**Safe Centrifuge Use General Guidelines**

 General Guidelines are an essential component of the University of Regina’s Health & Safety Management System. This general guideline has been created to provide a set of **Do’s & Don’ts** on how to use a Bunsen burner. It is expected that the general guidelines will assist in the creation of a lab-specific Safe Operating Procedure.

 All general guidelines along with the related Safe Operating Procedures pertaining to you or your group’s activities should be kept in a location central to the work being performed and readily available to the individuals involved in the task.

It is the responsibility of the PI, LI, Lab Manager, and Supervisor to ensure that all centrifuge users are properly trained in the care and use of centrifuges and rotors.

All centrifuges, that have manufacturers’ rotor de-rating systems including ultracentrifuges, high speed centrifuges, and high speed bench top centrifuges, must have an up-to-date record of the total hours of usage. This is essential to prevent rotor fatigue and other mechanical hazards. Each user log entry must include the User’s Name; Date of Use; Sample Description; Number of Runs; Run Time; Run Speed and Rotor Serial Number.

Rotors must be de-rated according to the manufacturer’s specification.

**General Safety Measures**

When using a centrifuge, follow these safety measures:

* The centrifuge should always be installed according to the manufacturer’s specifications.
* Do not locate the instrument near areas containing flammable reagents or combustible fluids, or where vibration will cause items to fall off nearby shelves.
* The centrifuge should be securely anchored by strong suction cups (bench top models), wheel brakes (floor models), etc. Movement of the instrument can damage parts and injure users.
* Proper selection, use and maintenance of rotors is critical to safe operation. Lack of care can lead to severe personal injury.
* Use only rotors designed for the specific centrifuge.
* Inspect the rotor for signs of corrosion or cracking before using. If found, do not use the rotor, and inform the lab supervisor that the rotor is unusable.
* Inspect the inter-lock system to ensure the cover cannot be opened while the rotor is spinning.
* Never operate the rotor unless it is symmetrically loaded and balanced. Care is required to achieve this.
* Never operate the rotor without the lid or cover closed or locked in place; if the lid cannot be locked, the machine must be removed from service.
* Clean and disinfect rotors and sample cavities or cups after each use with non-corrosive solutions.
* Lack of proper sample management can result in exposure of the user to harmful materials.
* Always use sample tubes or bottles designed for the particular rotor being used.
* In general, samples should be capped to avoid generation of aerosols.
* Nitrocellulose tubes should only be used when transparent and flexible. They must never be heated because of explosion possibility.
* Plastic centrifuge tubes should be discarded after one cycle of ultracentrifugation.
* When using radioactive, toxic or pathogenic materials, be aware of potential hazards associated with them in case of leakage during centrifugation. If leakage does occur, you may be exposed to particles dispersed in the air (aerosol).
* For safe use of the centrifuge:
* Do not circumvent any of the safety features (such as lid closure override switches).
* Do not lean or place items on the instrument while it is running.
* Do not leave the centrifuge until full operating speed is obtained and the instrument appears to be running normally without vibration.
* If vibration occurs, stop the run immediately; wait until the rotor stops, and check the load balances.
* In event of a power failure, do not try to open the lid to retrieve samples for a least one hour. After the rotor has stopped, follow the instructions in the manual for recovery of the samples.
* In general:
* Always leave the drum of the centrifuge clean; wipe up any spills or aerosols. Do not use a bottle brush to clean the cavities of a rotor, as it may scratch the rotor, and allow corrosion to start.

**Breakage of Tubes/ Leaking Tubes in Centrifuges**

1. If breakage occurs or is suspected while the machine is running, the motor should be switched off and machine left closed for about **30 minutes** to allow for material settling.
2. If breakage is discovered after the machine has stopped, immediately close the lid and leave closed for about **30 minutes**.
3. Put on nitrile gloves, laboratory coat, shoes, pants, and eye/face protection. Strong, thick rubber gloves worn under the disposable nitrile gloves should be considered.
4. Before attempting to deal with the leak, prepare a pan of disinfectant solution large enough to immerse the entire rotor in (iodine-based solutions are recommended over bleach because of corrosion).
5. Get sharps container and forceps/tongs. Forceps or cotton held in forceps should be used to retrieve all glass debris.
6. If the rotor is sealed, and removable, remove rotor from the centrifuge using paper towels to catch drips.
7. Place leaking rotor in the biosafety cabinet before opening.
8. Carefully remove the lid from the rotor. All broken tubes, glass fragments, buckets, trunnions, and the rotor should be placed in the disinfectant.
9. Unbroken, capped tubes may be placed in disinfectant in a separate container and recovered.
10. Wipe outside of rotor with disinfectant, and leave them in the cabinet, out of the way. All instruments and rotor pieces involved in the incident should be chemically decontaminated.
11. After proper decontamination, instruments and rotor pieces may be washed with a mild detergent according to the manufacturer’s instructions.
12. As an added measure of caution, the inside of the centrifuge (chamber) must be wiped out with a non-corrosive disinfectant twice, washed with water, and dried.
13. If a tube has broken in a centrifuge that does not use a containment type rotor, DO NOT open the centrifuge. Turn off the power and allow sufficient time for aerosols that have been created to settle (~30 min.). Don protective garb and respiratory protection (Must be Fit-Tested by HSE) before opening the chamber. Decontaminate the inside of the chamber with a noncorrosive disinfectant (70% ethanol or Wescodyne) by thoroughly soaking the interior. A spray bottle or lab squeeze bottle is sufficient. Large amounts of liquid generated during decontamination may be removed by a disposable pipette attached to suction device attached to a disinfectant trap. Any paper waste generated during clean-up should be bagged and autoclaved.

**Note:** It is recommended that a sealed rotor or bucket be used when centrifuging infectious materials. If none is available, placing a smaller tube inside a larger sealable tube can provide some protection against aerosol creation in the event of breakage.