

K-07

TOOLMAKER TRAINING

SKILL DEVELOPMENT GUIDE

Duty K: Internal Grinder

**K-07: Set Up Machine (Lathe Chuck, Magnetic Parallel,
Face Plate, Taper Pot, or No Holding Device)**

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Task Preview

Set Up the Internal Grinder (Lathe Chuck, Magnetic Parallel, Face Plate, Taper Pot, or No holding Device)

The Toolmaker sets up the internal grinder when Assembly requires tooling to perform grinder work. Upon receiving a process sheet and dimensional print for a job requiring work on the internal grinder, the Toolmaker determines the part processing needs. The required holding device is installed and the part and/or holding device is centered on the permanent magnet.

The Toolmaker must be able to read a print, and must have experience with basic internal grinder operations/machine controls. Failure to perform this task correctly can damage the part, cause personal injury, or damage or change the alignment of the machine.

How your skills will be checked

The Skill Check will require you to set up the internal grinder. All tools, materials, and resources will be available. The Evaluator will verify that your demonstration meets the skill objective by observing or measuring each task standard. You must demonstrate safe work practices during the Skill Check. Contact your Evaluator when you are ready for the Skill Check.



Skill Objective

Given a process sheet and dimensional print requiring internal grinding, set up the internal grinder.

Task Standards

1. The part must be installed to the required holding device, as determined from the dimensional print.
2. The holding device and/or part must be centered on the permanent magnet within .0001" or less, when measured with a dial indicator.
3. All safe practices must be demonstrated during the setup procedure.

What You Will Need

This section contains the safety information, tools, and resources you will need before setting up the internal grinder.



- Follow all Caterpillar facility safety standards when performing this task.
- Be aware of rotating equipment and unexpected machine movement.



- internal grinder
- dial indicator (tenths)
- setup equipment (required holding device)
- shop towel
- measuring equipment (micrometers, calipers, etc.)
- Arkansas stone
- copper/brass knocker
- jo blocks



- dimensional print
- standards for holding tolerances from tool design



Task Steps

Set Up Machine

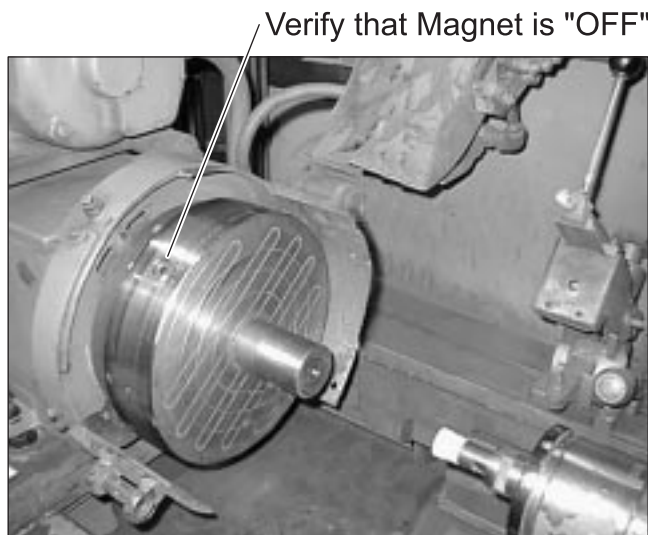
Note: These steps apply to the Heald 273A Universal Internal Grinder.

1. Determine the part requirements.

- Read the dimensional print and the process sheet to determine the part requirements for the internal grinder. Check print dimensions.
- Calibrate gages with jo blocks.

2. Clean the face of the permanent magnet.

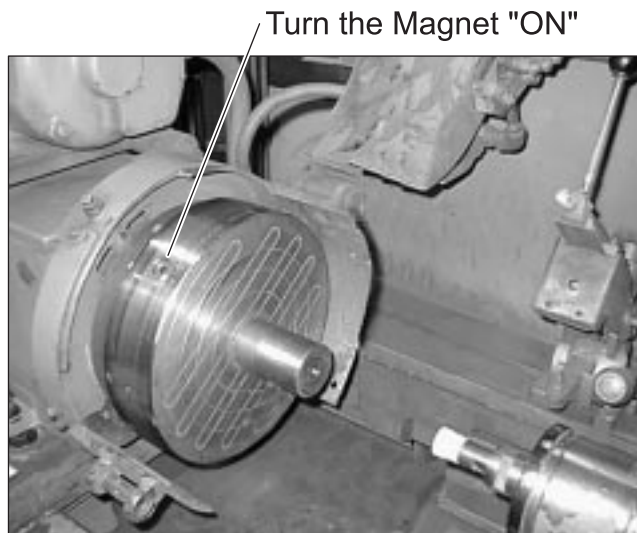
- Verify that the permanent magnet is OFF (on-off is found on the outer edge of the magnet).



Permanent Magnet OFF Position

- With the permanent magnet OFF, wipe debris from the magnet face with a shop towel.
- Wipe the permanent magnet with your hand to verify the surface is free of debris.

- Stone the permanent magnet with a hard Arkansas stone, if necessary, to remove debris.
- 3. Verify the magnet is square with the machine axis using an indicator.**
- 4. Turn the permanent magnet ON.**
 - Place the magnetic chuck wrench in the ON position, as marked on the magnetic chuck.
 - Turn the wrench counterclockwise about half way, causing half magnetism.



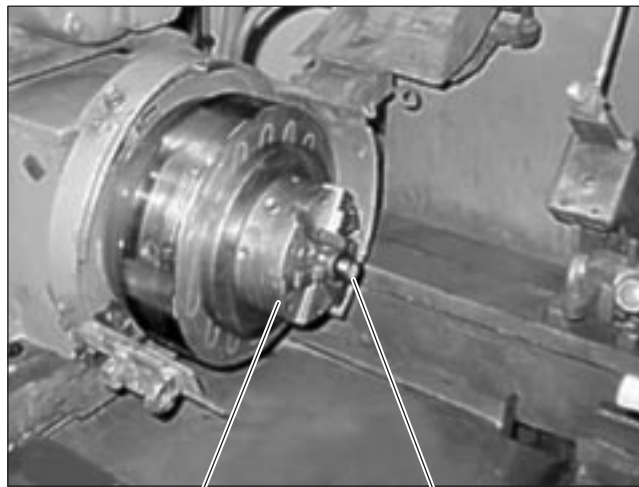
Permanent Magnet ON Position

- 5. Attach the required holding device to the permanent magnet.**
 - Holding devices may include a lathe chuck, magnetic parallel, face plate, or taper pot, or the part may be directly attached to the permanent magnet.
 - Apply step 2 every time you change a device.
- 6. Visually center the holding device on the permanent magnet.**
 - Attempt to center the holding device when placing it against the face of the permanent magnet.
 - Run work head (permanent magnet), with a just enough rpm to allow centering the holding device and/or part.
 - Using the bronze knocker, center the holding device concentric with the magnetic chuck.

- Turn the permanent magnet to full magnet, to hold the lathe chuck on the magnet.
- Turn off the work head power.

7. Install the part to a lathe chuck, if required.

- Place the part in the jaws of the lathe chuck, and tighten the jaws wrench-tight.



Lathe Chuck

Part

Lathe Chuck Holding Device

- Use a dial indicator and center the device to the part specification.

- Use a copper/brass knocker to tap on the chuck.



Indicated Lathe Chuck

Note: You may have to indicate the two furthest points on the ground surface when using an arbor.

8. Install the part in a magnetic parallel or a faceplate, if required.

Note: The parallel must be ground true for every job.

- Make a mark on the magnetic parallel or faceplate surface to ensure 100 percent clean-up.
- Grind the magnetic parallel or faceplate until it is true with the axis of the grinder. Select a wheel to suit the task for the holding device.
- Grind off the mark on the holding device.
- Install the part to the faceplate, making sure the part is attached wrench-tight.
- Place the part on the magnetic parallel.

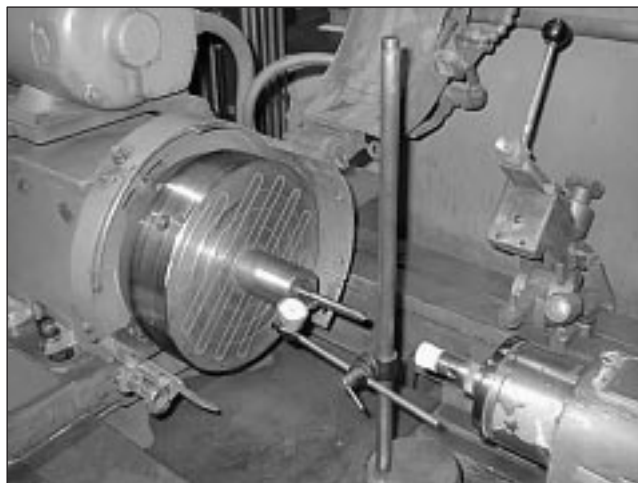
- Center the part to dimensional print specifications.



Indicated Part in a Faceplate

9. Install the part in a taper pot, if required.

- Center the taper pot to print specifications.
- Check the concentricity of the tapered hole; if it is concentric, install the part into the taper pot.
- Re-indicate the pot to be sure it was not moved.



Part Indicated in a Taper Pot

10. Install the part to the permanent magnet, if no holding device is required.

- The part must have a suitable face (finely finished) to mate well with the permanent magnet.
- Thoroughly clean the permanent magnet and the part of all debris.
- Turn the permanent magnet to half magnet to center the part on the permanent magnet to print specifications.

11. Turn the permanent magnet on full.

- With the work head turned off, turn the magnet to the full ON position.



Concept Check

Set Up Machine

Answer the following questions to check your understanding of setting up the machine. Circle the correct answer in each question. Then compare your responses with the answers at the bottom of this page. Some of the questions may have more than one correct answer. If you have difficulty answering a question, review the Skill Development Guide or ask your Trainer for assistance.

1. Upon receiving a _____ and _____ for a job requiring work on the internal grinder, the operator determines the part processing needs.
 - a. process sheet, dimensional print
 - b. process sheet, materials
 - c. written request, requirements
 - d. dimensional sheet, and process print
2. Failure to perform this task correctly can:
 - a. damage to the part.
 - b. cause personal injury.
 - c. result in acceptable part tolerance.
 - d. damage or change the alignment of the machine.
3. Install the part to the faceplate making sure it is attached:
 - a. diagonally.
 - b. hand-tight.
 - c. wrench-tight.
 - d. with 50 ft-lbs of torque.

Answers: (1. a 2. a, b, d 3. c)

Next Step

If you are ready to demonstrate the task now, ask your Evaluator or Trainer to schedule the Skill Check. However, if you need to practice some of the steps first, continue to the next section.



Practice

The following practice will help prepare you for the Skill Check. Ask your Trainer to set up the practice for you. After you complete a practice, ask your Trainer to check your work.

Practice 1:

Practice indicating a part.

Tools and equipment for Practice 1:

Internal grinder equipped with setup equipment, a dimensional print for a part, stock

Practice Objective 1:

Indicated measurements must match the print specifications for the part.

Practice 2:

Practice using the copper/brass knocker to center a part.

Tools and equipment for Practice 2:

Internal grinder, copper/brass knocker

Practice Objective 2:

Part must be centered on the permanent magnet within .0001" or less, when measured with a dial indicator.

Next Step

Continue to practice until you are ready for the Skill Check. When you are ready to demonstrate the task, ask your Evaluator or Trainer to schedule the Skill Check.

