

Standard Operating Procedure		Page 1 of 4
CENTRIFUGE SAFETY		
Investigator: General Safety	Location: EHS	Revision: 1.0

1.0 PURPOSE:

Rotors on high-speed centrifuge and ultracentrifuge units are subject to mechanical stress that can result in rotor failure. In addition, improper loading and balancing of rotors can cause the rotors to break loose while spinning. For these reasons, centrifuges must be properly used and maintained.

2.0 SCOPE:

This procedure applies to all Louisiana State University Personnel that use and handle centrifuges. The intent of this guideline to provide information on the safe use of centrifuges and afford employee protection from the associated health and physical hazards.

3.0 RESPONSIBILITIES:

Only trained and qualified personnel shall be allowed to use and handle centrifuges. Supervisors are responsible for ensuring that personnel are trained to use and handle centrifuges.

4.0 DEFINITIONS:

Not Applicable

5.0 REFERENCES:

Not Applicable

6.0 MATERIALS and/or EQUIPMENT:

Personal Protective Equipment

7.0 PROCEDURES:

7.1 Training and Repair

7.1.1 Before using any centrifuge, review the owner's manual. If a manual is not available, obtain a copy from the manufacturer. Do not operate a centrifuge until having read the owner's manual and have been shown proper use by an experienced operator.

7.1.2 Be familiar with emergency and log book maintenance procedures prior to operation.

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7.1.3 Centrifuges should be repaired only by the manufacturer or authorized dealer representative. Do not attempt repairs. Centrifuges in need of repair should be tagged and locked-out while awaiting service.

7.2 Rotor Care and Use

7.2.1 If the rotor is not kept clean and chemicals remain on the rotor, corrosion will result. Moisture left for extended periods of time can also initiate corrosion. It is important that the rotor is left clean and dry after use. (Wash with mild detergent and warm water using a nylon bottle brush, if necessary). Dry the rotor thoroughly and store upside down with the cover and tubes removed.

7.2.2 Do not autoclave rotors at temperatures above 100°C.

7.2.3 To avoid corrosion, do not expose aluminum rotor components to strong acids or bases, alkaline lab detergents, or salts (chlorides) of heavy metals (e.g., cesium, lead, silver or mercury).

7.2.4 Check that the centrifuge chamber, drive spindle, and tapered mounting surface of the rotor are clean and free of scratches or burrs.

7.2.5 Damaged rotors must not be used.

7.2.6 Wipe drive surfaces prior to installing the rotor.

7.2.7 Make sure rotor, tubes, and spindle are dry and that the rotor is properly seated and secured to the drive hub. Do not operate the centrifuge without the appropriate rotor cover securely fitted with seals in place.

7.2.8 If the temperature of the chamber is below room temperature, pre-cool the rotor to the lower temperature before securing the rotor (this will minimize the chance of it seizing to the tapered spindle).

7.2.9 Always complete the machine log book since the number of hours of operation determines the life of the rotor.

7.2.10 High-speed rotor heads are prone to metal fatigue. Each rotor should be accompanied by its own logbook indicating the number of hours run at top or derated speeds. Do not exceed the design mass for the maximum speed of the rotor. Failure to observe this precaution can result in dangerous and expensive rotor disintegration.

7.2.11 Never exceed the state maximum speed for any rotor.

7.2.12 De-rate the rotor speed whenever a) the rotor speed/temp combination exceeds the solubility of the gradient material and causes it to precipitate, or; b) the

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compartment load exceeds the maximum specified. Failure to reduce rotor speed under these conditions can cause rotor failure.

7.2.13 Balance the rotor to within the limits specified (take care that materials of similar densities are in opposite positions of the rotor).

7.3 Tube Care

7.3.1 Before use, tubes should be checked for cracks. The inside of cups should be inspected for rough walls caused by corrosion and adhering matter should be removed. Metal or plastic tubes (other than nitrocellulose) should be used whenever possible.

7.3.2 Make sure each tube compartment is clean and corrosion free.

7.3.3 Tubes must be properly balanced in the rotor ($\frac{1}{2}$ gram at 1 G is roughly equivalent to 250 Kg @ 500,000 G's).

7.3.4 Check compatibility of the tube material to the solvent medium (some solvents may cause the tubes to swell or crack in the rotor).

7.3.5 Never fill centrifuge tubes above the maximum recommended by the manufacturer.

7.3.6 Use only correctly fitting tubes.

7.3.7 Use sealed rotors, sealed buckets, or a guard bowl cover complete with gasket as well as safety centrifuge tubes (tube or bottle carrier with sealable cap or "O" ring cap).

7.4 Miscellaneous

7.4.1 Once a run is complete, make sure the rotor has **COMPLETELY STOPPED** before opening the centrifuge lid. Never attempt to open the lid of a centrifuge or slow the rotor by hand while the rotor is in motion. Serious injury may result.

7.4.2 If a tube breaks, the centrifuge should be turned off, allowed to stand undisturbed for 30 minutes before opening. Clean and disinfect the rotor. If infectious material was placed in the centrifuge, plan proper decontamination and cleanup. Cleaning and disinfection of tubes, rotors and other components requires considerable care. No single method is suitable for all items, and the various manufacturer recommendations must be followed to avoid rotor fatigue, distortion, and corrosion.

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8.0 CONTINGENCIES:

- 8.1 In case of a fire, explosion, or gas leak evacuate individuals from the area and call the emergency response (911). Notify supervision and adjacent personnel as quickly as possible. Observe appropriate procedures for personal injury or fire as provided in EHS Web site.
- 8.2 In case of a chemical spill, alert others in the immediate vicinity and notify your supervisor. Determine the severity of the spill and proceed as appropriate. Small spills may be cleaned up by laboratory personnel. For large spills, notify EHS (578-5640) and Campus Police (911 or 578-3231). If possible to do so safely (without risk of over-exposure), take action to stop the release. Ensure that extraneous personnel remain at a safe distance until the spill is completely cleaned-up

9.0 REVIEWS AND REVISIONS:

This procedure shall be reviewed for compliance and effectiveness and revised as necessary on an annual basis.

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