SAFE OPERATING PROCEDURE

Drill Press

Machine:	Drill Press
Make/Model:	Grizzly G7947
Revised:	3 / 16 / 2023
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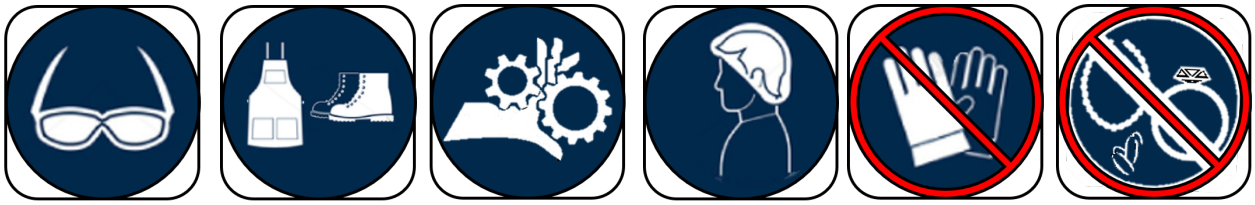
Location:	Engr. II, rm 2226
Department:	Mechanical Engineering

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

Typical Operations

- Drill (through and blind holes)
- Bore and counter sink
  - Speeds for counter sink operations are approximately $^1/_2$ speed for similar sized drill bit
- Ream
  - Speeds for counter sink operations are approximately $^1/_2$ to $^2/_3$ speed for similar sized drill bit

Procedure Checklist

PRE-Operation:

- Identify ON/OFF switch.
- Keep overhangs as small as possible and check that the work piece is securely clamped either in a drill press vise or to the table. Use V-blocks for round parts.
- Ensure chip shield is safely positioned and secured.
- Check to ensure the cutting tool is clear of the work.
- Remove all tools and parts from the drill press table.
- Ensure cutting tool is clear of work and can turn freely.
- Ensure the correct speed for the drill bit is selected.

Operation:

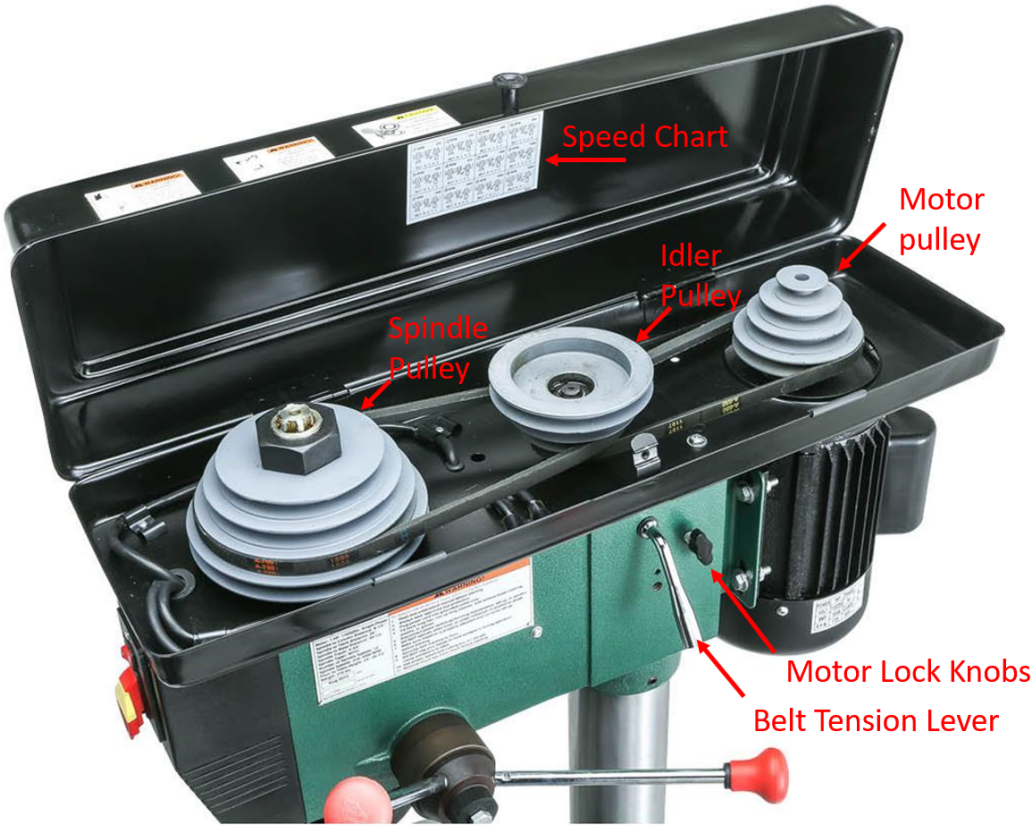
- Turn on power.
  - Never leave the drill press running unattended.
- *Peck drill* – remove material in increments of 0.05 inches – to start holes.
- Apply even pressure on the feed; listen for “chattering”, “squeaking”, or over heating bits.
- Use a brush — never a rag — to remove chips.
  - Never use your hand to remove chips (even if the machine is stopped)
- Apply cutting fluid as needed.
- Power down machine when finished with task(s).
  - Do not attempt to slow/stop the chuck or spindle by hand.

POST-Operation:

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

Changing Speed

1. **DISCONNECT MACHINE FROM POWER!**
2. Loosen *motor lock knobs* (one on each side).
3. Rotate *belt tension lever* to take tension off V-belts.
4. Locate desired speed on *speed chart* and move V-belts to corresponding V-grooves on the *motor, idler,* and *spindle pulleys*.
5. Rotate *belt tension lever* until belts are tight; tighten both *motor lock knobs*.
6. Close cover before plugging in machine.



Do's and Don'ts

Do's:

- Read the user manual: [GitHub LINK]
- Approved materials for this machine: some steel, aluminum, brass, plastic, and wood.
- 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 on the drill press to help illuminate work area.
- When drilling large diameter holes first drill a pilot hole. The pilot hole should be as large, or slightly larger than, the width of the large drill bit's dead center.
- Ensure you will not drill into the table when drilling through holes.
- Use care when removing a drill bit from the chuck — always support the tool with one hand when removing.
- Use sharp drill bits. . . ask the lab manager where the sharpener is (yes, we have one!)

Don'ts:

- Do not use the drill press without approval!
- Do not use end mills in the drill press.
- Do not use Dremel bits in the drill press.
- Do not use custom fixture without approval.
- Do not hold the workpiece being drilling with your hand(s).
- Do not use your bare hand to wipe away chips.
- Do not use compressed air to clean any part of the drill press.
- Do not power the machine in an attempt to tighten or loosen the chuck.

Speed Recommendations

The speeds shown here are intended as a starting point only. The optimum speed will always depend on various factors, including: tool diameter, drilling pressure, material hardness, material quality, and desired finish.

Table 1: **Speed** recommendations in RPM.

Drill Bit	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
1/16” — 3/16”	3300	2350	2350	2350	3300	2350
13/64” — 3/8”	2350	2050	2050	1260	2350	1260
25/64” — 5/8”	1650	1260	1650	1260	1650	670
11/16” — 1”	1260	630	1260	440	1260	400

Forstner Bit	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
1/4” — 1/2”	2050	1650	–	–	–	–
9/16” — 1”	1650	1260	–	–	–	–
1-1/8” — 1-7/8”	1260	670	–	–	–	–
2” — 3”	630	400	–	–	–	–

Hole Saw	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
1/2” — 7/8”	630	630	670	–	–	–
1” — 1-7/8”	440	440	630	–	–	–
2” — 2-7/8”	310	310	400	–	–	–
3” — 3-7/8”	210	210	310	–	–	–
4” — 5”	210	210	210	–	–	–

Note:

- Running a tool too slow will only decrease productivity; however, running a tool too fast with regard to speed or feed rate will result in accelerated tool wear or outright failure. . . So err on the side of running too slow.
- A feed that is too light will cause the drill to *chatter* and rapidly dull. A feed that is too great can cause chipped cutting edges, drill breakage, or excess heat — avoid too great a feed.