***STANDARD OPERATING PROCEDURE – E001***

**High-Speed Floor Centrifuges**

1. **Objectives**

The objective of this document is to establish standard operating procedures for using high-speed floor centrifuges, ensuring the safety of laboratory personnel by mitigating potential risks associated with hazardous materials, and injuries. In addition, this SOP aims to enhance the efficiency of experimental workflows.

1. **Personal Protective Equipment**

To ensure safety during the operation of high-speed floor centrifuges, appropriate personal protective equipment (PPE) must be worn. This includes:

* Long pants and closed-toe shoes to protect against spills and sharp objects.
* A long-sleeved, buttoned lab coat to minimize skin exposure.
* Safety glasses or goggles to protect against splashes or flying debris.
* Disposable nitrile or latex gloves to prevent direct contact with hazardous materials.
* If the user has long hair, it should be tied back.

1. **Potential Hazards**

The use of high-speed floor centrifuges presents various hazards that must be managed to maintain a safe working environment. These include:

* **Mechanical Hazards:** Risk of injury from moving parts, rotor imbalance, excessive speeds, or equipment failure.
* **Biological Hazards:** Exposure to infectious agents or biohazardous materials, particularly if aerosols are generated.
* **Chemical Hazards:** Exposure to hazardous chemicals if containers are improperly sealed or handled.
* **Noise Hazards:** Elevated noise levels during operation, which may cause hearing damage over time.
* **Spill Hazards:** Leaks from improperly sealed containers, leading to contamination or accidents.

1. **Procedures**
2. Preparation

* Ensure that all personnel operating the centrifuge have received appropriate training and are familiar with the equipment.
* Inspect the centrifuge for any visible damage or wear before use i.e. checking for cracks in the rotor and the rotor lid and centrifuge lid seal properly.
* If defects are found, cease use of the centrifuge immediately and contact the supplier or MDMF/IMR for repair.
* Confirm that the surface is level and stable. Do not use the centrifuge on an uneven or slanted surface.
* Make sure the centrifuge is clean and free of spills or debris.
* Wear appropriate PPE before starting the centrifuge.
* Prepare suspensions in suitable centrifuge tubes or containers, ensuring that the maximum volume in each tube does not exceed 75%.
* Balance the samples in the rotor by placing equal weights directly opposite to each other. Use scales to weigh the samples and balance them as necessary.
* Insert compatible tubes into the correct centrifuge rotor and place only compatible rotor into buckets.

1. Operation

* Choose the desired speed and duration for centrifuging the samples.
* If the rotor cannot accommodate the required speed, transfer the samples to a compatible centrifuge tube and rebalance them, including the lid.
* Align the rotor's two pins with the corresponding pins on the centrifuge spindle. Gently slide the rotor down the spindle.
* Confirm the rotor type and target speed. Ensure that you are using the correct lid for the selected rotor.
* Place the samples into the rotor, ensuring they have equal mass. Position samples of equal mass opposite one another, using scales to verify balance if necessary.
* After loading, reconfirm the rotor type and check that the correct lid is used. Securely attach the rotor lid to the spindle.
* Ensure the rotor lid is fastened, close the centrifuge lid, and set the desired temperature, speed, and duration.
* Press the “Start” button to begin the centrifugation process, allowing the centrifuge to reach the desired speed. If samples need to be chilled, pre-cool the machine and rotor by running it for 10 minutes at 4 degrees Celsius or select the pre-cool option.
* Observe the centrifuge for any unusual noises or vibrations. If any issues arise, press the “Stop” button and step away from the equipment.
* If a problem occurs, contact a technician for assistance before attempting to open the centrifuge lid.
* Do not open the lid or attempt to remove samples until the centrifuge has completely stopped.
* Avoid standing directly in front of the centrifuge while it is in operation.
* Do not leave the centrifuge unattended until it has reached the target speed. If no issues are detected, you may leave the area until the run is complete.

1. Post-Operation

* After the run is complete and the rotor has fully stopped, unscrew the rotor lid and carefully remove your samples.
* Remove the sample vials from the rotor and safely place them in an appropriate rack or container.
* If a sample vial has leaked during the run, follow the laboratory’s spill response procedures. Rotor may be required to be disinfected while wearing appropriate PPE.
  + Note: Be cautious, as spilled liquids at the bottom of the rotor positions can be easily overlooked and may cause imbalances in future runs.
* Remove the rotor from the centrifuge after the run and place it in the designated box next to the unit.
* If using a fixed-angle rotor, ensure the lid is placed on top of it in the box.
* Clean the rotor and inside of the centrifuge with 70% ethanol and wipe it dry. This cleaning process must be performed after each run, as neglecting to do so may disrupt future experiments and promote contamination.

**5) Incident Reporting**

* Report any accidents resulting in injuries to the Principal Investigator and/or the departmental safety officer (DSO) immediately.
* For serious incidents, notify the security unit immediately by calling the 24-hour hotline on **23588999**.

**6) References**

* Nikolic, A. (2016). *SOP\_SMB07: Centrifugation: High Speed Floor Centrifuges.* Risk Assessment. The University of Sydney.
* Coleman, N. & Nikolic, A. (2014). *SOP SMB007.2 (AN NC 0614): Centrifugation: High-speed floor centrifuges.* The University of Sydney.
* Health, Safety and Environment Office, The Hong Kong University of Science and Technology (2023). *Chapter 9: Biological Safety.* Retrieved on June 30, 2025, from https://hseo.hkust.edu.hk/sm\_09