This Information Sheet provides guidance on how to use and maintain micro centrifuges safely.

A centrifuge rotates at very high speed to separate liquids from solids by separating particles from a suspension. A number of different types are used at the University from bench mounted to larger floor mounted centrifuges. **This guidance refers to bench mounted micro centrifuges only.**

## Micro Centrifuge Hazards

The following hazards may arise if micro centrifuges are handled incorrectly:


- Injuries to the hands and fingers from the rotor.
- An unbalanced rotor can move violently, leading to damage to the centrifuge and items near it.
- Samples flicked into the face or eyes when opening the lid.
- Biological and chemical risks from centrifuged samples.
- Samples ejected if the centrifuge is loaded incorrectly.
- Poor day-to-day maintenance eg spills not cleaned up, causing the integrity of the centrifuge to fail (see picture below).

## Before Starting

**Never operate a micro centrifuge unless trained and authorised to do so.**

This will ensure you understand how to use the centrifuge, including how to select suitable tubes and rotors for both the centrifuge and the materials processed, how to correctly balance tubes: both when weighing their contents and placing them in the centrifuge's rotor.

## General

- **CHECK** you know how to use the centrifuge. If you don't, ask for help.
- **ALWAYS** refer to the COSHH Assessment before centrifuging to make sure you understand any chemical or biological hazards associated with the sample.
- **ALWAYS** wear suitable PPE eg gloves and goggles and remember, different thicknesses of gloves are needed dependent on what you are doing eg thicker gloves if handling concentrated acids or bases.
- **REPLACE** gloves regularly to ensure efficacy.

Structural failure, possibly due to not being cleaned over time causing integrity to deteriorate

| CHEMICAL GROUP | GLOVE MATERIAL | | | | | |
|---|---|---|---|---|---|---|
| | Natural Rubber | Nitrile Rubber | Neoprene ™ | PVC | Butyl | Viton™ |
| **Water miscible substances, weak acids / alkalis** | ✓ | ✓ | ✓ | ✓ | | |
| **Oils** | | ✓ | | | | |
| **Chlorinated hydrocarbons** | | | | | | ✓ |
| **Aromatic solvents** | | | | | | ✓ |
| **Aliphatic solvents** | | ✓ | | | | ✓ |
| **Strong acids** | | | | | ✓ | |
| **Strong alkalis** | | | ✓ | | | |
| **PCBs** | | | | | | ✓ |

## Selecting Tubes

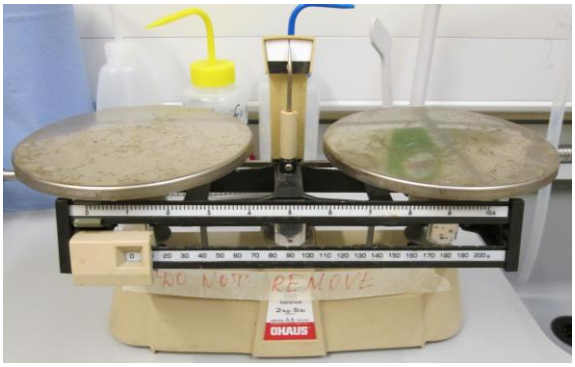
Different centrifuges use different tubes. These can vary in make, shape, size and material. **ALWAYS CHECK**:

- Each tube is clean and in good order ie no cracks, crazing.
- Tubes are suitable for the rotor.
- The tubes are suitable for the RPM and RCF they are spun at.
- The tubes are suitable for the material and the volume of material that is to be processed.
- There is a sufficient number of the same type of tube and associated caps, ‘o’ rings etc.
- **NEVER** overfill tubes and check they are correctly sealed.

Tubes often used in Micro Centrifuges

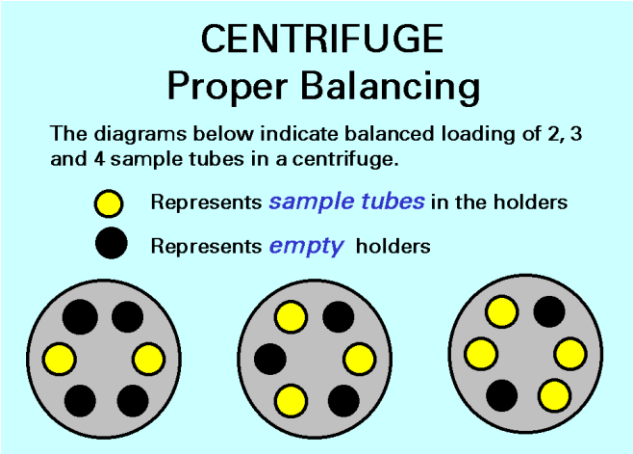
## Balancing Tubes

It is **ESSENTIAL** tubes are balanced correctly as their contents weight increases significantly when spun. Check the manufacturer’s guidance for advice on this. The use of digital or manual balances, which are set to ‘0’ before weighing helps:




**Loading and Operating the Micro Centrifuge**

- Always use the correct rotor.
- Place the tubes in the rotor, making sure the rotor is balanced properly (see below).





- If applicable, make sure the rotor is seated on the drive correctly.
- Secure the centrifuge lid and start the machine.
- Stay with the centrifuge until full operating speed is reached and the machine appears to be running without vibration.
- **If there appears to be excessive noise or vibration:**
    - Stop the machine and wait for it to stop.
    - Check the rotor balancing.
    - If you can't see anything wrong, make sure no one else uses the machine and report the problem to a Technician / Supervisor.
- **If a tube breaks / cleaning the centrifuge:**
    - Stop the machine and leave for 30 minutes to reduce the risk of aerosols.
    - Clean the centrifuge following the manufacturer's guidance or if you are unsure ask a Technician / Supervisor.
    - Make sure you wear appropriate gloves for the sample handled.

**Opening the Centrifuge Before and After Use**

- Never open the centrifuge until it has come to a complete stop.
- If you can open the 'lid' whilst the rotors are spinning, report immediately to a Technician.

**Disposing of Waste**

- Check the COSHH Assessment to ensure containers / gloves etc are disposed of correctly.

**Maintenance and Inspections**

It is essential centrifuges are maintained as directed by the specific manufacturer's guidance.

In addition, the importance of regular, recorded inspections which includes checks of safety critical devices, such as power / lid interlocks cannot be emphasised to ensure continued operation.

Examples of what should be included in an inspection are:

- General cleanliness –spilt chemicals which if left can deteriorate the centrifuge casing etc.
- Storage – if plastic, store the centrifuge out of direct sunlight as it can weaken the casing.
- The correct rotor (if removable) and tubes are available and being used.
- The centrifuge, rotor and tubes are structurally sound eg no cracks, chips, crazing, dents.
- The rotor (if removable) is not past its 'use by / replacement' date.
- The lid secures correctly when closed.
- The lid cannot be opened until the rotor has stopped spinning. This confirms the safety interlock works.
- There are no unusual sounds or vibration patterns coming from the centrifuge.

**FINALLY**:


- If you think there is something wrong with the centrifuge, **STOP** using it, place a sign on it to ensure others do not use it and report it immediately to your Supervisor / Lab Technician.