

LOCATION DETAILS		
School/Branch: School of Molecular & Biomedical Science		
SAFE OPERATING PROCEDURE DETAILS		
Safe Operating Procedures for Beckman J2 Series & J25 Avanti Centrifuges		Date Prepared: 18/08/2010
PREPARED BY: Name, position, & Signature (insert names of supervisor, HSO, subject matter expert)		
Tony Richardson – School Infrastructure Coordinator Kate Dixon – School Safety Officer		Signature: 
RISK ASSESSMENT		
Has a risk assessment been completed and all other environmental considerations been made? YES	See risk assessment dated: 09/02/2010	Risk Rating: Low Medium High Very High
RISKS IDENTIFIED		
<ul style="list-style-type: none"> Exposure to biological substances/chemicals through tube leakage Machine damage and potential injury due to rotor imbalance Machine damage and potential injury due to rotor attachment Rotor Failure 		
SAFETY PRECAUTIONS		
<p>The following control measures MUST be adhered to:</p> <ul style="list-style-type: none"> All users must undergo formal training in Ultra Centrifuges and the records kept and documented in the Training Needs Analysis All rotors must undergo a Periodic Rotor Inspection as organised by the Infrastructure Coordinator. Centrifuge lids must never be opened while the rotor is in motion After centrifugation an aerosol will form above the sample, in the tube. Depending on the hazard status of the sample (e.g. Pathogenic microorganisms or hazardous chemicals), appropriate controls may be needed. When starting a centrifuge run: always remain with the centrifuge for a minute or two to see all is operating well. 		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED		
<p>The following PPE must be worn at all times:</p> <ul style="list-style-type: none"> Gloves, Safety Glasses and Lab Coat 		
SAFE OPERATING PROCEDURE		
Centrifuge Tube Bottle Selection and Use		
<p>a) The tube material must be appropriate (i.e. resistant) to the chemical composition of the sample. The supplier's catalogue should give you this information.</p> <p>b) The tube must be made of material strong enough to withstand the forces of centrifugation you intend to use. The supplier's catalogue should give you this information.</p>		

- c) The tube must be filled to the levels recommended for the forces used. A full tube is always best, liquids are incompressible.
- d) Tubes must be balanced and placed diametrically opposed in the rotor. This becomes more important and closer tolerances are required the faster the speed.
- e) Tube lids should be liquid sealed and gas tight, if the centrifuge operates with a high vacuum. The supplier's catalogue should give you this information. If the lids are not sealed then the tubes must only be three quarters full. Remember: you must still take c above into consideration.
- f) Do not use any type of stick-on label on the centrifuge tube.

Log Books

- **The log book must be filled out**, with a pen, for all runs in super-speed and ultra-speed centrifuges. The information required is:
 - The date
 - Your name: Family name as a minimum
 - The rotor
 - The Speed: in rpm
 - The length of the run

Refrigeration:

- Pre-cool rotors in a refrigerator before use
- Close the lid when pre-cooling the centrifuge bowl, to control frost build-up

Rotor Inspection

- Rotors are always inspected before a run, look for:
 - Are all "O" rings in place and in good condition? Rotors must **never** be used if "O" rings are missing or perished. (NB all Beckman centrifuges draw a vacuum in the bowl and poor seals in the rotor and tubes may lead to vacuum pump damage).
 - Is there any material in any of the rotor cavities - this will effect balance (clean out if there is, see rotor cleaning below)
 - Is there any corrosion, cracks or dents on any part of the rotor? Such faults can lead to rotor failure. Any such problem must be reported immediately to the infrastructure manager.

Mounting the Rotor on a Super-Speed Centrifuge

With the Beckman J2 series centrifuges it is quite easy to miss-mount the rotor; it is more difficult with the Beckman Avanti centrifuges, but it is possible. Procedure to mount a Beckman J2 or Avanti Rotor:

For the J2:

1. Rotate the drive shaft so the grooves are orientated North-South and East-West (see diagram)



2. Pick up the rotor with the pins orientated East-West (Note: On JA20, JA20.1& JA25.5 the pins can be seen through the centre hole; for JA10, JA14 & FAB10 rotors the pin position is marked by 2 punch marks on the

rotor hub.)

3. Place the rotor onto the driveshaft so the pins locate in the East-West grooves and press the rotor down firmly.
4. Place the tubes/bottles in the rotor
5. Place or screw (as applicable) the lid onto the rotor then screw the securing shaft to the drive shaft.
6. Test that the rotor is secured to the drive shaft by trying to lift the rotor; it must not move at all.

For the Avanti:

1. Rotate the drive shaft so the single groove is orientated to the top (see diagram)



2. Pick up the rotor with the pins orientated Left - Right (Note: On JA20, JA20.1 & JA25.5 the pins can be seen through the centre hole; for JA10, JA14 & FAB10 rotors the pin position is marked by 2 punch marks on the rotor hub.)
3. Place the rotor onto the driveshaft so the pins locate against the two projecting lugs and press the rotor down firmly.
4. Follow actions 4 to 6 above

After the Run:

- Never remove a centrifuge tube/bottle from a rotor with a metal object (other than tools provided by the centrifuge manufacturer for that specific purpose).
- Check the rotor for any liquid or solid and clean if there is.
- Return the rotor to its normal storage place.

Rotor Cleaning

- There is a rotor cleaning kit in the Technical Support Unit (TSU), use only the detergent and brushes from this to clean any rotor.
- Aluminium rotors are anodised, i.e. the surface has been converted to aluminium oxide; this is very corrosion resistant but thin. Every effort must be made not to damage this layer as bare Aluminium is easily corroded.
- Aluminium is most easily corroded by alkali (i.e. high pH) this means that most of the detergents we have in the lab are entirely unsuitable to clean rotors. Note: the failed rotor motor below has many powdery white spots, this is aluminium oxide i.e. corrosion.
- For a mildly soiled rotor: rinse well with warm tap water then rinse with RO water, put into a 37C room to dry.
- For more severe soiling: immerse the rotor in warm tap water and clean with the detergent and brush from the rotor cleaning kit. Rinse with RO water and dry in a 37C room.
- Never place a wet rotor directly onto metal, e.g. a stainless steel draining board, as it can corrode the rotor.

ADMINISTRATION

Note: This Safe Operating Procedure must be reviewed :
a) after any accident, incident or near miss;

- b) when training new staff;
- c) if adopted by new work group;
- d) if equipment, substances or processes change; or
- e) Within 5 years of date of issue.