STANDARD OPERATING PROCEDURE

Centrifuge Operation SOP

Document no.	SOP-LAB-011
Revision	1.0
Owner	Laboratory Supervisor
Effective date	September 15, 2026
Review cycle	Every 12 months

1. Purpose

To operate laboratory centrifuges safely and consistently so that samples are processed correctly and equipment damage or injury from imbalance is prevented.

2. Scope

Applies to benchtop and floor-model centrifuges used to separate samples by density. Does not cover ultracentrifuges, which require manufacturer-specific training.

Definitions

Rotor	The removable component that holds sample tubes and spins inside the centrifuge.
Imbalance	An uneven weight distribution across the rotor that can cause vibration, damage or a safety hazard.
RCF	Relative centrifugal force, the effective spin force applied to a sample, often used instead of RPM in test methods.

3. Responsibilities

Lab Technician	Loads, balances and operates the centrifuge, and reports vibration or unusual noise.
Lab Supervisor	Approves protocol parameters and investigates reported imbalance or damage events.
Maintenance Technician	Services the centrifuge, replaces worn rotors or seals, and clears it to return to use.

RACI matrix

Activity	Lab Technician	Lab Supervisor	Maintenance Technician
Inspect centrifuge before use	R/A	I	-
Balance and load sample tubes	R/A	-	-
Set and approve run parameters	R	A	-
Service or repair the centrifuge	I	C	R/A

R = Responsible, A = Accountable, C = Consulted, I = Informed

4. Materials and PPE

Materials, tools and systems

- Analytical or top-loading balance for tube balancing
- Matched sample tubes and rotor buckets
- Rotor and chamber cleaning supplies
- Centrifuge usage and maintenance log
- Manufacturer's operating manual for each rotor

Personal protective equipment

- Disposable nitrile gloves
- Safety glasses
- Lab coat

5. Procedure

Step	Task	Owner	Done
5.1	**Inspect the centrifuge before use** Check the chamber, rotor and lid gasket for cracks, corrosion or debris, and confirm the unit is level and unobstructed before starting.	Lab Technician	☐
5.2	**Select the correct rotor** Confirm the rotor installed matches the tube size and the speed and RCF required by the test method.	Lab Technician	☐
5.3	**Weigh and balance tubes** Weigh each filled tube on the balance and pair it with a tube of matching weight directly opposite it in the rotor, using a balance blank if an odd number of samples is run. **Checkpoint:** Opposing tube pairs are within the rotor manufacturer's stated weight tolerance.	Lab Technician	☐
5.4	**Load tubes symmetrically** Place balanced tube pairs into opposite rotor positions, filling the rotor symmetrically rather than clustering tubes on one side. **Warning:** Never run the centrifuge with an unbalanced or partially loaded rotor pattern.	Lab Technician	☐
5.5	**Secure the rotor lid and chamber lid** Close and lock the rotor lid, then close and latch the centrifuge chamber lid before entering any run parameters.	Lab Technician	☐
5.6	**Set run parameters** Enter the speed or RCF, run time, and temperature specified by the test method, confirming the settings match the protocol before starting.	Lab Technician	☐
5.7	**Start the run and monitor briefly** Start the centrifuge and stay near it for the first minute of acceleration to listen and watch for vibration, unusual noise or an error code. **Checkpoint:** No unusual vibration or noise is detected during the initial acceleration.	Lab Technician	☐
5.8	**Stop the run if imbalance occurs** If vibration, noise or an imbalance error occurs, stop the run immediately, wait for a complete stop, and re-balance the load before restarting.	Lab Technician	☐
5.9	**Wait for a complete stop before opening** Wait until the rotor has come to a full stop, confirmed by the display or by listening, before unlatching the chamber lid. **Warning:** Never attempt to slow or stop a spinning rotor by hand or by opening the lid early.	Lab Technician	☐

Step	Task	Owner	Done
5.10	**Remove tubes carefully** Open the rotor lid, remove tubes without disturbing the separated layers, and place them upright in a rack for the next processing step.	Lab Technician	☐
5.11	**Clean the rotor and chamber** Wipe down the rotor, buckets and chamber interior after each use, especially after any spill or tube breakage, per the manufacturer's cleaning instructions.	Lab Technician	☐
5.12	**Log usage and report issues** Record the run parameters and operator in the usage log, and report any vibration, noise or damage to maintenance for follow-up.	Lab Technician	☐

6. Quality checks

- Every load is balanced within the rotor's stated weight tolerance before a run starts.
- The rotor lid and chamber lid are confirmed locked before each run.
- No run is left unattended during the initial acceleration phase.
- Reported vibration or noise events are logged and reviewed by maintenance.

7. Records

- Centrifuge usage log
- Tube balancing weight records
- Maintenance and service history
- Imbalance or incident reports

8. KPIs

- Number of imbalance stops per month
- Percentage of runs completed without interruption
- Average centrifuge downtime for repair
- Number of tube breakages per quarter

9. Common mistakes

- Estimating tube balance by eye instead of weighing on a balance.
- Opening the lid before the rotor has fully stopped.
- Running a partial load without a balance blank in the opposite position.
- Not reporting minor vibration because the run finished anyway.

10. Revision history

Revision	Date	Description	Reviewed by
1.0	September 15, 2026	Initial release	Ilia Pirozhenko

Approval

Prepared by	Approved by	Date

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