



Bio Basics Fact Sheet: Centrifuge Safety

Background:

Centrifugation may present two serious hazards: mechanical failure and dispersion of aerosols. This fact sheet describes safety and maintenance procedures to minimize centrifuge hazards.

Safe Procedures for Centrifugation:

Before centrifugation

- Train each operator on proper operating procedures, review the user manual.
- Use only rotors compatible with the centrifuge. Check the expiration date for ultracentrifuge rotors.
- Check tubes, bottles, and rotors for cracks and deformities before each use.
- Make sure that the rotor, tubes, and spindle are dry and clean.
- Examine O-rings and replace if worn, cracked, or missing.
- Never overfill centrifuge tubes (don't exceed $\frac{3}{4}$ full).
- Always cap tubes before centrifugation.
- Always balance buckets, tubes, and rotors properly.
- Check that the rotor is seated on the drive correctly, close the lid on the centrifuge, and secure it.
- When using swinging bucket rotors, make sure that all buckets are hooked correctly and move freely.

During centrifugation

- Close lids at all times during operation. Never open a centrifuge until the rotor has stopped.
- Do not exceed safe rotor speed.
- The operator should not leave the centrifuge until full operating speed is attained and the machine appears to be running safely without vibration.
- Stop the centrifuge immediately if an unusual condition (noise or vibration) begins and check load balances.

After centrifugation

- Allow the centrifuge to come to a complete stop before opening.
- Wear new pair of outer gloves to remove rotor and samples, see [Glove Selection and Use](#).
- Check inside of centrifuge for possible spills and leaks, clean centrifuge and rotor thoroughly if necessary.
- Wash hands after removing gloves.

Centrifuging infectious materials or human samples

Safety procedures above plus

- Always wear gloves when handling tubes or rotors.
- Avoid the use of celluloid tubes with biohazards. If celluloid tubes must be used, an appropriate [chemical disinfectant](#) must be used to decontaminate them.



- Always use sealed safety cups, safety buckets, or sealed rotors with O-ring as secondary containment.

- Place a biohazard label on the centrifuge.
- Fill centrifuge tubes, load into rotors, remove from rotors, and open tubes within a biological safety cabinet whenever possible.
- Wipe exterior of tubes or bottles with [disinfectant](#) prior to loading into rotor or bucket. Seal rotor or bucket, remove outer gloves, and transport to the centrifuge.
- Wait at least 10 minutes after the run to allow aerosols to settle before opening the centrifuge. Check for possible spills or leaks. For spills of infectious materials transmitted by inhalation, see Emergency Procedures below.
- Decontaminate centrifuge interior, safety cups or buckets, and rotors if tube breakage occurs. See Emergency Procedures below.
- Include centrifugation procedure and decontamination plan in lab SOPs.

Emergency Procedures:

Centrifuge spills of infectious materials transmitted **by inhalation**

- If a spill has occurred in the centrifuge, hold breath, close the centrifuge lid, turn centrifuge off, and immediately leave the lab.
- Notify others to evacuate the lab, close the door, post a biohazard spill sign at the lab door.
- Remove any contaminated protective clothing and place in a biohazard bag. Wash hands and any exposed skin surfaces with soap and water. Seek medical attention as necessary.
- Report spills to P.I. or lab supervisor. Call Biosafety Officer (626-6002) for assistance.

Centrifuge malfunction, rotor failure, or tube breakage of materials **not transmitted by inhalation**

- If a centrifuge malfunctions while in operation, turn it off immediately and unplug.
- If tube breakage occurs, turn centrifuge off immediately. Leave for 30 minutes to reduce the risk of aerosols. The operator should wear proper gloves, remove debris, clean and disinfect centrifuge interior, rotors, safety cups or buckets following the manufacturer's instructions.

Centrifuge Maintenance:

Moisture, chemicals, strong cleaning agents, and other substances can promote corrosion of centrifuge parts and cause centrifuge failure. The following are general maintenance recommendations:

- Follow manufacturer instructions for maintenance and cleaning.
- Keep the centrifuge clean and dry.
- Clean all spills immediately and decontaminate the rotor after use with biological or radioactive materials.
- Clean rotors and cups with non-corrosive detergents (mild detergent and distilled water are recommended), then dry the surface thoroughly.
- Never clean rotors and associated parts with abrasive wire brushes.
- Store the rotor upside down in a dry place, with lids or plugs removed, to prevent condensation.
- Remove adapters after use and inspect for corrosion.
- Inspect rotor regularly. Remove rotors from use that show any sign of defect, and report it to a manufacturer's representative for inspection.

Maintaining a Log Book:

To avoid rotor failure, keep a log book for high speed rotors recording the length of time and speed for each use. Track and discard rotors according to the manufacturer's recommended schedule.

Reference:

Centrifugation Hazard. Videocassette. Howard Hughes Medical Institute, 1995. 9 minutes.