TRAINING UPDATE

Lab Location:	SGAH & WAH	**Date Distributed:**	1/28/2014
Department:	Core	**Due Date:**	2/28/2014
		Implementation:	**3/1/2014**

DESCRIPTION OF PROCEDURE

Name of procedure:

Airfuge Ultracentrifuge (Beckman Coulter™)
SGAH.C857, WAH.C856 v0

Ultracentrifuge Maintenance and Function Check Log AG.F265

Description of change(s):

This is a NEW procedure that provides instructions for:

- operating the ultracentrifuge
- daily maintenance and cleaning
- troubleshooting

The Log is used to document maintenance

This SOP and log will be implemented on March 1, 2014

Document your compliance with this training update by taking the quiz in the MTS system.

Quest Diagnostics

Ultracentrifuge Maintenance and Function Check Log

☐ Shady Grove Adventist Hospital
☐ Washington Adventist Hospital

Year:		Department:		Manufacturer:		Model #:		Serial #:	

Month:		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	Supervisor Monthly Review
Each Day of Use (See Key Below)																																	
Each Day of Use verify speed setting																																	(Initial/Date)
Tech Initials (day of use)																																	
Monthly (Date/Initial)	Date performed: _____ Tech: _____																																
Supervisor / Group Lead Weekly Review (Initials/Date)																																	

Each Day of Use: (Inspect for cleanliness and perform steps 1-3 as needed & immediately after a spill)

1. Wipe rotor chamber, cabinet and lid with damp cloth. **Never pour water on rotor chamber.**
2. Check the stator pad for ease of rotation, clean with alcohol if dirty.
3. Wipe the channel of the stator, air jets, and brake pin with isopropyl alcohol

Monthly Maintenance: (Initial square under the date instead of checking it.)

1. Check stator pad for wear (a worn pad is smooth & shiny on the upper half of inside surface.)
2. Replace a worn pad.
3. Examine filter element - if red it needs to be replaced (contact BioMed)

Semi-Annual Maintenance: (Performed by Clinical Engineering)

All records can be obtained from the Bio Medical Engineering department.

1. Verify Speed / Timer
2. Check lid safety interlock
3. Check brushes & drive belts
4. Repair or replace defects

Key for Daily Maintenance:

√	Everything checked out ok.
F	Failed **(Document Corrective Action Below)**
N	Not in use.

Corrective Action Log:

Date	Action Taken or Explanation of Problem

Approved draft for training all sites (version 0)

Non-Technical SOP

Title	**Airfuge Ultracentrifuge (Beckman Coulter™)**
Prepared by	Robert SanLuis Date: 11/26/2013
Owner	Robert SanLuis Date: 11/26/2013

Laboratory Approval		
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		
Local Issue Date:	Local Effective Date:	

Review:		
Print Name	**Signature**	**Date**

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TABLE OF CONTENTS

1. PURPOSE

This procedure outlines the safe, effective use of the Beckman Coulter™ Airfuge Ultracentrifuge.

2. SCOPE

This procedure applies to all Core Laboratory personnel working in the Chemistry section of the laboratory.

3. RESPONSIBILITY

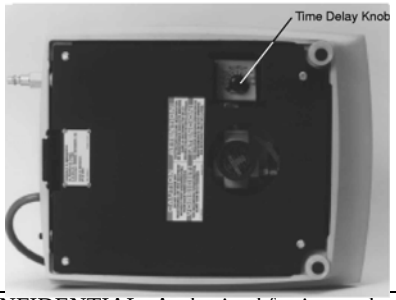
Core Laboratory personnel who perform Chemistry testing are responsible for knowing how to safely operate this centrifuge.

4. DEFINITIONS

PRESSURE REGULATOR KNOB - The pressure regulator knob controls the driving air pressure. Pressing down on the knob and turning to the right (clockwise) closes the door. Turning the knob further brings up the air pressure and accelerates the rotor to speed.

PRESSURE GAUGE - Operating air pressure is displayed on this gauge. Recommended operating air pressure is 30 psig (207 kPa).

RUN LIGHT - The run light comes on when the timer is set and remains lit until the braking system is engaged



TIME-DELAY KNOB - This knob, located on the ultracentrifuge bottom panel (see Figure 1-2), is used to set a time-delay period that allows the rotor to coast after the timer reaches zero at the end of a run. The run light goes out and a brake pin is released at the end of the set delay period. A setting of 120 seconds on the knob (or

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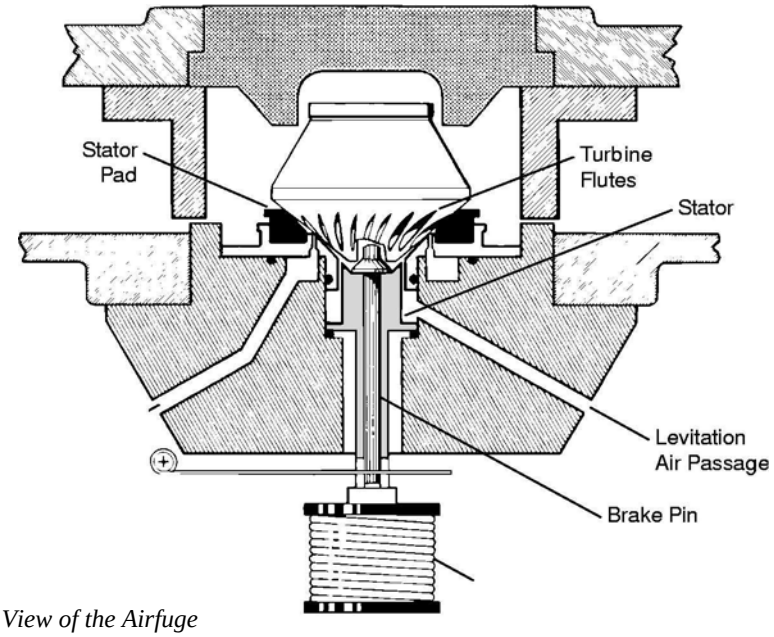
about 3.5 on older instruments) represents the 2-minute delay period.

BRAKE TENSION SCREW - The brake spring wire (see Figure 1-3) forces the brake pin up into the rotor bottom during braking. Occasional adjustment of the spring tension, using the BRAKE TENSION adjusting screw located on the back panel (see Figure 1-4), may be necessary

LEVITATION AIR SCREW - When the timer reaches zero at the end of a run, the driving air is turned off and levitation air supports the rotor during its deceleration. If the flow of levitation air is too high and the rotor fails to stop completely, or too low and the rotor stops too fast, adjustment of the LEVITATION AIR screw located on the rear panel may be necessary.

STATOR - The brass stator (see Cross-section view) contains the driving air jets that control the rotor speed and the air jets that levitate the rotor during deceleration. Levitation air operates automatically during deceleration.

STATOR PAD - The black stator pad (see Figure 1-5) rests on the channel of the stator and cushions the rotor during a run and when the rotor is at rest.



Cross-section View of the Airfuge

BRAKE PIN - Braking action is provided by a movable brake pin (see Figure 1-5) set vertically on a spring in the shaft of the stator (see Figure 1-3). An electromagnet holds the pin down during a run and releases it 2 minutes after the timer reaches zero. When released, the pin engages the rotor bottom, stabilizing the rotor as it gradually decelerates to a stop.

DOOR LATCH - The door-latch mechanism secures the door during centrifugation. This prevents premature door opening, which would result in damage to the rotor and stator pad.

FILTER - A filter is supplied with the ultracentrifuge for water and oil removal from the air supply. The filter element turns red when it is saturated and needs to be replaced.

NAME RATING PLATE - A name rating plate is affixed to the rear of the instrument. Always mention the serial number and model number when contacting Beckman Coulter regarding your Airfuge ultracentrifuge.

5. PROCEDURE

NOTE: The ACR -90 rotor uses 3.5 - mL and 2.4- mL disposable liners, and is used to clarify lipemic serum. Serum can be clarified by a **10**-minute spin at 90,000 rpm at 30 psig (207 kPa) air pressure.

WARNING

Normal operation may involve the use of solutions and test samples that are pathogenic, toxic, or radioactive. Handle body fluids with care because they can transmit disease. No known test offers complete assurance that they are free of micro-organisms. Some of the most virulent-Hepatitis (B and C) and HIV (I-V) viruses, atypical mycobacteria, and certain systemic fungi-further emphasize the need for aerosol protection. Handle other infectious samples according to good laboratory procedures and methods to prevent spread of disease. Because spills may generate aerosols, observe proper safety precautions for aerosol containment. Do not run toxic, pathogenic, or radioactive materials in this centrifuge without taking appropriate safety precautions. Biosafe containment should be used when Risk Group II materials (as identified in the World Health Organization *Laboratory Biosafety Manual)* are handled; materials of a higher group require more than one level of protection.

A. LOADING THE SAMPLE

1. Insert the appropriate sized liner into the rotor base.

2. Carefully load the sample into the liner sample compartment careful to not overfill the sample compartment.

3. Gently screw the top of the rotor onto the rotor base, careful not to over tighten.

B. STARTING THE RUN

1. Ensure the air supply is turned on.
   CAUTION: Never operate the ultracentrifuge without a rotor cap or lid installed on the rotor

2. Lightly touch the brake pin to be sure it operates freely.

3. A worn stator pad is smooth and shiny on the inside surface. Replace a worn stator pad.

4. Place the rotor on the stator pad and shut the instrument door.

5. Set the TIME dial for the required run time (10 minutes). Turn the dial past the 30-minute point, then back to the required time. *(ACR-90 rotor-set* the run time for 10 minutes to prevent significant evaporative loss.).

6. Secure the instrument door by turning the pressure regulator knob to the right (clockwise), pushing down, until the air pressure indicated on the PRESSURE gauge brings the rotor to the required speed. Optimal run speed is achieved at 30 psig (207 kPa). (This is the only recommended operating air pressure for the ACR-90 rotor.) Note that some low-speed rotor vibration is normal at the beginning of the run.

CAUTION
If the rotor makes an unusual noise, turn the timer to zero. When the rotor stops, open the chamber door and remove the rotor. Check to make sure the rotor is loaded correctly. Correct the problem before restarting the run

C. ENDING THE RUN

1. When the timer reaches or is turned to zero, the rotor will coast for about 2 minutes. After the 2-minute delay period, the run light goes out and the brake pin engages the rotor. The rotor will stop about 1 to 3 minutes later, depending on the rotor.

2. *After the rotor has stopped,* turn the pressure regulator knob to the left (counterclockwise) until the PRESSURE gauge reading is zero.

3. Open the chamber door. Refer to the applicable rotor manual for instructions on unloading and cleaning the rotor.

NOTE: Do not tighten the pressure regulator knob between runs.

D. GENERAL MAINTENANCE

Perform the following procedures **each day of use** to ensure satisfactory performance and long service life of the ultracentrifuge.

1. Inspect the interior of the rotor chamber for accumulations of foreign matter. Clean as required (see CLEANING below), as these accumulations can result in rotor vibrations.

2. Check the stator pad for ease of rotation. Rotate it on the stator, using light finger pressure, to ensure it moves easily. Also check for dirt or oil; clean with alcohol* (especially the white circles on the bottom).
   * Flammability hazard. Do not use in or near operating ultracentrifuges

3. Check the stator pad for wear; a worn pad is smooth and shiny on the upper half of the inside surface. A shiny pad has lost its cushioning effect and will eventually cause rotor failure. Replace a worn pad.
   NOTE: Proper deceleration of the rotor (that is, allowing the rotor to come to a complete stop before opening the door) will increase pad life.

4. Document on all maintenance on appropriate log.

CLEANING

Frequent cleaning will ensure proper operation and prolong the life of the ultracentrifuge. Always clean up spills when they occur to prevent corrosives or contaminants from drying on component surfaces. (Be careful not to spill liquid on the instrument where electrical or mechanical components could become damaged.) Refer to *Chemical Resistances* (publication IN-175) for chemical compatibilities of cleaning materials.

INSTRUMENT INTERIOR AND EXTERIOR

- Clean the instrument exterior surfaces by wiping with a damp cloth or washing with standard dilute bleach solution. Do not use acetone or other solvents.

- To prevent accumulations of sample, dust, oil, dirt, or other foreign matter, regularly wipe the channel of the stator, the air jets, and the brake pin with isopropyl alcohol.

E. OTHER MAINTENANCE

1. Filter Element Replacement

   Replace at 1400 hours of run time, if the air supply is not excessively oily. Replace the element when it turns red or when there is an additional drop of about 67 kPa (10 psig) in the air pressure that reaches the Airfuge. Contact BioMed for service.

2. Brake Spring Wire Adjustment

   If the brake pin is flat on the stator surface, either the brake spring wire is out of position or the brake spring tension is too low. Contact BioMed for service.

3. Brake Spring Wire Tension Adjustment

   If the brake spring wire is centered but the brake pin drops flat on the stator, the brake spring wire tension requires adjustment. Adjustment may also be required if the rotor fails to stop. Contact BioMed for service.

6. RELATED DOCUMENTS

Centrifuge Use, Maintenance and Function Checks, Laboratory policy
Hemolysis, Icteria and Lipemia Interference, Laboratory policy
Ultracentrifuge Maintenance and Function Check Log (AG.F265)

7. REFERENCES

Beckman Coulter™ Airfuge Ultracentrifuge, Operators Manual

8. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By

9. ADDENDA AND APPENDICES

Troubleshooting Guide

Troubleshooting Guide

This section lists possible malfunctions, together with probable causes and corrective actions. For any problems not covered here, contact Beckman Coulter Field Service (1-800-551-1150 in the United States) for assistance.

Possible malfunctions are described in the table below along with possible causes-listed in the probable order of occurrence-and corrective actions. Perform the recommended corrective action in sequence, as listed. If you are unable to correct the problem, call Beckman Coulter Field Service. To help diagnose and correct the problem, provide as much information as possible:

Problem	Possible Cause	Recommended Action
Brake pin falls flat on stator surface	Brake spring wire not centered Brake spring tension too low	Adjust the brake spring wire. Adjust the brake spring tension.
Brake pin not actuating	Brake spring tension too low	Adjust the brake spring tension.
	Stator shaft oily	Clean the stator shaft and pin.
	Brake pin damaged	Replace the brake pin.
Problem	Possible Cause	Recommended Action
Rotor will not spin	Air supply or power disconnected	Check air and power connections.
	Circuit breaker tripped	Reset the circuit breaker.
	Filter saturated	Replace the filter element.
	Stator pad worn or damaged	Replace the stator pad.
	Stator screws loose	Check stator screws; tighten as required.
Rotor runs erratically or makes unusual noise	Stator pad damaged Dirty air jets	Replace the stator pad. Clean the stator assembly.
	Missing or damaged rotor cap	Check the rotor cap.
	Rotor improperly loaded	Check placement of tubes or liner in rotor.
Rotor fails to stop	Brake pin shaft oily	Clean the pin and shaft.
	Levitation air flow too hig h	Adjust levitation air.
	Brake spring tension too low	Adjust the brake spring tension.
Rotor stops too fast	Levitation air flow too low	Adjust levitation air.
	Time-delay period too short	Check the time-delay setting.
	Stator pad worn or damaged	Replace the stator pad.
	Brake pin shaft oily	Clean the stator assembly and shaft.
	Brake malfunction	Adjust brake spring tension and levitation air.

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Problem	Possible Cause	Recommended Action
Oil visibly collecting in instrument	Filter element saturated	Replace the filter element.
Filter element turns red	Filter element saturated	Replace the filter element.
Pressure at instrument will no longer read 30 psig	Filter element saturated	Replace the filter element.
Run light fails to come on	Light burned out	Rep lace the lamp.
	Circuit breaker tripped	Reset the circuit breaker.
	Time delay faulty	Call Beckman Coulter Field Service.
Rotor crashes	Stator pad worn	Order Repair Kit 1.
	Missing rotor lid or cap	Refer to the applicable rotor manual.
Circuit breaker trips repeatedly	Various	Call Beckman Coulter Field Service.

Caution *Repeated tripping of the circuit breaker may cause instrument damage*