

Safe Operating Procedure

(Revised 4/17)

CENTRIFUGE SAFETY

In a laboratory setting, centrifuges are typically used to separate substances of different densities or solids from liquids. Because centrifuges operate at high rotational speeds, there is potential for serious personal, property, or equipment damage if not used properly. Most centrifuge accidents result from user error. It is imperative to consult the manufacturer's manual for information on proper use, maintenance, and service of each make and model of centrifuge used in the laboratory. Laboratory staff should not use any centrifuge unless properly trained in specific operation, routine (user) maintenance, decontamination/cleaning, and emergency procedures.

General Centrifuge Consideration:

- Only use rotors designed for use with the specific centrifuges. Do not interchange rotors between centrifuges. Never exceed the maximum speed rating for any rotor. Inspect rotors before each day's use and remove from service if damaged.
- Only use tubes, bottles, or other containers rated for centrifuge use and chemically compatible with the contents. Never use tubes or containers beyond manufacturer's specifications or those that appear cracked, warped, or broken. Securely close containers with tight fitting lids prior to centrifugation.
- Always balance the rotor load before beginning centrifuge operation. Opposing loads must balance within a certain tolerance per manufacturer's instructions. Use of a scale is highly recommended. You may notice slight vibrations as the rotor accelerates or decelerates at low speeds. This is normal. Most centrifuges are equipped with an imbalance detector, which turns the centrifuge off before any eccentric rotation caused by a load imbalance can damage the drive shaft or bearings. Stop the centrifuge immediately if an unusual condition (noise or vibration) begins and re-check the load balance after the rotor has completely stopped.
- Make sure the centrifuge chamber (bowl) and drive spindle, are free of scratches, burrs, or other damage.
- Never operate any centrifuge with the lid open. Most centrifuges contain an interlock mechanism that prevents the lid from being opened until the rotor has stopped.

- Attend the centrifuge until it has reached operating speed and be alert to any unusual condition that may suggest potential failure or breakage of a centrifuge container. Stop the centrifuge if an unusual condition is suspected.
- Do not alter or bypass any centrifuge safety features such as lid interlock switch, imbalance detector, and speed sensor.
- Centrifuges in need of repair should be tagged (see Appendix A) and locked-out while awaiting service. See EHS SOP, ***Lockout/Tagout for Machines & Equipment***.

Procedural Consideration:

- Consider the physical and health hazards of any chemical that will be subject to centrifugation. Loading of centrifuge containers in a chemical fume hood may be warranted, particularly if the chemical is corrosive, volatile, toxic or otherwise recommended for use with local ventilation controls.
- Consider the risk of exposure when handling biological agents. Loading of centrifuge containers in a biosafety cabinet may be warranted, particularly if the material is potentially infectious to humans or generally considered a biohazard.
- Use the appropriate personal protective equipment (PPE) while loading and unloading centrifuge containers. Use the same PPE as is used and recommended for other manipulations.
- Verify that centrifuge containers are compatible with the material to be centrifuged and are rated for centrifuge use at the operational g-force.
- Use only containers that can be securely closed when centrifuging potentially hazardous materials (chemical, radioactive, biological substances). Do not overfill centrifuge containers.
- Consider the associated risk and use safety cups or sealed rotors, as appropriate. When using safety cups or sealed rotors due to the hazards, load and unload them in an appropriate ventilated cabinet (e.g., fume hood for chemicals; biological safety cabinet for biohazards). Clean/disinfect the outside of the container after filling and before centrifuging to minimize risk of contaminating interior surfaces of the centrifuge.
- When centrifuging potentially hazardous material, wait as long as feasible after the end of a normal cycle to open the lid. Potentially generated aerosols will settle over time. A general recommendation would be to wait at least 10 minutes after the centrifuge stops to open the lid.

Suspected Container Breakage:

- When there is a suspected breakage of the outer centrifuge container and the material is hazardous, users are encouraged to refrain from opening the centrifuge lid and to consult with EHS on proper clean-up procedures and other

considerations (e.g., PPE, waste disposal, decontamination/disinfection, inspection of components for signs of damage, etc.), unless an adequate lab- and material-specific procedure has been developed for the laboratory.

- In the absence of a lab- and material-specific procedure, clearly post signage warning others of the hazard and appropriate instruction (e.g., SPILL! DO NOT OPEN! CONTAINS XXXXX {date; contact name and information}). If the material was a substance potentially infectious to humans, cover the top and sides of the centrifuge with an impervious cover (e.g., heavy plastic) and secure with tape. Promptly contact your supervisor and/or EHS for instruction. In no case, shall the centrifuge be opened any sooner than 20 minutes after the rotor has come to a complete stop to allow sufficient time for aerosols to settle. General centrifuge decontamination procedures can be found in the EHS SOP, **Decontamination of Laboratory Equipment**
- If the material involved was a radioactive material, promptly contact EHS. A contamination survey must be completed before the centrifuge can be put back into service.

Additional Considerations:

- Clean and decontaminate centrifuges prior to service by a certified technician and prior to disposal. This may include decontamination of any HEPA filters, vacuum lines within the equipment, or additional accessories.
- Consult manufacturer's recommendations for routine cleaning and maintenance to help ensure safe operations.
- O-rings and seals on rotors and safety cups should be inspected routinely for breakage or damage and replaced promptly to ensure effective containment.

Appendix A: Out of Order Sign

Instructions: cut along dotted lines and place sign on equipment in need of repair.

STOP



**DO NOT USE.
OUT OF ORDER**

Service Requested On:

For Repair Status or Questions, please contact: