

## Standard Operating Procedure

**Task:** Changing Pump Oil

**Date:** 5/15/14

**Revision Date:** 7/6/16

**Background:** Changing pump oil is routine maintenance required for removing any contaminants from pump oil. These contaminants discolor the pump oil and may give rise to particulates, which can affect the performance of the pump and lead to major mechanical problems if left untreated. The procedure simply entails draining the pump of old oil and replacing with clean oil. For cases in which the oil is especially contaminated, the pump is flushed with clean oil one or more times to ensure that all contaminants are effectively removed. Note that while the pump design will differ based on the manufacturer and pump type (e.g. belt drive vs. direct drive), the basic outline below will still be applicable.

### Training Requirements:

- Lab safety training
- Training in pump operation

### Potential Hazards:

- Oil spills
- Burns from hot pumps or pump oil
- Falling pumps

**Special PPE Requirements:** oven mitts for handling hot pumps

### Materials Needed:

- Vacuum pump
- New pump oil (e.g. VWR<sup>®</sup> Vacuum Pump Oil #19, Cat. # 54996-082)
- Large Funnel
- Container for disposal of used oil
- Secondary container
- Large rubber stopper
- Wood block
- Pentane and paper towels for cleaning up oil spills

### When to change pump oil:

- Pump oil should be changed at least every 6 months on group cleaning day.
- If pump oil becomes noticeably discolored, red or black, the pump oil should be changed and the pump cleaned.
- If a large amount of solvent has been drawn through the pump, the pump oil should be changed.

**Procedure for draining old pump oil:**

- If pump is turned on, turn off and allow to cool for several minutes. (Running pumps are hot and may cause burns.) Main glove box pumps can be changed hot if necessary, but oven mitts covered with nitrile gloves should be used for pump handling.
- Remove the vacuum hose and unplug pump.
- Carefully lift pump up onto a wooden block or benchtop, leaving room for a funnel and a waste bottle.
- For belt drive pumps, check to verify that the belt is in good working order. If the belt is significantly cracked or frayed, replace it before continuing.
- Remove the plug from the top of the pump (to allow air into the oil reservoir) so that used oil will drain smoothly.
- With funnel and waste bottle positioned carefully, and within a secondary container, remove the plug from the front of the pump. (Be cautious draining hot pump oil as it will be less viscous)
- Get a lab mate to help you drain all of the oil by gently lifting the back of the pump while you continue to hold the funnel and waste bottle.
- Once pump has drained completely, replace the drainage plug.

**Procedure for flushing pumps:**

- If pump oil is noticeably dark red/black, or if a foreign substance has been drawn through the pump, the pump should be flushed. If pump oil was clean or only slightly yellow, skip to procedure for refilling pumps.
- Make sure the drainage plug has been replaced.
- Using a funnel and new pump oil, fill the pump beyond the minimum fill line (about halfway to the maximum fill line).
- Replace the top plug and place a rubber stopper over the vacuum inlet.
- Run the pump for 5 to 10 min with the stopper in place.
- Drain the pump as described above.
- Repeat if pump oil is still noticeably dirty or discolored.
- If the oil remains discolored or contains particulates after three flushes, replace the pump with a spare and consult a repair specialist.

**Procedure for refilling pump:**

- Make sure the drainage plug has been replaced.
- Using a funnel and new pump oil, fill the pump to the max fill line indicated on the front window.
- Replace the top plug.
- Carefully lift the pump back into its cabinet, reattach the vacuum line and plug the pump back in.
- Clean any spilled oil using pentane and paper towels. Do not use THF or other polar solvents as these will react with the informational labels and the plastic casing!
- Use the label maker to print a new label indicating the date the pump oil was changed.

**References and Related SOPs:**

- Regen SOP