

# Standard Operating Procedure

## Rotary Evaporator in the P.O.W.E.R. Laboratory

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### Description of Process

Some chemical procedures require a quick and effective separation of substances through evaporation. The Rotary Evaporator is a tool which puts the separable substance under vacuum and heats evenly through a spinning motion, causing one component to evaporate and leaving the first component behind.

### Engineering and Ventilation Controls

Perform all operations in a fume hood, stand behind the sliding sash windows, and reach around them to perform the manipulations required. This minimizes exposure to the chemicals in case of an accident. Keep the cabinet doors to the water chiller open during operation to minimize fire hazards.

### Personal Protective Equipment

*EYE PROTECTION:* Safety glasses or goggles; face shield, if desired

*PROTECTIVE CLOTHING:* Laboratory coat and gloves (nitrile or neoprene)

### Rotary Evaporator Procedure

1. Remove the round bottom flask from the base of the condenser, directly above the hot bath. Inspect the flask to ensure it is clean.
2. Load your sample into the cleaned round bottom flask.
3. Attach the round bottom flask to the condenser. If need be, use vacuum grease located next to the rotary evaporator to create a vacuum seal between the condenser and the round bottom flask. Be sure to use a Keck clamp to secure the round bottom flask to the condenser.
4. Inspect the collection flask located to the left of the hot bath, and below the condenser. Make sure the flask is clean before use.
5. Open the cabinet doors directly below the rotary evaporator. Since the chiller is turned sideways, the back of the chiller is on the right side of the cabinet and the front of the chiller is located on the left side of the cabinet.
6. Make sure the tubing is securely connected to the back of the chiller and the condenser.
7. **Turn on the chiller using the power switch located in the back of the chiller.** The condenser should fill with water, if not already full.

8. The chiller is normally set to 20 °C. If you need to change this temperature for some reason, do not set it below 15 °C. To change the temperature, rotate the knob located on the front of the chiller.
9. Make sure the vacuum pump located next to the rotary evaporator is connected to the condenser. Make sure the release valve at the top of the condenser is turned to the closed position.
10. Turn on the vacuum. The gauge on the vacuum pump should read 27 in Hg if the system is not leaking.
11. Fill the hot bath with enough water for the round bottom flask to sit in.
12. Lower the round bottom flask into the hot bath by either turning the condenser column, or lowering the entire setup.
  - a. To turn the condenser, locate the dark grey knob on near the top of the support. Turn the knob counter clockwise until the knob pops out about an inch. Gently turn the condenser with your hands to the satisfactory position, then push the grey knob back in, and turn clockwise to lock it back into place.
  - b. To lower the entire setup, press the power button on the rotary evaporator control panel. Use the Up and Down keys to raise or lower the setup.
13. Turn on the hot bath using the switch located on the right side of the bath towards the back. Use the dial on the hot bath control panel to set the temperature of the hot bath. Since water is typically present in the hot bath, the heating system will not heat above 100 degrees.
14. If you have not already turned on the rotary evaporator, press the power button on the rotary evaporator control panel.
15. Use the dial on the rotary evaporator control panel to set the desired spin speed of the condenser.
16. If the desired evaporation should be timed, press the timer button on the rotary evaporator control panel and use the dial to set a time in minutes, or press the int button and use the dial to set a time in seconds.
17. When all the specifications have been made, press the dial on the rotary evaporator control panel in. The rotary evaporator will begin to rotate.
18. To stop the rotary evaporator, push the dial on the rotary evaporator control panel in again, or wait until the specified length of time passes. The rotary evaporator will stop spinning then.
19. If the separation was successful, the higher boiling point substance will be left in the original round bottom flask, and the lower boiling point substance will be collected in the collection flask.
20. Press the power button to turn the rotary evaporator off. If the entire system was lowered in step 12b, the system will raise to its original height.
21. Turn off the hot bath using the switch on the right hand side, near the back. Make sure the temperature dial is set to zero.
22. Turn off the chiller using the power switch located in the back of the chiller.
23. Turn off the vacuum pump.

24. Slowly vent the system by turning the release valve at the top of the condenser to the open position.
25. Make sure the round bottom flask is cool before removing it from the condenser. Remove your product from the round bottom flask and clean the flask.
26. Remove the collection flask from the condenser setup. Remove your product from the collection flask and clean the flask.
27. Replace the collection flask and the round bottom flask for the next user.
28. If the area surrounding the chiller is cool enough, close the wooden cabinet doors. If the area surrounding the chiller is not cool enough, leave the doors open, and someone will close them.