

CENTRIFUGES

1. Centrifuges used in School laboratories are typically small to medium speed bench top devices. Typical centrifuge operating speed classifications are:

- Low speed < 8000 rpm
- Medium speed 8000 ~ 30000 rpm
- High speed 30000 ~ 80000 rpm
- Ultracentrifuge > 80000 rpm



The major hazards associated with centrifuges are:

- Physical contact between the operator and the rotating head
- Mechanical breakage of rotors caused by corrosion or use in excess of manufacturer's recommended limits
- Severe vibration caused by an unbalanced rotor.

A rotor can be subject to the stresses which occur in high speed aircraft. The periphery of a 10cm rotor travelling at 50,000 rpm is travelling at over 1,100 miles per hour. The rotor is stressed by every acceleration / deceleration cycle and undergoes measurable stretching each time it accelerates. Mechanical breakage of unbalanced rotors and the vibration resulting from an unbalanced rotor can cause extensive and expensive damage as well as having potential to cause severe injury to anyone in the same room as the centrifuge.

To prevent injury centrifuges should be:

- Used in the correct manner and
- Regularly inspected and maintained.

Note: The formation of aerosols material containing when biological organism are centrifuged may also be a hazard and require the use of sealed centrifuge buckets.

2. Correct use of centrifuges

- Centrifuges may be operated only by trained and authorised people (records should be held of those who are trained and authorised).
- The centrifuge lid must be closed whenever the rotor is in motion and must be interlocked so it cannot be opened when the rotor is in motion.
- Do not stop the rotor by hand or indirectly by the application of an implement to the rotor. Stop the centrifuge by returning the control to zero, not by switching off the power supply.
- If there is any indication of malfunction, stop the machine immediately and contact the person designated as having responsibility for the centrifuge.
- Follow the manufacturer's instructions, particularly regarding balancing tolerances and operating speeds for different rotors. Note that balancing by volume is not suitable for dense solutions (e.g. sucrose must not be balanced with the same volume of water).
- Before starting a run, inspect the rotor and tube caps for signs of corrosion or cracks. Never use faulty parts.
- Ensure that the outsides of containers are clear and free of drops of liquid before placing them into the rotors (the drops of liquid could be a cause of corrosion). If any liquid is spilt into a centrifuge or onto a rotor it is crucial that it is removed immediately and the equipment cleaned using an appropriate method.

School of Engineering Laboratory & Workshop Policies & Guidance

- Never leave a centrifuge while it is accelerating. Many faults occur during the acceleration phase of a run. If you are present, you can immediately turn the machine off.
- Always fill in the log book, giving all the details required. The replacement times for rotors and drive mechanisms are calculated from the data in the log book.
- Always clean and dry the rotor and the centrifuge carefully after use. It is important to remove all traces of materials that could promote corrosion or stress cracking. Mild detergent (e.g. Teepol), possibly with gentle brushing, is all that is required for cleaning. Avoid scratching a rotor.
- Always leave the lid "ajar" when the centrifuge is not in use.
- If you are unfamiliar with the operation of any machine, seek assistance.

3. Inspection and maintenance of centrifuges

Safety inspection of the centrifuge (and in particular the rotor) should take place at predetermined intervals. The equipment must be maintained in accordance with the manufacturer's instructions. Records should be kept for each centrifuge.

Where records are required of rotor use, the nominated person will be responsible for keeping the records.

The TRO has overall responsibility for co-ordinating the regular inspection and maintenance of the centrifuges in the School. The TRO will assign a person to be responsible for each centrifuge.

Revision Record			
Issue	Name	Date	Reason for review
1	ES	31/5/2022	Transfer from main handbook
	ES	26/8/2022	Added alt text for image.