

Department:	Laboratory and Blood Bank		
Document:	Multidisciplinary Policy and Procedure		
Title:	Quality Control Procedures and Results for Centrifuge Check and Maintenance		
Applies To:	All Laboratory Staff and Biomedical Engineers		
Preparation Date:	January 02, 2025	Index No:	LB-MPP-028
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1. PURPOSE:

- 1.1 This procedure provides instruction on maintaining, troubleshooting, calibrating and running control of centrifuge.

2. DEFINITIONS:

- 2.1 Is the method for periodic checking of laboratory centrifuges for the speed, balance and regular maintenance.

3. POLICY:

- 3.1 Periodical checks are made on satisfactory performance of all the equipment used in the clinical laboratory. Precision and accuracy of results are required to keep control on the high quality of reports. Laboratory equipment are the simplest but the first to be monitored. This consists of daily, weekly and monthly check of the temperatures of incubators (optimal 35° C), refrigerators (2 ° C to 4 ° C), autoclaves. Carbon dioxide incubators should also have a constant measurement of their CO₂ concentration (optimum 8%). Miscellaneous items, such as centrifuges require periodic inspection. Microscopes and weighing balances should be cleaned always.
- 3.2 Equipment's are the corner stone of any automated test. Dealing with equipment's includes calibration to maintain accuracy, running control to check for reproducibility, troubleshooting it, and running a full maintenance schedule. In other words, accurate and precise results cannot be established if there is no reliable machine.
- 3.3 All centrifuge used in the clinical laboratory is to be tested, maintained and calibrated according to manufacturer's guideline and the lab requirements outlined in this policy.

4. PROCEDURE:

4.1 Safety Precaution:

- 4.1.1 Avoid touching the equipment without gloves.
- 4.1.2 Avoid imbalanced tubes or raising of the lid before the centrifuge has stopped. Keep hair, clothing or dangling items out of the way.
- 4.1.3 Make sure that the equipment is directly plugged to emergency socket (not through an extension cord).

4.2 Operating the Equipment:

- 4.2.1 Load balanced, stoppered tube properly on opposite sides of tube racks. (In a geometrically symmetrical arrangement).
- 4.2.2 Close the lid and press start button (1500 g for 15 minutes) or any speed and time according to procedure.
- 4.2.3 To open rotor lid, press stop.
- 4.2.4 Lid will open automatically when fully stopped.
- 4.2.5 Remove the test tube.

4.3 Maintenance Schedule: The maintenance schedule of centrifuge includes a schedule task to be performed daily, weekly, monthly, twice per year and as needed.

4.3.1 Daily cleaning:

- 4.3.1.1 Check whether the centrifuge is positioned or mounted on a horizontal flat surface so as to prevent the instrument moving away from its place.
- 4.3.1.2 Balancing the centrifuge load, buckets should be loaded in matched pans and test tubes should be arranged in a way so that balanced tubes oppose each other in the centrifuge head.

4.3.2 Weekly:

- 4.3.2.1 Clean rotors, buckets, adapters using a cloth dampened with mild detergent (pH 6-8).
- 4.3.2.2 Dry with a soft cloth or put them on a drying oven (highest temperature 50°C).
- 4.3.2.3 Check I whether the rubber buffers are in place in the buckets.

4.3.3 Monthly maintenance:

- 4.3.3.1 For proper functioning and performance, all displays are seen in the window and if it is ready for use, press start button to start the operation.

4.3.4 Every 6 months maintenance:

- 4.3.4.1 Temperature, speed check and greasing, call the service engineer.

4.3.5 As needed:

- 4.3.5.1 In case of rotor & rotor chamber contamination – disinfect with 1:10 Sodium Hypochlorite.
- 4.3.5.2 In case of glass breakage, glass splinters must be removed with the use forceps and cotton then discard in yellow container for broken glass.
- 4.3.5.3 Check brushes and bearings and replace if necessary.

4.4 Calibration: To be performed by the service engineer.

4.4.1 Using a tachometer or dial for setting the speed (RPM).

4.4.2 Using the Relative Centrifugal Force Nomograph, place a straight-edge on the nomograph connecting the known speed (rpm) & the known rotating radius. The point at which the straight-edge interacts the RCF axis is the force.

4.4.3 Recommended centrifugal forces:

- 4.4.3.1 Low spun Platelet Plasma (150 – 200g for 10-15 minutes)

- 4.4.3.2 High spun Platelet Plasma (1200-1500g for 15 minutes)

- 4.4.3.3 Packing of red cells (2000-2300 for 30 minutes)

4.4.4 Calculation steps:

$$4.4.4.1 RCF = 1.118 \times 10^{-5} \times r \times RPM^2$$

RCF: Relative Centrifugal Force (gravities)

1.118 X 10-5: Constant

r: Radius (distance in centimeter from the center shaft to the middle of the specimen tube)

RPM: rotating speed (revolutions per minute)

4.5 Quality Control: Balancing the centrifuge load and observe for any noise.

4.6 Troubleshooting: Recognizing Errors and Correction.

4.6.1 When all displays remain dark, check the main supply.

4.6.2 When displays are momentarily dark, press the start again.

4.6.3 Unusual loud running noises are due to:

- 4.6.3.1 Tube breakage and mass shifting;

- 4.6.3.2 Defect drive or rotor;

- 4.6.3.3 Disorder of speed control;

- 4.6.3.4 Faulty fan or compressor;

- 4.6.3.5 Press stop key or main switch on/off;

4.6.4 When "open" message appears and the centrifuge cannot be started close the lid correctly.

4.6.5 Lid message flashes in speed section due to lid lock was opened with draw thread during operation. If this happens, close the lid, switch the power on and press the start button.

4.6.6 When "BAL" message flashes in speed section due to:

- 4.6.6.1 Rotor is not properly loaded;
- 4.6.6.2 Bucket does not swing out properly or not at all;
- 4.6.6.3 Sudden tube breakage & shift of centre gravity by escaping fluid;
- 4.6.6.4 Defective motor shaft;
- 4.6.6.5 Mechanical or other damage to rotor;
- 4.6.6.6 Centrifuge lop-sided;
- 4.6.6.7 If this happens:
 - 4.6.6.7.1 Distribute tubes or fillings evenly;
 - 4.6.6.7.2 Clean trunnions & bucket grooves & grease with lubricant No.6692;
 - 4.6.6.7.3 Remove splinters & debris, clean & reload bucket, restart with reduced speed if necessary;
 - 4.6.6.7.4 Call service for defective motor shaft or mechanical damage.
- 4.6.7 When "E-07" message flashes in speed section this is due to over temperature alarm. In case of this, let centrifuge cool down, remove sample and cool them, pre temper centrifuge and start again.
- 4.6.8 When "E-xx" message flashes in speed display (possible xx-values -00-19) due to release of thermal or electrical safety trip. Switch off the centrifuge and after rotor standstill, switch on & wait for 15 minutes to start again.

5. MATERIALS AND EQUIPMENT:

N/A

6. RESPONSIBILITIES:

- 6.1 All laboratory staff
- 6.2 Biomedical Engineers

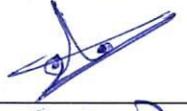
7. APPENDICES:

- 7.1 Centrifuge maintenance sheet

8. REFERENCES:

- 8.1 Calibration-of-eppendorf-centrifuge.html.
- 8.2 Safety in Health-Care Laboratories (WHO).
- 8.3 HemataSTAT Sample Quarterly and Daily Quality Control Procedures.
- 8.4 Guidelines for Good Clinical Laboratory Practices (GCLP), Indian Council of Medical Research.

9. APPROVALS:

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Appendix 7.1

Kingdom of Saudi Arabia
Hafar Al Batin Health Cluster
Maternity and Children Hospital



الملكة العربية السعودية
الجمع الصحي ببحر الباطن
مستشفى الولادة والأطفال

CENTRIFUGE MAINTENANCE LOG SHEET

DEPARTMENT: MONTH: YEAR:

DAILY CHECKLIST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Clean the out surface of machine																															
Check Centrifuge Position																															
Technician's Signature:																															

WEEKLY CHECKLIST	1st	2nd	3rd	4th	Remarks
Clean lid					
Clean rotors					
Clean adapters					
Clean buckets					
Technician's Signature:					

MONTHLY	REMARKS	EVERY 6 MONTHS	REMARKS
Perform Q.C. check by using citrated plasma		Check Time, speed and greasing (To be done by Biomedical Services Engineer)	
Using automated CBC method			
Platelet should be $<4.0 \times 10^9 / L$			
Technician's Signature:			