

PROCEDURE

Corewell Health East - Centrifuge Use and Maintenance - Taylor

This Procedure is Applicable to the following Corewell Health sites:
Corewell Health Taylor Hospital

Applicability Limited to:	N/A
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Functional Area:	Clinical Operations, Laboratory
Lab Department Area:	Lab - General

1. Principle

This document instructs the user on how to use and properly maintain laboratory centrifuges. Blood Bank centrifuges will be used and maintained by following specific Blood Bank procedures.

2. Responsibility

Personnel who have completed the competency requirements will perform these tasks.

3. Definitions

- A. Revolutions per Minute (rpm)
- B. Kilogram per cubic decimeter (kg/dm^3)
- C. Centrifugal Force (xg)
- D. Millimeter (mm)

4. Centrifuge Types

- A. Thermo Scientific™ Sorvall ST16 centrifuge is a laboratory product designed to separate components by generation of Relative Centrifugal Force. It separates human samples of blood, urine or other body fluids collected in appropriate containers.
- B. The Beckman Coulter Allegra X-22 Series bench-top centrifuge generates centrifugal force required for a wide variety of applications. This centrifuge is designed for routine processing of sample preparations.
- C. The Silencer® S2110E is a quiet, general-purpose centrifuge designed to be used in educational, biochemistry, clinical, or industrial laboratories for general purpose applications such as urine and blood separations, radio immunoassay, and other sedimentation purposes. The S2110E has quick acceleration and deceleration, making it well suited for general processing of urine.
- D. The StatSpin® Express 3 is a high-speed horizontal bench top centrifuge used to rapidly separate blood components in the original sample collection tubes.
- E. Hettich MIKRO 200/200R is an in vitro diagnostic medical device used for centrifugation as well as enrichment of sample material of human origin for subsequent further processing for diagnostic purposes. Set at the maximum speed of 15000 RPM, it is suitable for separating lipids from human serum and plasma.

Entities will reference associated Documentation contained within this document as applicable
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5. Equipment Needed

Specimen tubes for Coagulation testing require plasma with a platelet count of <10,000/ μ L. Centrifuges used for spinning coagulation tubes are designated and set to produce such plasma. The centrifuges must be checked biannually to monitor the platelet count in the citrated plasma.

- A. Thermo Scientific™ Sorvall ST16 centrifuge - Set at 3600 rpm for 5 minutes. Designated for platelet poor plasma.
- B. Beckman Coulter Allegra X-22 centrifuge - Set at 3600 rpm for 10 minutes.
- C. Silencer 2110 centrifuge - Set at 1800 rpm for 5 minutes for urinalysis only.
- D. StatSpin® Express 3 centrifuge - Set at 5600 rpm for 5 minutes. Designated for platelet poor plasma.
- E. Hettich MIKRO 200/200R centrifuge – Set at 15000 rpm for 15 minutes. Designated for lipemic samples to separate lipids from serum and plasma.

6. Supplies

- A. Corrosion protection oil
- B. Lubricating grease
- C. T-handle Rotor Wrench or ratchet wrench
- D. Tie-down Screw-already in centrifuge
- E. 1/8-inch, 5/16-inch, 2.5 mm hex keys
- F. Detergent
- G. Disinfectant/Alcohol wipes
- H. Brush
- I. 1.5 mL graduated bullet tubes
- J. Extended Fine Tip Transfer pipets

7. Equipment Maintenance

A. Thermo Scientific™ Sorvall ST16

- 1. Daily Maintenance
 - a. Check the centrifuge for interior and exterior spills.
 - b. Clean spills with 70% Ethanol.
- 2. Weekly Maintenance
 - a. Open the centrifuge.
 - b. Turn off the centrifuge.
 - c. Pull out the power supply plug.
 - d. Remove the rotor by pressing down on the green locking device and lifting the rotor out of the centrifuge.
 - e. Use warm water to wash out the cavities.
 - f. Use a final rinse of distilled water.
 - g. Dry completely using paper towels.
 - h. Wipe the interior bowl with a dry cloth and a general disinfectant with a pH between 6-8.
 - i. After cleaning, treat the entire surface of aluminum parts and all cavities with a small amount of corrosion protection oil on a gauze pad.
 - j. Return rotor to centrifuge; the green locking device will auto-lock. Test by pulling up the green lock without pressing down.
 - k. Document maintenance on Centrifuge Maintenance Log.
 - l. Disinfect the centrifuge immediately whenever infectious material has spilled during centrifugation. See Operators manual for specific disinfection instructions.
- 3. Biannual Maintenance
 - a. Clean the ventilation holes with a dry cloth. These are the two slits on the back of the centrifuge.
- 4. Annual Maintenance
 - a. Centrifuge checks for platelet poor plasma. Refer to [Corewell Health East - Platelet Poor Plasma Study - Taylor, Trenton, Wayne](#) procedure.

- b. The Biomedical Engineering Department will perform electrical, rotor speed, and timer checks.
- c. If the centrifuge fails to achieve its operating speed goals and time settings, laboratory management should be notified. Biomedical Engineering staff will contact the manufacturer for follow up and repair information.

B. Beckman Coulter Allegra X-22

- 1. Daily Maintenance
 - a. Check the centrifuge for interior and exterior spills.
 - b. Clean spills with 70% Ethanol.
- 2. Weekly Maintenance
 - a. Inspect the interior of the rotor chamber for accumulations of sample or dust, wipe with a damp cloth or paper towel.
 - b. Wipe the interior bowl with a dry cloth and a general disinfectant.
 - c. Clean the drive shaft, shaft cavity, threads, and the tie-down screw using a mild detergent and a soft brush. Rinse thoroughly and dry completely.
 - d. Apply lubricating grease to the pivot pins.
 - e. Clean the exterior centrifuge case and door by wiping with a cloth dampened with a mild detergent and water.
 - f. Document on Centrifuge Maintenance Log
 - g. Disinfect the centrifuge immediately whenever infectious material has spilled during centrifugation. See Operators manual for specific disinfection instructions.
- 3. Monthly Maintenance
 - a. Lubricate the rotor drive shaft.
- 4. Annual Maintenance
 - a. The Biomedical Engineering Department will perform electrical, rotor speed and timer checks.
 - b. If the centrifuge fails to achieve its operating speed goals and time settings, laboratory management should be notified. Biomedical Engineering staff will contact the manufacturer for follow up and repair information.

C. Silencer 2110 Centrifuge

- 1. Daily Maintenance
 - a. Check the centrifuge for interior and exterior spills.
 - b. Clean tube breakages and spills immediately and thoroughly.
- 2. Weekly Maintenance
 - a. The interior can be cleaned with disinfectants such as bleach, followed by a clear water rinse and wipe. The interior must be rinsed and dried thoroughly before using the centrifuge. Use water sparingly when rinsing, as the motor seal is not watertight.
 - b. The exterior should be kept clean with the use of a mild soap and a damp (not wet) lint-free cloth. The centrifuge must be dried thoroughly before using.
- 3. Annual Maintenance
 - a. The Biomedical Engineering Department will perform electrical, rotor speed and timer checks.
 - b. If the centrifuge fails to achieve its operating speed goals and time settings, laboratory management should be notified. Biomedical Engineering staff will contact the manufacturer for follow up and repair information.

D. StatSpin® Express 3

- 1. Daily Maintenance
 - a. Inspect tube inserts for cracks or broken tube fragments.
 - b. If insert contains broken tube fragments dispose of the broken tube in appropriate sharps container. If spills are noted, clean the insert (s) with 70% ethanol or a 10% bleach solution, dry and reinstall.

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2. Monthly Maintenance

- a. Open the centrifuge cover
 - b. Unplug the power cord from the electrical outlet
 - c. Remove all the tubes and inserts
 - d. Remove the rotor
 - 1) Loosen and unscrew the retaining nut using a 5/16 inch hex key tool.
 - 2) Remove the retaining nut and lift the rotor off the drive shaft.
 - e. Remove the black gasket surrounding the chamber by pulling up one end of the gasket.
 - f. Inspect the rotor for cracks or damage.
 - g. Clean the inner surface (bowl and inside lid) with a mild detergent and if necessary, a disinfectant, wiping with an absorbent tissue dampened with 70% alcohol or 10% bleach solution. Never spray detergent or disinfectant directly into the bowl because over-spray can reach the motor bearings or internal circuitry causing harm to the electronics. Replace the bowl liner if necessary.
 - h. Rotor Disinfecting
 - 1) The rotor and inserts may be soaked in detergent and warm water or a 10% bleach solution.
 - 2) DO NOT attempt to clean an insert that has a broken tube. Dispose of insert immediately.
 - 3) Dry the rotor and inserts with a clean absorbent paper towel or allow to air dry.
 - 4) Re-install the rotor
 - a) There are two drive pins adjacent to the drive shaft on the rotor mount. These pins mate with the corresponding holes on the bottom of the rotor.
 1. Rotate the rotor so wells 5 and 6 are aligned with the drive pins.
 2. Slide the rotor onto the shaft and push down gently to seat the drive pins in the holes.
 3. Place the retaining nut on the shaft and tighten securely using the 5/16 inch hex key.
 - a. If the drive pins are not aligned, the retaining nuts will not tighten securely.
 - i. Clean the outside surfaces and the control panel with a water-dampened absorbent tissue and mild detergent.
 - j. Plug into electrical outlet.
- CAUTION-** Before operating the centrifuge, ensure that the rotor is fully seated onto the motor shaft and the hex screw is fully tightened.

3. Annual Maintenance

- a. The Biomedical Engineering Department will perform electrical, rotor speed and timer checks.
- b. If the centrifuge fails to achieve its operating speed goals and time settings, laboratory management should be notified. Biomedical Engineering staff will contact the manufacturer for follow up and repair information.

E. Hettich MIKRO 200/200R

1. Daily Maintenance
 - a. Each day of use, check the centrifuge for interior spills and clean the centrifuge chamber with alcohol wipes followed by water, if necessary.
2. Monthly Maintenance
 - a. Clean the outside of the centrifuge with alcohol wipes, followed by water.
 - b. Remove the rotor using the Hettich Hex wrench.
 - c. Clean the centrifuge chamber, rotor and lid with alcohol wipes, followed by water.
 - d. Check for any corrosion, cracks, or other damage.
3. Annual Maintenance
 - a. The Biomedical Engineering Department will perform electrical, rotor speed, and timer checks.

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- b. Grease the motor shaft with Hettich grease.

8. Safety Precautions

- A. In order to ensure safe operation of any centrifuge, the following general safety regulations must be followed:
 - 1. The centrifuge should be operated by trained individuals and used for its intended use only.
 - 2. Do not move the centrifuge while it is running.
 - 3. Do not lean on the centrifuge.
 - 4. Use only rotors and accessories provided by the manufacturer of each centrifuge.
 - 5. Never overload the rotor.
 - 6. Never start the centrifuge when the lid is open or open the lid until the rotor has come to a complete stop and this has been confirmed by the display.
 - 7. Never attempt to slow or stop the rotor by hand.
 - 8. If a hazardous situation occurs, turn off the power supply to the centrifuge.

9. Procedure

A. Thermo Scientific Sorvall ST16

- 1. Use
 - a. Turn on the power switch on the back of the device. The device performs a self-check of its software.
 - b. The speed and time are displayed. These may be changed by pressing the up and down arrow buttons near each category.
 - c. Press the OPEN key.
 - d. Load the rotor symmetrically.
 - e. Let rotors spin for programmed speed and time.
 - f. Once the speed drops to zero, the rotor stops spinning and the lid opens automatically. The centrifuge can be stopped at any time during the preset program by pressing the STOP key.
- 2. Unloading
 - a. Lift the cover.
 - b. Carefully remove the tubes and try not to re-suspend the sample.
- 3. Troubleshooting
 - a. The most common cause of centrifuge failures are due to imbalanced loads.
 - b. Check the load placed in the rotor and re-arrange for symmetry if necessary.
 - c. For additional troubleshooting steps, refer to the Thermo Scientific™ Sorvall ST16 Instruction Manual.

B. Silencer 2110 Centrifuge

- 1. Use
 - a. Press the Power Switch to bring the centrifuge out of sleep mode and unlock the lid.
 - b. The speed and time settings default to 2100 RPM and 5 minutes. Set the desired speed and time by pressing the up or down arrows.
 - c. Open the lid and load samples, taking care to maintain a balanced load.
 - d. Close the lid and press the Start Switch. The lid-lock will engage; the Speed Display will switch to displaying the actual speed.
 - e. The interlock LED will turn off, and the centrifuge will accelerate to the set speed.
 - f. Upon reaching the set speed, the time will start counting down, and the Time Display will display the time remaining.
 - g. When the set time has elapsed, the centrifuge will decelerate to a stop. When the rotor has come to a complete stop, the lid-lock will release, and the Lid Interlock LED will be illuminated.
- 2. Unloading
 - a. Lift the cover.
 - b. Carefully remove the tubes and try not to re-suspend the sample.
- 3. Troubleshooting

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- a. The most common cause of centrifuge failures are due to imbalanced loads.
- b. Check the load placed in the rotor and re-arrange for symmetry if necessary.
- c. For additional troubleshooting steps, refer to the Beckman Silencer 2110 Centrifuge Instruction Manual.

D. StatSpin® Express 3 Centrifuge

1. Use

- a. The electronically operated cover interlock mechanism prevents operation until the cover is completely closed and locked and prevents the cover from opening when the centrifuge is in operation. When the cover is completely closed and locked, an operating cycle can be initiated.
 - b. Loading
 - 1) Verify the appropriate tube inserts are installed.
 - 2) The rotor must be properly balanced to ensure smooth operation. **DO NOT** spin a single tube.
 - 3) Use the same size and style tubes in opposite positions. Balance liquid in tubes to within 0.5 mL.
 - 4) Close and latch the centrifuge cover.
 - 5) Select the spin time by pressing the appropriate cycle time button. This laboratory uses the 5 minute setting at 5600 rpm.
 - 6) Press the Start button.
- CAUTION** - Replace Tube Inserts immediately if a tube breaks during centrifugation
- 7) Close and latch the centrifuge cover.
 - 8) Select the appropriate cycle by pressing the cycle selector until the desired LED is illuminated.
 - 9) Press the start button.

c. Unloading

- 1) When the cycle completes, the rotor decelerates to a complete stop in 30 seconds or less. The instrument beeps, and the cover latch automatically releases.
- 2) Lift the cover.
- 3) Carefully remove the tubes and try not to re-suspend the sample.

2. Troubleshooting

- a. The most common cause of centrifuge failure is due to imbalanced loads.
- b. Check the load placed in the rotor and re-arrange for symmetry if necessary.
- c. For additional troubleshooting steps, refer to the StatSpin® Express 3 Centrifuge Instruction Manual.

E. Hettich MIKRO 200/200R

1. Use

- a. The electronically operated cover interlock mechanism prevents operation until the cover is completely closed and locked and prevents the cover from opening when the centrifuge is in operation. When the cover is completely closed and locked, an operating cycle can be initiated
- b. Press the Stop/Open button; the lid opens at approximately 45°.

2. Loading

- a. Fill all centrifuge (bullet) tubes outside the centrifuge.
- b. Check that the rotor is firmly seated.
- c. Place the lid centrally on the rotor and turn the lid clockwise until it is tightly closed.
NOTE: If the lid is not on the rotor, the centrifuge will make a very loud whining noise.
- d. Centrifuge samples for 15 minutes at 15000 rpm

3. Unloading

- a. The centrifuge will automatically stop, and the cover will open.
- b. Turn the lid anticlockwise until it is open.

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- c. Carefully remove samples, noting that the lipid layer rises to the top.
 - d. Utilize the Extended Transfer Pipets to bypass the lipid layer and remove the serum or plasma underneath. Place into a sample cup and run the sample as usual.
- 4. Troubleshooting
 - a. The most common cause of centrifuge failure is due to imbalanced loads.
 - b. Check the load placed in the rotor and re-arrange for symmetry if necessary.
 - c. For additional troubleshooting steps, refer to the Hettich MIKRO 200/200R Centrifuge Instruction Manual

10. Revisions

Corewell Health reserves the right to alter, amend, modify or eliminate this document at any time without prior written notice.

11. Resources

- A. Corewell Health East - Platelet Poor Plasma Study - Taylor, Trenton, Wayne

12. References

- A. Thermo Scientific™ Sorvall ST16 Centrifuge Instruction Manual 50120982-6 October 2016
- B. Beckman Coulter Allegra X-22 Instruction Manual 2007
- C. Silencer® Centrifuge 2110 E Automatic Digital Desktop Centrifuge Service Manual Rev. 11/19/2009
- D. StatSpin® Express 3 Centrifuge Instructions for Use Manual 55-005187-001EC September 2018
- E. Hettich MIKRO 200/200R Instructions for Use Manual Rev. 13/01.2024

13. Procedure Development and Approval

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14. Keywords

Not Set