

## Shop Safety Procedure



<b>Equipment/Task Name:</b>	<b>DRILL PRESS</b>
<b>Equipment/Task Hazard Class:</b>	<b>4</b> <a href="http://ehs.yale.edu/forms-tools/tool-classification-matrix">http://ehs.yale.edu/forms-tools/tool-classification-matrix</a>
<b>Shop Name:</b>	
<b>Shop Hazard Class:</b>	

### Purpose

Drill presses are used to produce round holes in a variety of materials. Although the majority of drill press tooling consists of various types of drill bits, specialty tooling is available for countersinking, holesawing, center-punching, and mortising.

Drill presses may be smaller bench-mounted units or larger self-standing tools. Many shops have multiple drill presses that have been dedicated to particular working materials, i.e. wood, metal, or plastics.

### Hazards

As with all shop tools, there are many potential hazards associated with the use of a drill press. Larger self-sanding drill presses are Class 4 tools while smaller benchtop units are typically Class 3 (<http://ehs.yale.edu/forms-tools/tool-classification-matrix>). There are a number of particular hazards associated with the operation and use of drill presses, regardless of size.

#### Rotating Drill Bit, Drill Chuck, and Spindle

- Large amounts of energy embodied in rotating parts
- Potential for loose clothing, jewelry, hair, or other items to become entangled in rotating parts, potentially drawing operator close to or into the wheel or shaft with serious consequences.

#### Sharp Tooling and Edges on Workpiece

- Potential for cuts, lacerations, and puncture wounds
- Fresh cuts on work piece may produce burrs and other sharp edges

#### Flying or Rotating Objects

- Cutting and boring activities can generate sharp flying chips posing skin and especially hazard injury hazards.
- Workpieces, drill bits / tooling, or clamps can become disengaged and rotate or be flung across the room. Insufficiently secured work pieces can be rotated at high speed, potentially striking or crushing fingers, hands, or other close body parts. For these reasons, many long-time machine users consider the drill press to be underrated as a hazardous tool.

#### Hot Objects and Components

- The friction associated with drilling and cutting generates significant amounts of heat that can cause skin burns, flying sparks, and fire hazards.

<b>Limitations</b>
<ul style="list-style-type: none"> <li>• Drill presses are largely limited to the creation of round holes and countersinks in work pieces. As noted above, some specialized tooling is available for boring squared-edge mortises in wood, tools which consist of a squared housing with chisel edges and a drill bit inside.</li> <li>• Drill presses can generate significant torque upon contact with the work piece. Never handhold the work piece, and instead use the tool vise, clamps, or a dedicated jig. Similarly, never fixture a work piece in the chuck of a drill press.</li> <li>• Other methods of material removal require different tools – consult your supervisor or instructor for guidance.</li> </ul>
<b>Required Personal Protective Equipment</b>
<ul style="list-style-type: none"> <li>• Refer to the Shop Safety Postings and instructions provided by the Shop Supervisor.</li> <li>• Safety glasses</li> <li>• Face shield if the drill press is not equipped with a chuck / chip shield.</li> <li>• Shop specific required PPE:</li> </ul>
<b>Required Training</b>
<ul style="list-style-type: none"> <li>• Applicable Shop Rules <ul style="list-style-type: none"> <li>○ <b>Student Shop Rules</b> (<a href="http://ehs.yale.edu/forms-tools/shop-rules-student-accessible-shops">http://ehs.yale.edu/forms-tools/shop-rules-student-accessible-shops</a>)</li> <li>○ <b>Professional Shop Rules</b> (<a href="http://ehs.yale.edu/forms-tools/guidelines-professional-shops">http://ehs.yale.edu/forms-tools/guidelines-professional-shops</a>)</li> </ul> </li> <li>• For Class 2 through 5 Student Shops, review and signing of the Yale University Shop/Tool Use Safety Agreement (<a href="http://ehs.yale.edu/forms-tools/shoptool-use-safety-agreement">http://ehs.yale.edu/forms-tools/shoptool-use-safety-agreement</a>).</li> <li>• Shop Supervisors or Instructors must evaluate the tool user based on successful demonstration of the Training Competencies listed below as applicable.</li> </ul> <p><u>Training Competencies:</u></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Dress appropriately and don correct personal protective equipment.</li> <li><input type="checkbox"/> Understand the uses, limitation, and hazards of the drill press.</li> <li><input type="checkbox"/> Know how to inspect the drill press and adjust all components for selected operation.</li> <li><input type="checkbox"/> Show good judgment in drill press start-up process.</li> <li><input type="checkbox"/> Know how to secure or fixture various workpieces.</li> <li><input type="checkbox"/> Be capable of effectively and safely performing the drilling operation, including using adequate lubrication and reasonable drilling speed and feed for workpiece material and cutting bit selected.</li> <li><input type="checkbox"/> Shop specific training requirements:</li> </ul>
<b>Authorized Tool Users</b>
Shop Supervisor, Shop Monitors and those authorized by shop supervision to operate the tool.
<b>Tool Safety Rules</b>
<ul style="list-style-type: none"> <li>• Observe and follow all Yale Professional or Student Shop Rules as posted.</li> <li>• Understand and follow manufacturer operating procedures.</li> <li>• Inspect the tool for damage prior to use.</li> <li>• Verify all guards are in place and adjusted properly.</li> <li>• Do not bypass any safety devices.</li> <li>• Always stay at the machine while it is running.</li> <li>• Clean the tool after use.</li> <li>• Report any malfunction or damage to the Shop Supervisor after tagging the tool “Out of Service, do not use”.</li> </ul> <p><u>Shop specific rules:</u></p>

## Proper Setup and Use

### Prior to approaching the drill press you should have determined:

- Is the workpiece safe and appropriate for use on the particular drill press?
- The hole or other cutting location on the workpiece and marked it?
- The appropriate drill press speed setting for the material and intended tooling?
- Any need for cooling or lubrication during cutting, and prepared it?
- Is all personal protective equipment (safety glasses with wrap around side shields or a full-face shield) in place? The operator should prepare for drilling by removing all loose clothing and jewelry, and tying back all long hair (including beards).

### At the drill press

- Securely clamp drill bit/tool in the drill chuck - be sure to insert fully up into chuck, tighten snugly, and REMOVE CHUCK KEY!
- Test speed and proper “true” rotation of drill bit to ensure it is properly centered with no wobble. Turn off drill motor.
- Locate and securely clamp workpiece.
- Use drill bit center and center punch marking to center and align workpiece with drill ( i.e., lower bit to surface of part so that it engages center mark). Reposition workpiece as needed.
- Rotate workpiece clockwise against drill press column, if possible, to act as a rotation stop.
- Verify that clamp/ fixture workpiece to secured to drill press table.
- Center on table hole or place sacrificial wood block under part.
- Recheck alignment of drill bit with hole location.

### Drilling process

- Swing chip / chuck shield into place.
- Lubricate drilling location with brush or oil spout, as required.
- Turn on drill press motor, and await full speed.
- Slowly lower drill bit and engage workpiece.
- Feed drill bit into part, letting the bit do the cutting. Do not force feed.
- Clear chips and lubricate as needed.
- Turn off drill press when hole is complete.

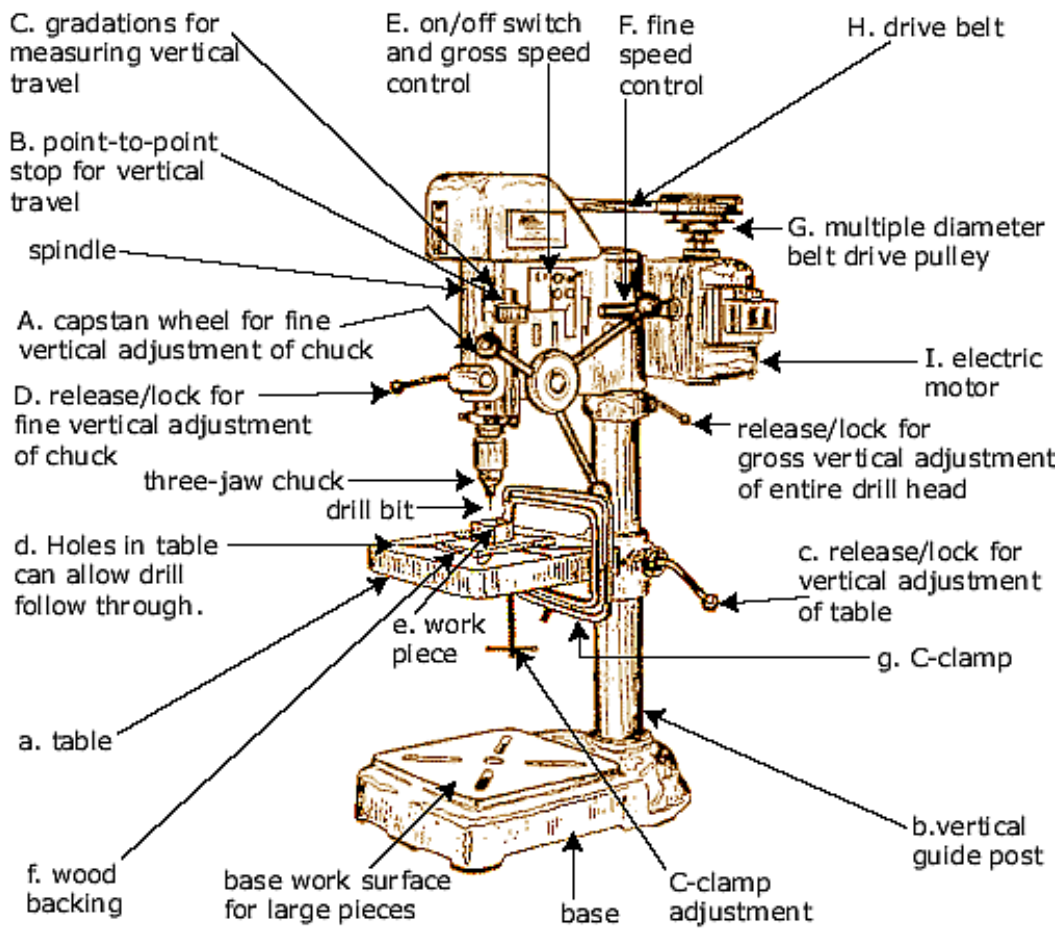
### Completion:

- Ensure that the drill chuck has fully stopped rotation.
- Remove clamps from workpiece – beware of hot, sharp chips, drill bit, and any workpiece burrs.
- Remove bit / tool, clean as needed, and return to proper storage location.
- Clean chips and any lubricating fluids from drill press.

### Shop specific procedures:

Diagrams/Illustrations

Typical drill press



Creation/Revision Dates:

*Suggestions, questions, or comments? Please contact your shop supervisor or EHS.*