



## 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:

#### 1. General

##### 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

- Keep the lid closed 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 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.

#### 2. Centrifuging infectious materials or human samples

Safety procedures above plus:

- Place a biohazard label on the centrifuge.
- 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 if available.



- Fill centrifuge tubes, load into rotors, remove from rotors, and open tubes within a biological safety cabinet if biological safety cabinet is available.
- 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.
- Always 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, 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:

### 1. Emergency Situations

The following events are considered an emergency:

- If there is a spill in the centrifuge
- If centrifuge malfunctions
- If there is rotor failure
- If there is tube breakage

### 2. Emergency Procedures

- Turn centrifuge off immediately, close the centrifuge lid.
- Notify others, evacuate the lab, close the door, post a biohazard spill sign at the lab door.
- Leave for 30 minutes to reduce the risk of aerosols. For spill clean-up, the operator should wear proper gloves, remove debris, clean and disinfect centrifuge interior, rotors, safety cups or buckets following the manufacturer's instructions.
- Place any contaminated protective clothing, gloves and all clean-up materials in a biohazard bag. Wash hands and any exposed skin surfaces with soap and water. Seek medical attention as necessary.
- Report incidents to P.I. or lab supervisor and DEHS. Call Biosafety Officer (626-6002) for assistance.

## 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.
- Cleanup all non-infectious spills immediately. For infectious spills see **Emergency Procedures** above.
- Decontaminate the rotor after use with biological or radioactive materials. Use 10% bleach for 30 minutes followed by 70% ethanol and let air dry to clean rotors and cups.

- 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.