

MILLING MACHINE

Scope and Responsibilities

This standard operating procedure (SOP) applies to all personnel who operate and instruct on the safe operation and use the milling machine. In a school setting this includes,

- **Administrators/Teachers:** Ensure operators are trained and the SOP is followed
- **Students/Teachers/Operators:** Follow the owner/operators manual, industry recommendations, this SOP, guarding is in place, and wear the appropriate personal protective equipment (PPE)

SAFETY IS A PRIORITY !

DO NOT use this machine unless you have received instruction in its safe use and operation and have been given permission by your teacher.

To ensure the safe and efficient operation of the milling machine, this machine requires:



Safety glasses must be worn at all times in work areas.



Long and loose hair must be contained.



Closed toe / CSA approved footwear must be worn at all times in work areas.



Close fitting / protective clothing must be worn.



Rings and jewelry must not be worn.



Gloves must not be worn when using this machine.

Personal Protective Equipment (PPE)

- Safety glasses or face shield
- Hearing protection
- Closed-toed footwear (CSA Safety footwear is required on Co-Op placements in industry)

Pre-Operational Checks

- Always refer to the manufacturer's manual
- Check workspace and walkways to ensure no slip-hazards are present
- Ensure no slip or trip hazards are present in workspaces and walkways
- Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted)
- Do not leave equipment on top of the machine
- Check that machine guards are in position
- Ensure cutter is in good condition and securely mounted
- Check coolant delivery system to allow for sufficient flow of coolant (if equipped)
- Faulty equipment must not be used. Immediately report suspect machinery.

Operational Steps

1. Preparation

- Make sure you have been authorized to use this piece of equipment - you have received training, passed the test, have demonstrated the safe use of this piece of equipment and have a safety passport signed
- You are “shop ready” – trained, proper clothing, wearing required PPE, etc.
- Never leave the Milling machine while it is running
- Keep clear of moving machine parts
- Never leave the machine running unattended
- Follow correct clamping procedures- keep overhangs as small as possible and check work piece is secure
- Set the correct speed to suit the cutter diameter, the depth of cut and the material
- Before making adjustments and measurements or before cleaning swarf accumulations switch off and bring the machine to a complete standstill
- Never override or defeat a safety device.

2. Starting the Machine

- Engage magnetic starter
- Start the milling machine and allow it to reach full speed before beginning the milling operation
- Make sure that the cutter is rotating in the correct direction (clockwise only)
- Use cutting fluid (if required).

3. Milling Operation

- Slowly bring the milling cutter into contact with the workpiece
- On manual machines, only do conventional milling, never climb milling
- Take small cuts, limit chip load
- Avoid excessive pressure to prevent overheating and damage to the workpiece or milling cutter
- Continuously monitor the milling process and make adjustments as needed
- Remove burrs using a file or deburr tool.

4. Shutting Down the Machine

- Turn off the milling machine and allow to come to a complete stop
- Release and remove your workpiece
- Clean the machine and work area.

Post-Operational Checks

- Inspect the milling cutter for any damage
- Clean the machine as required
- Remove milling cutters and store them safely
- Report any issues or maintenance needs to the supervisor/instructor.

Common Problems of Operation

- Machine does not power up
- Table does not move up or down, left, or right
- Collet is not tight.
- Milling cutter is bent, dull or does not spin correctly
- Operator error
- Excessive heat or noise

This equipment SOP provides a general guideline for operating a milling machine. Always refer to the manufacturer’s manual, industry best practices, and specific workplace safety protocols for detailed instructions. **IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR or SUPERVISOR.**

Safety Precautions

- When starting a milling machine, always stand in front of the machine, never off to the side
- Never leave the milling machine unattended while it is running
- Always deburr your work with a file or deburr tool
- Keep hands and head away from the tool during operation
- Wear Personal Protective Equipment (P.P.E) such as safety glasses, safety goggles, face shields, proper clothing as appropriate, NO GLOVES
- No loose clothing, long hair, or jewelry is allowed in the shop
- Only operate the milling machine after you have received instruction and permission from the teacher
- Be aware of the positions of the on/off switches and emergency STOP button
- See that the milling cutter is square to the work before starting
- Always use conventional milling, never climb milling.

Common Injuries Sustained

- Sharp cutters
- Entanglement of loose sleeves, long hair, etc.
- Eye injury
- Skin irritation
- Metal splinters and burrs
- Flying debris

Maintenance

- Always refer to the manufacturer's manual
- Regularly check and repair or replace damaged or worn equipment immediately
- Clean and lubricate the machine as required
- Keep a maintenance log for the machine
- Inspect the electrical cords for damage, cracked insulation, fraying, etc.
- Inspect milling cutters before using – always use cutters in good condition.

Work Zones

- Typically, in front of the machine approximately 1 meter (3 feet) the length of the machine
- Work zone or area should be identified on the floor (ie: yellow paint or tape)
- Work zone or area should not be entered while operator is using the machine

Additional Information can be found at,

Ontario Council for Technology Education [SAFEdocs](#) and [ToolSAFE Videos: OCTE](#)

Wayken Rapid Manufacturing <https://waykenrm.com/blogs/climb-milling-vs-conventional-milling/>

Wayken Rapid Manufacturing <https://waykenrm.com/blogs/milling-cutter-tools/>

Canadian Center for Health and Safety

https://www.ccohs.ca/oshanswers/safety_haz/metalworking/millingmachines.html