

HANDOUT: Step by Step Instructions: Millwright (3 pages)
Skill Builders: Scanning, Percentages, Decimals & Fractions

IN THE WORKPLACE: Following detailed step by step instructions to build structures or install and operate machinery is part of most tradesperson's work. Errors in sequencing steps or skipping them altogether can result in significant losses to the company in lost time and wasted materials.

Read **Step by Step Instructions** to locate answers to the questions. Write the answers in the space provided.

1. What is the process being described?

2. Divide the steps of the process into the following 3 phases. Write the step numbers in the spaces:

- a. Safety: _____

- b. Preparation: _____

- c. Procedure: _____

3. Sometimes steps in instructions have sub-steps or multiple parts.

- a. Which steps have sub-steps that must be performed to successfully complete the procedure? List them.

- b. How many sub-steps are in Step 10? List them.

4. Which steps are performed before the wheel touches the part?

5. Which steps must be completed before setting the grinding depth?

6. What parts are magnetic?

7. Why is some information in steps 1,9, and 14 written in brackets? How is it different from the rest of the instructions?

8. Write the following decimals as percentages and as fractions:

a. 0.0005 _____

b. 0.001 _____

c. 0.0002 _____

9. The measurements given are very precise. Calculate the difference in size between 0.0005" and 0.0001" and show your answer as a fraction.

STEP BY STEP INSTRUCTIONS GRINDING PROCEDURE FOR METAL STOCK

1. Ensure the proper wheel for the stock is being used (there are different grinding wheels for aluminum, stainless steel, and titanium), the wheel is not defective and is properly dressed for the grinding application.
2. Clean the bed before placing the workpiece onto it. This will prevent interference with the magnetic chuck.
3. Place magnetic parallels around the workpiece to ensure the workpiece does not shift during grinding. Turn the magnetic chuck on to secure the pieces onto the bed.
4. Adjust the bed and saddle position to center the stock below the wheel.
5. Lower the wheel an inch above the workpiece.
6. Take a piece of paper and place it between the wheel and the stock. Move the paper back and forth while simultaneously lowering the wheel until the paper is no longer able to move to zero the z-axis. Zero the z-axis of the workpiece by setting the dial on downfeed handwheel to 0 inches.
7. Lock the table Longitudinal stroke setting block so that there is about an inch of overtravel at each end of the table stroke.
8. Adjust the table position so the wheel sits about an inch to the right of the workpiece.
9. Lower the wheel to the desired depth of grinding (preferably 0.0005"- 0.0001" per pass). There should be a maximum downfeed of 0.001 inch per pass.
10. Ensure the wheel is not in contact with the workpiece before turning the main power on. Press the green button to turn the spindle on and turn the coolant switch on.
11. Grind the stock by making passes left to right along the x-axis.
12. Once the first strip of the workpiece has been sufficiently ground, turn the y-axis handwheel half a turn clockwise.
13. Grind another strip of the workpiece from left to right along the x-axis.
14. Repeat until the workpiece is fully ground, then repeat all the previous steps for the other side (take a piece of paper and place it between the magnetic chuck and stock to protect the finish).
15. When finished, elevate the wheel then clean the machine and the surrounding area.

Ref: Virasak, L. (2019). Chapter 5 Surface Grinding. In Manufacturing processes 4-5. (pp. 133-143). Retrieved from: <https://openoregon.pressbooks.pub/manufacturingprocesses45/chapter/chapter-5-surface-grinder/>. This work has been adapted. [Manufacturing Processes 4-5](#) by LamNgeun Virasak is licensed under a [Creative Commons Attribution 4.0 International License](#), except where otherwise noted.