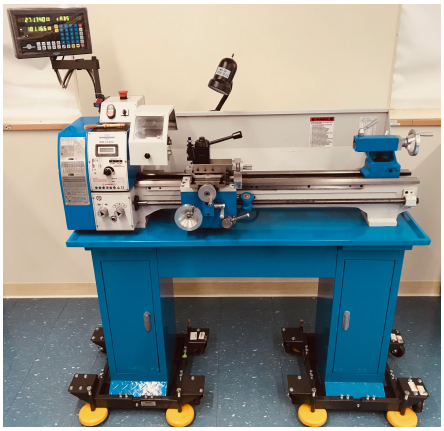
SAFE OPERATING PROCEDURE

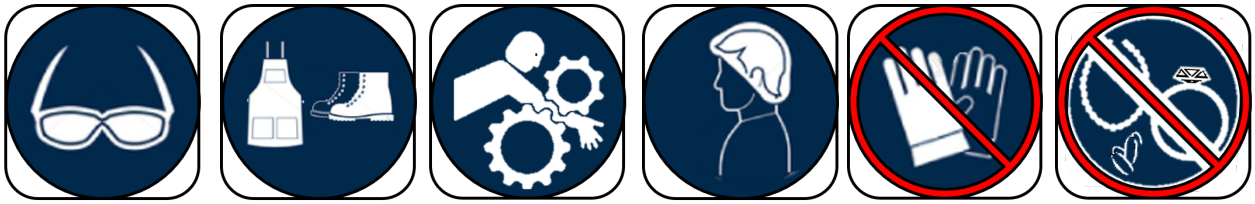
Lathe



Machine:	Lathe
Make/Model:	PM1030V
Revised:	3 / 10 / 2023
Author:	Trevor Marks
Location:	Engr. II, rm 2226
Department:	Mechanical Engineering

DO NOT use this machine unless you have been trained in its safe use and operation!

Personal Protective Equipment



Safety Glasses Required | Protective Clothing | Entanglement Hazard | Contain Long Hair | Do Not Wear Gloves | Do Not Wear Jewelry

Potential Hazards

- Eye injury from flying chips or broken bits
- Cuts from contact with cutting tools or pointed end of center
- Entanglement in rotation machine parts
- Pinch from moving machine parts
- Burns from hot tools or hot work pieces
- Metal Splinters
- Falls due to poor housekeeping around the machine

Procedure Checklist

PRE-Operation:

- Identify ON/OFF switch and emergency stop button.
- Keep overhangs as small as possible and check that the work piece is securely clamped. Use the tailstock if a work piece extends more than three diameters from the chuck.
- Remove all tools and parts from the top of the lathe and from the bed and slides.
- Remove the chuck key before starting the lathe.

- Check to ensure the cutting tool and carriage is clear of the work.
  - Turn the chuck or faceplate by hand to ensure there is no binding or danger of the work striking any part of the lathe.
- Make sure chip shield and guards are in place.
- Disengage any active auto-feed controls and set the correct rotation direction.

Operation:

- Turn on power.
- Never leave the lathe running unattended.
- Set the correct speed for machining process and for the cutter being used.
- Use a brush — never a rag — chips.
  - Never use your bare hand to remove chips (even if the machine is stopped)
- Use cutting fluid as needed.
- Power down machine when finished with task(s).
  - Do not attempt to slow/stop the chuck or work by hand.

POST-Operation:

- Use a brush or rag to clean machine.
- Remove any custom fixtures used.
- Ensure the space and floor around the mill is clear of chips, debris, and oil.
- Leave the machine and work area in a safe, clean state.

Do's and Don'ts

Do:

- Read the user manual: [GitHub LINK]
- Approved materials for this machine: some steel, aluminum, brass, and plastic.
- Consult with lab manager or Machinery's Handbook for cutting fluid choices.
  (typically WD40 for aluminum and brass and dry for plastics)
- Work from a drawing and a project plan (ask the lab manager for templates).
- Take the time to properly layout your work.
- Use the light to help illuminate the work area.
- Use care when removing drill chuck from the tailstock — always support the tool with one hand when removing.
- Check tailstock alignment *every-time* before turning between centers.

Don'ts:

- Do not use the lathe without approval!
- Do not use custom fixture without approval.
- Do not remove/change the lathe chuck without permission.
- Do not use your bare hand to wipe away chips.

- Do not use compressed air to clean any part of the lathe.
- Do not power the machine in an attempt to tighten or loosen the work.

Speed and Feed

Table 1: **Turning speed** recommendations; given in feet per minute.

Material	HSS	Carbide
Steel	100 - 300 [Note 1]	700 - 900
Aluminum	400 - 700	800 - 1200
Brass	100 - 300	800 - 1200
Delrin	500 - 600	
Polycarbonate	950	

Note 1 Free machining and low carbon steel only.

Note 2 Speed and feed values are suggested starting points; they may be increased or decreased depending on machine conditions, depth of cut, finish required, etc.

Speed Formula

$$\text{Speed} = \frac{12\ \text{SFM}}{\pi\ \text{DIAM}}$$

Where Speed is the speed of the work in RPM (revolutions per min), SFM is the cutting tool speed at the surface in FPM (feet per min), and DIAM is the diameter of the work piece in inches.

Speed and Feed Calculator hosted by LittleMachineShop.com
https://littlemachineshop.com/mobile/speeds_feeds.php