

**LOCAL JOINT HEALTH AND SAFETY COMMITTEE
DEPARTMENT OF BIOMEDICAL SCIENCES
STANDARD OPERATING PROCEDURE**

1. SAFE USE OF HIGH-SPEED AND ULTRA CENTRIFUGES.

Effective date: July 2003

Author: Ann Maslen, Technician

Purpose: To promote the safe and effective use of high-speed (Beckman J2-21M) and Ultra (Beckman LE 80K) centrifuges in Rm. 0601, Department of Biomedical Sciences.

Approvals Required: Faculty Supervisor, Local JHSC, EHS

2. DEFINITIONS:

High Speed: Arbitrary used to denote Centrifugal Force to 40,000 x G

Ultra Speed: Arbitrary used to denote Centrifugal Force to 100,000 x G

3. REQUIREMENTS:

All users of these centrifuges must be WHMIS trained and have departmental safety orientation. New users of the centrifuges should have introductory training and instruction on safe and proper use of the equipment by the technician in charge (currently: Yu Gu, Rm. 1658A).

4. TASK:

- Manuals for the High-speed (J2-21M) and Ultra (LE-80K) centrifuges and rotors are on the fridge beside the centrifuges. All users of the centrifuges should be familiar with the contents of these manuals.
- Centrifuges may be booked ahead for specific times and dates by leaving a note taped to the lid of the appropriate centrifuge. For consideration of other users, do not grossly over-estimate your usage time.
- The Ultracentrifuge is equipped with a fixed angle (Ti-90) and a swinging-bucket (SW 40-Ti) rotor. The high-speed has two fixed angle rotors (JA-14 and JA-20).
- Determine the appropriate centrifuge and rotor for your application based on centrifugal force and size of tubes required. Rubber sleeves for adapting the rotors for use with different size tubes are available on the shelf above the centrifuges or on request.
- Using the charts provided on the wall above the centrifuges, determine which type of centrifuge tube or bottle to use based on composition, chemical resistance and speed rating.
- **Caution: Selection of the wrong tube or bottle may result in breakage of the tube, loss of sample and damage to the rotor!**
- Refer to the wall chart adjacent to the centrifuges to correlate rotor speed and centrifugal force so that you **Never exceed the maximum speed posted for the rotor!**
- Rotors are stored in the refrigerator beside the centrifuges. Based on your determinations, select the correct rotor for the centrifuge to be used. **Caution: Rotors are not interchangeable between centrifuges.**
- For the angle head rotors, check that the rubber O-rings are in place. There is one ring on the inner surface of the rotor lid and one on the neck of the rotor where the lid attaches. Lubricate the O-rings with vacuum grease, and the rotor threads with Spinkote. Both lubricants are available on the shelf above the centrifuges.
- It is more practical to place the JA-14, JA-20 or Ti-90 rotor in the appropriate centrifuge before loading with tubes. The SW 40-Ti rotor can only be loaded before it is placed into the centrifuge.

●**Caution: The rotors for the J2-21M centrifuge are heavy.** Carefully lower the rotor onto the shaft, **making sure that the pins located on the periphery of the central well of the rotor line up with and sit in the grooves on the centrifuge drive shaft.**

● Load the rotor with samples arranged symmetrically. Opposing tubes must be of **equal weight**. If necessary, use "water blank" tubes to balance sample tubes of unequal weight. **Do not conclude that tubes are balanced by sight or volume.** Use the pan balance provided in the centrifuge room for balancing tubes in rotors for the J2-21M centrifuge. Use an electronic balance for balancing tubes for the Ultracentrifuge rotors. When using rotor sleeves, balance them along with the tubes.

● **Do not centrifuge material, capable of developing flammable or explosive vapours**

● Program and start the centrifuge by following the directions in the section of the manuals for "Programming the Centrifuge and Performing a Run." You need to program for vacuum (Ultra only), speed, duration and rates of acceleration and de-acceleration before pressing the "Start" button.

● Modern high-speed centrifuges have built-in "Fail Safe" systems that sense rotor imbalance in the initial acceleration stage. The Ultra centrifuge hovers at about 1,500 rpm for a few minutes before accelerating to the programmed speed.

● Stay with the centrifuge until full speed is attained. If you sense that the centrifuge is not running smoothly indicated by abnormal vibration, whining, or grinding noises, abort the run immediately and recheck the rotor lid and balance. Report all irresolvable problems.

● Accurately record all information required for centrifuge/rotor use in the logbook provided. This information is essential for rotor down rating and centrifuge servicing.

● At the end of a run, shut off the centrifuge and ensure the cleanliness of the rotor and centrifuge. If required, use the Beckman detergent Solution 555 and brushes provided on the table across the room for scrubbing the rotor wells. This can be done at the sink in the adjacent room. Rinse the rotor with tap water, followed by distilled water. Dry the rotor with paper towels and return it to the refrigerator. **Store the fixed-angle rotors inverted** to prevent corrosion.

● **Rotors are easily damaged! Never use metal appliances such as spatulas, hemostats, pliers, screwdrivers or scalpel blades for removing stuck tubes or poking into rotor wells or any non-recommended cleaning detergent such as a liquid abrasive.**

5. CONTINGENCY PLAN AND REPORTING:

Never use a rotor that appears damaged (eg. O-rings missing, scratched, corroded). Report all incidences to Yu Gu, Rm. 1658A, Ext. 54974.

If a centrifuge displays error messages or abnormally vibrates, whines or grinds, stop the run immediately and report the problem. **Never attempt to over-ride centrifuge safety shut-offs or lock-outs.**

6. WASTE MANAGEMENT:

Dispose of broken centrifuge tubes appropriately in **non-infectious broken glass garbage container**. Clean-up spills in the centrifuges and rotors as required.

7. REFERENCES:

Beckman Optima LE-80K preparative Ultracentrifuge Instruction Manual. Beckman Centrifuge Safety Pamphlet IN-1 94a
Beckman Rotor Safety Guide DS-625B
Beckman J2-21M Centrifuge Instruction Manual

8. DISTRIBUTION OF COPIES:

All users of departmental centrifuges
Dr. G.M. Kirby, Faculty Supervisor
Environmental Health and Safety
Local JHSC, Departmental of Biomedical Sciences

Written by: Ann Maslen, Staff Technician, Dept. of Biomedical Sciences

Authorization: Faculty Supervisor

Date: July 2003