



Centrifuge Safety

Description

This standard operating procedure outlines the use of centrifuges. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls and personal protective equipment when using centrifuges.

Centrifuges are machines used to separate solids from liquids in a suspension. The spinning motion of a centrifuge produces centrifugal forces that separate substances of greater and lesser densities.

Potential Hazards

The centrifuge must be loaded carefully balanced. An unbalanced load may present a risk to both the machine and to persons nearby. Centrifuge rotors should never be touched while the rotor is spinning, as they present a significant personal risk when in motion. Another potential hazard is the possible aerosolization of harmful samples during centrifuge operation.

Engineering Controls

If centrifuging hazardous materials, care should be taken to use tightly capped tubes and/or sealable safety cups or rotors that can be loaded and unloaded in a fume hood or biosafety cabinet, depending on the hazard.

Work Practice Controls

The following information may be integrated into a lab-specific standard operating procedure (SOP) for centrifuge use.

1. Preventive Maintenance

- A. **Establish preventive maintenance schedule:** Including regular cleaning of centrifuge interior to prevent damage and avoid costly repairs. Reference centrifuge operator's manual or contact manufacturer for guidance.

Equipment repair and adjustments shall only be conducted by qualified service technicians.

- B. **Maintain log book:** For all high speed centrifuges and ultracentrifuges include run dates, durations, speeds, total rotor revolutions, and notes on rotor condition.

Retire rotors after manufacturer's recommended life span except where annual stress test demonstrates absence of structural flaws. Note: Rotor life span may be reduced or warranty voided if autoclaved; contact manufacturer for guidance.

2. Planning for Use

- A. **Complete lab-specific training for the centrifuge.**

- B. **Wear appropriate PPE:** Including safety eyewear, gloves, lab coat, and appropriate street clothing (i.e., long pants and closed-toe shoes). Ensure gloves are compatible with hazard(s).

- C. **Inspect centrifuge:**

- Ensure tubes are rated for intended use (speed, temperature, and chemical resistance).
- Ensure rotor is compatible with centrifuge and seated on the drive correctly.

- Ensure rotor and safety cups/buckets are free of cracks and deformities.
- Ensure rotor O-ring is not cracked, missing, or worn.
- Ensure safety cups/buckets are attached correctly and able to move freely.

Contact a qualified service technician if inspection identifies centrifuge components requiring repair or replacement.

D. Prepare centrifuge tubes for loading:

- Inspect centrifuge tubes before use.
- Follow manufacturer's filling limits for tubes. Do not overfill or underfill tubes.
- For biohazardous materials, disinfect outside of tubes prior to removal from biosafety cabinet and loading into rotor.

When centrifuging hazardous materials, use tightly capped tubes and/or sealable safety cups or rotors that can be loaded and unloaded in a fume hood or biosafety cabinet, depending on hazard. If a specific procedure does not allow for this, contact Environment, Health and Safety at (810) 766-6763 for guidance.

- E. Use in-line filter:** For high speed centrifuges and ultracentrifuges, use in-line filters to prevent contamination of vacuum pump and pump oil. Provide secondary containment for vacuum pump.

3. Centrifuge Operation

- A. Balance centrifuge:** Follow manufacturer's instructions for proper centrifuge balancing steps.

B. Start run

- Do not leave centrifuge until full operating speed is reached and it appears to be running safely without incident.
- Stop centrifuge immediately if you notice any unusual noises or shaking. Confirm rotor is balanced.

To prevent rotor failure, do not exceed maximum speed and maximum mass limits for the rotor. You must reduce rotor speed if sample density calculations indicate maximum mass limits will be exceeded; contact manufacturer for guidance.

4 Sample Removal

- A. Stop run:** Ensure centrifuge comes to complete stop before opening cover. When centrifuging hazardous materials, wait at least 10 minutes after run to allow aerosols to settle before opening centrifuge.
- B. Check for leaks/spills:** In samples, rotor, safety cups/buckets, and centrifuge well.
- C. Open sealable tubes/safety cups/rotors:** Wear appropriate PPE and open inside fume hood or biosafety cabinet, depending on hazard.

Personal Protective Equipment

When operating the centrifuge, proper eye protection (glasses/goggles), gloves, lab coat, and close-toe footwear should be worn. Gloves should be appropriate for the present hazard.

Waste Disposal

Centrifuge Disposal

1. For biohazardous materials, clean/disinfect centrifuge and remove/cross out biohazard sticker. Attach note on centrifuge describing what has been done.
2. For radioactive materials, request radiation safety survey and signage before disposal of centrifuge.

Exposures/Unintended Contact



If the employee is in need of emergency medical attention, call 911 immediately.



Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to UM-Flint DPS. Additionally, employees and supervisors must be sure to report the injury to EHS and complete and submit the [Illness and Injury Report Form](#) to WorkConnections within 24 hours. Follow the directions on the WorkConnections website [Forms Instructions](#) to obtain proper medical treatment and follow-up.

If you were involved in or observed an incident or near miss, please complete the [EHS Laboratory Incident and Near-Miss Report Form](#). This will be valuable in improving laboratory safety on UM-Flint campus.

TREATMENT FACILITIES:

<u>MAJOR INJURIES</u>	<u>MINOR INJURIES –During Business Hours</u>	<u>MINOR INJURIES –After Business Hours</u>
Genesys Hospital One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710 Hurley Medical Center One Hurley Plaza Flint, MI 48503 (810) 262-9000 McLaren Hospital Flint 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000	Genesys Occupational Health Network 1460 Center Rd. Burton, MI 48509 (810) 715-4620 Mon. to Fri. 7:30 am to 10 pm Sat. & Sun. Noon to 8 pm McLaren Flint-Burton OCC Center 1459 S. Center Rd. Burton, MI 48509 (810) 496-0900 Mon. - Fri. 8 am to 8 pm Sat & Sun 10 am to 2 pm	Downtown Flint 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550 Genesys East 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351 Genesys North 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397 Genesys South 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. & Sun. 1-10pm

Click [here](#) for more information on the UM – Flint Emergency Preparedness and Response Plan.

Spill Procedure

1. Mechanical Failure

Turn off centrifuge immediately and unplug power cord. Do not use centrifuge again until inspected by qualified service technician.

2. Hazardous Material Spill/Exposure

A. **Turn off centrifuge immediately.** Keep centrifuge cover closed for at least 30 minutes to reduce aerosolization of hazardous material.

B. **Follow spill, exposure, and incident reporting instructions.**

- For chemical, radioactive, and biohazard spills, contact EHS at (810) 766-6763 for assistance and guidance.

Remember:

- Conduct rotor or safety cup/bucket cleanup in nearest biosafety cabinet or fume hood, depending on hazard.
- Use tongs or forceps to avoid contact with sharp-edged debris.
- Avoid alkaline cleaners for aluminum centrifuge components.
- Avoid abrasive wire brushes for cleaning.

Report all emergencies, suspicious activity, injuries, spills, and fires to the UM-Flint Department of Public Safety (DPS) at 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Register with the [University of Michigan-Flint Emergency Alert System](#) via Wolverine Access. Also, preprogram the UM-Flint DPS telephone number (810) 762-3333 into your cell phone for quick, easy use.

Training of Personnel

All personnel are required to complete Laboratory Safety Training. Documentation of the training is required. This training can be accomplished by completing the **Comprehensive Laboratory Safety** session (**BLS009** or equivalent) via [MyLINC](#), or UM-Flint EHS on-line training or other equivalent approved by EHS. Furthermore, all personnel shall read and fully adhere to this SOP when handling centrifuges.

Certification

I have read and understand the above SOP. I agree to contact my Supervisor or Lab Manager if I plan to modify this procedure.

Name	Signature	UM ID #	Date

Prior Approval required – Is this procedure hazardous enough to warrant prior approval from the Principal Investigator? YES NO

Principal Investigator _____

Revision Date _____