

# lechyd a Diogelwch – Health and Safety

## LABORATORY SAFETY – SAFE USE OF HIGH SPEED CENTRIFUGES

This Information Sheet provides guidance on using high speed centrifuges safely in a laboratory environment.

A centrifuge is an item of equipment that rotates at very high speeds to separate materials on the basis of their density. There are a number of different types at the University from bench mounted to larger floor mounted centrifuges. This Information Sheet **only** refers to high speed, floor standing centrifuges.

### High Speed Centrifuge Hazards

If high speed centrifuges aren't handled properly the following hazards may arise:



- Major injuries to the hands and fingers from the rotor.
- An unbalanced rotor can cause violent movements, leading to damage to both the centrifuge, other items near it and even damage to the building infrastructure.
- Biological and chemical hazards from samples being centrifuged.
- Samples being ejected if the centrifuge isn't loaded correctly.
- If rotors are not attached properly, severe damage to the centrifuge and the building.



### Before you Start

Only trained, authorised personnel may operate high speed centrifuges. A list of such persons must be displayed by the centrifuge.

### General

- **ALWAYS** refer to the COSHH Assessment to make sure you understand any chemical or biological hazards associated with the sample before centrifuging it.
- **REFER** to the Code of Practice on Centrifuging Flammable Substances before centrifuging them.

Always



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**CODE OF  
PRACTICE  
CENTRIFUGING  
FLAMMABLE  
SUBSTANCES**

before  
centrifuging



- **ALWAYS** wear appropriate PPE eg gloves and goggles (the following chart and the COSHH Assessment should help you). But remember, different thicknesses of gloves are needed dependent on what you are doing eg thicker gloves will be needed if you are handling concentrated acids or bases.

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	-	-	-	-	-	✓

### Opening the Centrifuge Before and After Use

- Never open the centrifuge until it has come to a complete stop.

### Loading and Installing the Rotor

- Always use the correct rotor for the type of centrifuge and **NEVER** exceed the maximum rotor speed which is usually displayed on the rotor lid.
- Always check the rotor for signs of damage or corrosion before using.



This shows maximum rotor speed of 9000 RPM



This shows maximum rotor speed of 20,000 RPM

- Use tubes that are suitable to contain the sample being centrifuged.
- Before using the tubes, always check them to ensure they are clean, with no cracks etc.
- Do not overfill tubes and make sure they are tightly sealed.



Centrifuge destroyed as a result of the wrong rotor being used



Rotor failure

- Make sure the rotor is seated on the drive correctly.

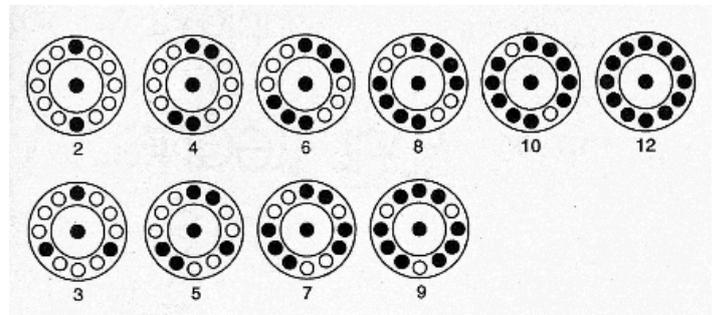
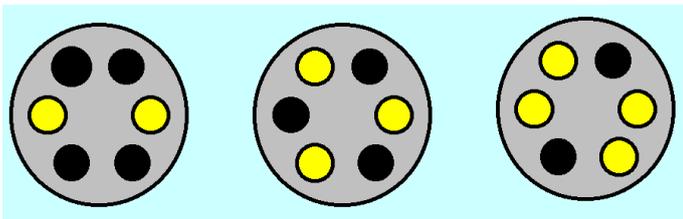


Ensure rotor pins are properly lined up with spindle pins



Gently spin the rotor to ensure the pins have located and the rotor moves freely

- Place the tubes in the rotor, making sure the rotor is balanced properly. This will be dependent on the number of tubes the rotor holds (see below) for examples of balancing a 6-tube and a 12-tube centrifuge.
- All tubes should weigh within 0.1grams of one another.



- Fit the rotor lid, ensuring it is screwed down properly into the spindle and that there are no gaps between the rotor lid and the rotor. Gently pull upwards on the rotor to check it is secure.



- Secure the centrifuge lid and start the machine.
- Always stay with the centrifuge until the 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 your Supervisor.
- **If a tube breaks:**
  - Stop the machine and leave for 30 minutes to reduce the risk of aerosols.
  - Make sure you wear appropriate gloves for the sample being handled.
  - Clean the centrifuge following the manufacturer's guidance or if unsure ask your Supervisor.

### **General Cleaning of Centrifuge and Rotors**

- Centrifuge rotors can corrode unless properly cleaned. This is particularly important when using corrosive chemicals such as cesium chloride.
- After each use clean and dry rotors according to manufacturer's instructions.



Water left in the centrifuge has caused corrosion

- In addition, if operated below room temperature, condensation will form within the centrifuge chamber. To prevent corrosion mop up excess water and leave the lid open until dry.

## Disposing of Waste

- Always refer to the COSHH Assessment to ensure you dispose of the containers / gloves etc correctly and safely.



### **FINALLY:**

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