A-04: Repair Vacuum Pump

SAFETY FIRST

- ☐ Follow all Caterpillar facility safety standards when performing this task.
- ☐ The motor power disconnect must be locked and tagged during the repair replacement.
- ☐ A hazard exists when working with lifting devices.
- ☐ The impellers and deflectors may have sharp edges.

EQUIPMENT

- ☐ Maintenance Mechanic hand tools
- ☐ lifting device

RESOURCES

- ☐ none

Repair Vacuum Pump

Note: This task covers the replacement of the vacuum pump motor.

Part 1: Disassemble the Vacuum Pump

1. Disconnect the power source.

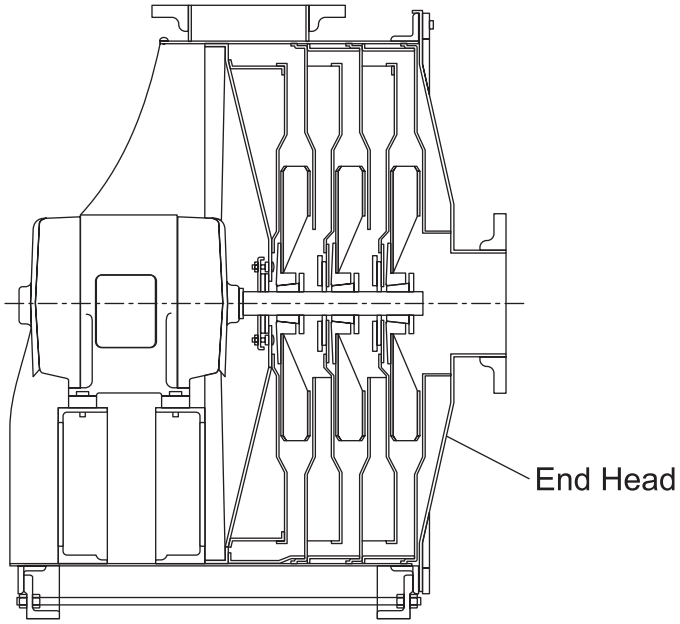
- ☐ Perform a lock and tag on the power disconnect.

2. Ask an Electrician to disconnect the wiring from the motor.

3. Remove the flex air coupling.

- ☐ Remove the duct tape and clamps that connect the inlet duct and front cover together.
- ☐ Slide the coupling away from the front cover.

4. Remove the end head (front cover).



- ☐ Unbolt the 16 bolts that hold the end head in place.
- ☐ Set the end head out of the way.

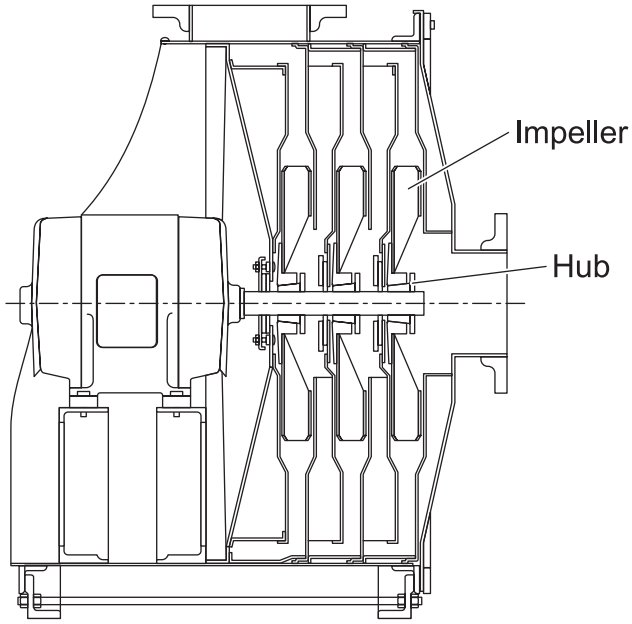
5. Remove the internal components.

- ☐ Mark the front end of the shaft to indicate the top of the shaft with a piece of soapstone.

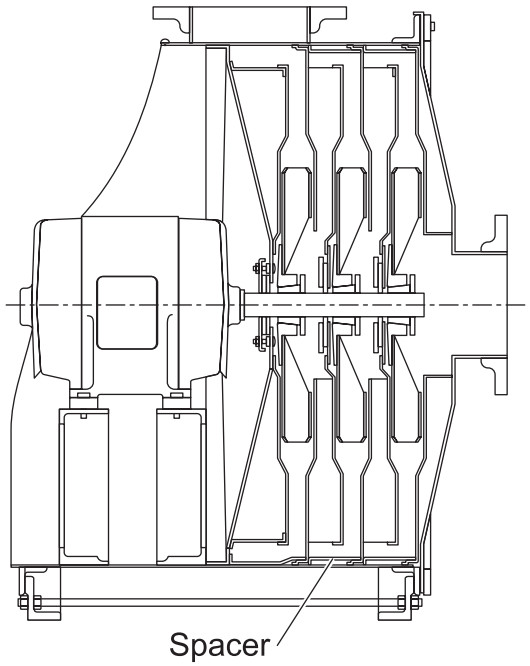
Note: Follow the process listed below until all of the impellers and deflector heads are removed.

- ☐ Mark the relationship of the impeller and the tapered bushing hub (or split clamped hub).
- ☐ Mark the relationship of the hub and the shaft.
- ☐ Measure the distance from the front of the shaft to the front of the hub.

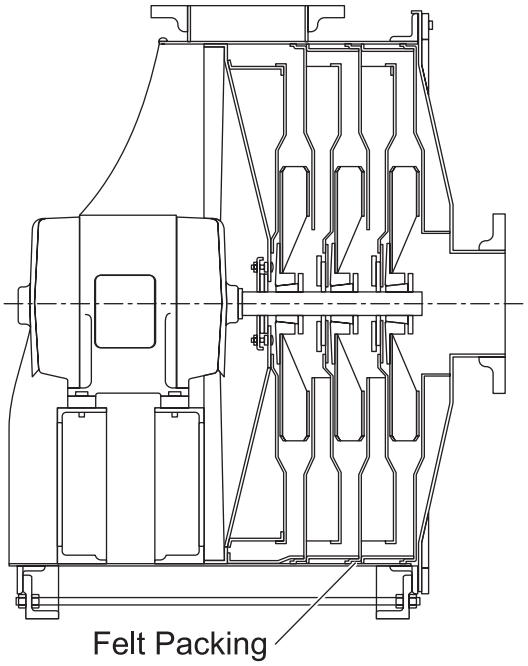
- ☐ Loosen the three (or six) Allen socket screws three full turns.
- ☐ Remove the hub and the impeller.



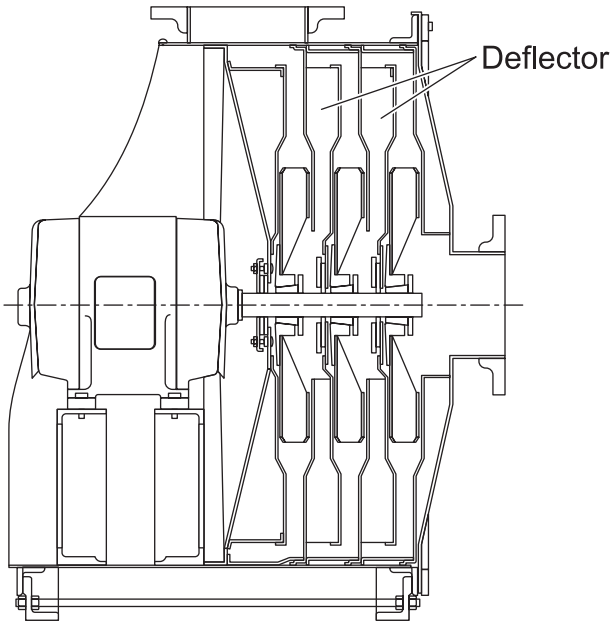
- ☐ Remove the spacer.



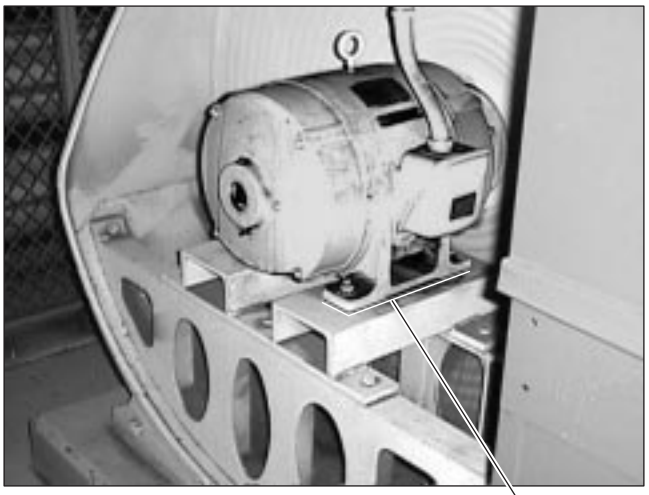
☐ Remove the felt packing for the deflector head.



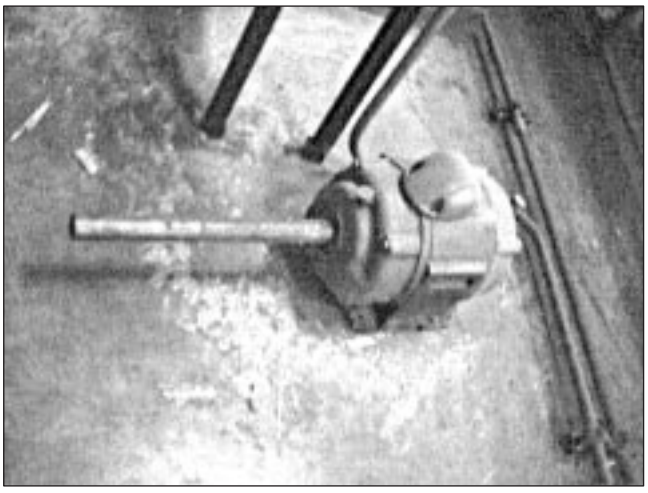
☐ Remove the deflector head.



6. Remove the motor.



- ☐ Mark the location of the motor on the frame. The replacement motor must be in the exact location as the previous motor.
- ☐ Remove the division head packing to prevent damage to the packing.
- ☐ Unbolt the motor from the frame.
- ☐ Attach a lifting strap to the motor and then to the lifting device.
- ☐ Lift the motor just enough to pull it back.
- ☐ Once the shaft of the motor is clear of the housing, raise the motor and set it out of the way.



Part 2: Reassemble the Vacuum Pump

1. Install the motor.

- ☐ Attach a lifting strap to the motor and then to the lifting device.
- ☐ Lift the motor and set it in place with the shaft in the exact center of the blower casing.
- ☐ Pay particular attention to align the motor in the same location as the previous one.
- ☐ Install the bolts and tighten wrench-tight.

2. Install the internal components.

- ☐ Install the division head packing, ensuring that the packing is tight around the shaft.
- ☐ Mark the top of the shaft again.

Note: If the center deflector plate is not removable, push each impeller towards the motor until it stops. Back the impeller off approximately 1/8-inch and tighten the impeller wrench-tight. If the center deflector plate is removable, follow the procedures listed below.

- ☐ Slide the first impeller on the shaft (the last one removed); leave the impeller loose.
- ☐ Install the defector head tightly against the stop. Using a suitable tool, press the felt packing firmly into the grooves.
- ☐ Remove the center deflector plates from the deflector head.
- ☐ Align the marks on the first impeller with the marks on the hub. At the same time, position the impeller and hub at the last measurement taken on the shaft.
- ☐ Tighten the hub screws wrench-tight. When tightening the screws, tighten evenly and in a star pattern.

Note: As each impeller is installed, rotate the impeller to ensure that the blades do not hit the deflector. When the deflector is installed, rotate the impeller. Repeat this process until the last impeller is installed.

- ☐ Install the center deflector plate.
- ☐ Slide the second impeller on the shaft; leave it loose.
- ☐ Place the spacer into the deflector head to form an assembly.
- ☐ Slide the assembly into the casing. Using a suitable tool, press the felt packing firmly into the grooves.

- ☐ Remove the center deflector plates from the second deflector head.
- ☐ Align the marks on the second impeller with the marks on the hub. At the same time, position the impeller and hub at the second measurement taken on the shaft.
- ☐ Tighten the hub screws wrench-tight. When tightening the screws, tighten them evenly and in a star pattern.
- ☐ Install the center deflector plate.
- ☐ Slide the last impeller on the shaft (the first one removed).
- ☐ Align the marks on the last impeller with the marks on the hub. At the same time, position the impeller and hub at the first measurement taken on the shaft.
- ☐ Tighten the hub screws wrench-tight. When tightening the screws, tighten them evenly and in a star pattern.

3. Ask the Electrician to reconnect the wiring to the motor.

4. Restore the power source.

- ☐ Remove the lock and tag and raise the level.

5. Perform an operational check.

- ☐ Operate the pump and check for signs of vibrations. If there are any signs of vibrations, follow the procedures under Part 3: Balance the Pump.

Part 3: Balance the Pump

1. Run the motor at operation speed.

2. Disconnect the power source.

3. Rotate the first impeller.

- ☐ Mark the position of the end impeller hub on the shaft.
- ☐ Loosen the bolts.
- ☐ Rotate the impeller 90 degrees on the shaft.
- ☐ Tighten the hub wrench-tight.

Note: Make sure that the power is disconnected and the lock and tag are installed.

4. **Repeat the process until all signs of vibration are eliminated.**

   ☐ Select the position that has the least amount of vibration.

5. **Install the front cover and tighten the bolts wrench-tight.**

6. **Restore power to the motor.**

7. **Clean the area.**

8. **Document the work history.**