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General Operating Procedure for:

Allegra X-15R Centrifuge

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Contents

1. Purpose

The purpose of this GOP is to regulate the operation of Allegra X-15R centrifuge.

2. Scope

This GOP applies to all personnel using and managing Allegra X-15R centrifuge.

3. Rotors introduction

3.1 Assembly drawing for different rotors (fig.1).

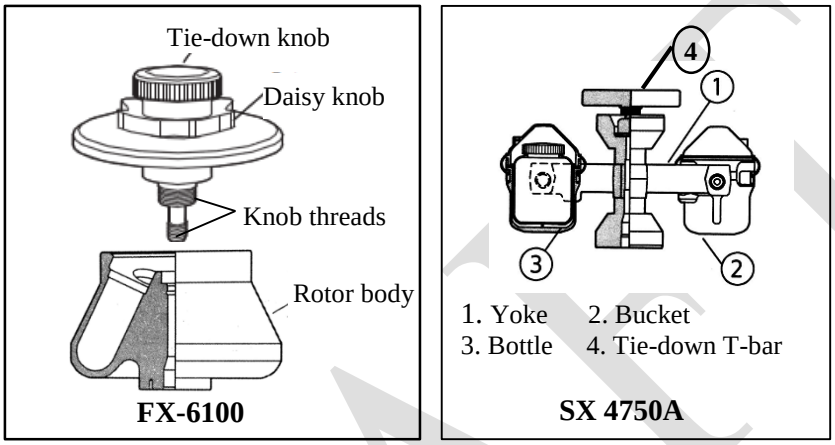

Fig.1 Rotors available in lab

3.2 Key parameters (table.1).

Table 1 Key parameters for available rotors

Rotor name	Rotor type	**Maximum speed /rpm**	Critical speed range / rpm	Maximum solution density / g/mL	**Total maximum allowable imbalance of opposing loads / grams**	Nominal tube capacity / mL
SX4750A	Swinging - bucket	**4750**	580 to 720	1.2	**50**	100
FX6100	Fixed-angle	**10200**	850 to 950	1.2	**6**	250

4. Safety notice:

Read all safety notice before using the rotor and centrifuge.

- Do not run toxic, pathogenic, or radioactive materials in this centrifuge without taking appropriate safety precautions.
- Handle body fluids or other infectious samples according to good laboratory procedures and methods to prevent spread of disease. Observe proper safety precautions for aerosol containment.

- Never bring any flammable substances within the 30-cm area surrounding the centrifuge and do not run such materials in the centrifuge.
- Only the components and accessories listed in the applicable rotor manual could be used in the corresponding rotor.
- Never exceed the maximum rated speed of the rotor and lab ware in use.
- Do not use sharp tools on the rotor that could cause scratches.
- **For SX4750A:** Attach all four buckets, empty or loaded, to the rotor for every run.
- Make sure that filled containers are loaded symmetrically into the rotor and that opposing tubes are filled to the same level with liquid of the same density.
- If disassembly reveals evidence of leakage and pathogenic or radioactive materials are involved, apply appropriate decontamination procedures to the centrifuge and accessories.
- Do not lean on the centrifuge or place items on it while it is operating.
- Never attempt to override the door interlock system while the rotor is spinning.

5. Procedure

5.1Switching on the system

5.1.1 Press the power switch to on (I).

5.1.2 Press 

Door to open the chamber door; lift the door open.

5.2 Prerun safety check

- Make sure that the rotor, lid, buckets, adapters, all tubes or bottles and accessories being used are clean and show no signs of corrosion or cracking. Do not use damaged components.
- Check the chemical compatibilities of all materials used.
- Verify that the tubes, bottles and adapters being used are listed in the applicable rotor manual.
- If fluid containment is required, use capped tubes or bottles.
  We strongly recommend capping all containers carrying physiological fluids to prevent leakage.

5.3 Rotor Preparation

- For low-temperature runs, precool the rotor, buckets, accessories, lab ware and sample in a refrigerator at the required temperature before use.
- Plastic labware has been centrifuge tested for use at temperatures between 2 and 25°C. For centrifugation at other temperatures, pretest tubes under anticipated run conditions.
- If plastic containers are frozen before use, make sure that they are thawed to at least 2°C prior to centrifugation.

5.4 Installing the rotor

FX6100 fixed –angle rotor

5.4.1 Lubricate the metal threads in the rotor with a thin, even coat of Spinkote lubricant (fig.2).

5.4.2 Lightly coat the large and small lid O-rings with silicone vacuum grease (fig.2).

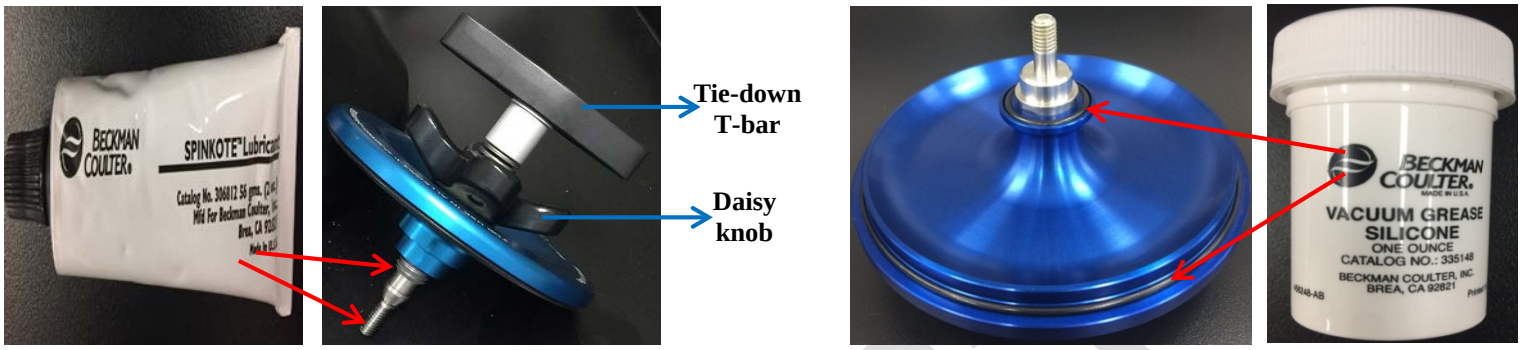

Fig.2 Lubrication area

5.4.3 Put the lid in place and use the "daisy" knob to tighten it by hand as firmly as possible.

5.4.4 Install the rotor into the centrifuge by centering it over the drive shaft and lowering it straight down.

Caution: Do not drop the rotor onto the drive shaft. The shaft can be bent or damaged if the rotor is forced sideways or dropped onto the shaft.

5.4.5 Turn the tie-down T-bar to the right (clockwise) to secure the rotor to the drive shaft.

Caution: if the rotor is left in the centrifuge between runs, before each run make sure it is properly seated on the drive shaft, and that the T-bar is tight.

SX4750 Swinging-bucket rotor

5.4.6 Lightly lubricate the drive hole with a thin, even coat of Spinkote lubricate.

Carefully lower the yoke straight down onto the centrifuge drive shaft. Be sure the yoke is properly seated on the shaft.

Caution: Never drop the rotor yoke onto the drive shaft. The shaft can be bent or damaged if the rotor is forced sideways or dropped onto the shaft.

5.4.7 Turn the tie-down T-bar to the right (clockwise) to tighten the yoke firmly on the drive shaft.

Caution: if the rotor yoke is left in the centrifuge between runs, before each run make sure it is properly seated on the drive shaft, and that the T-bar is tight.

5.4.8 Attach each bucket to the yoke by aligning the grooves in the bucket sides with the pivot pins, then sliding the buckets down until the pivot pins are seated in the bucket pockets.

Caution: Attach all four buckets, loaded or empty, to the rotor yoke.

5.4.9 Gently swing the buckets to ensure that they are properly seated on the pivot pins.

5.5 Loading samples

FX6100:

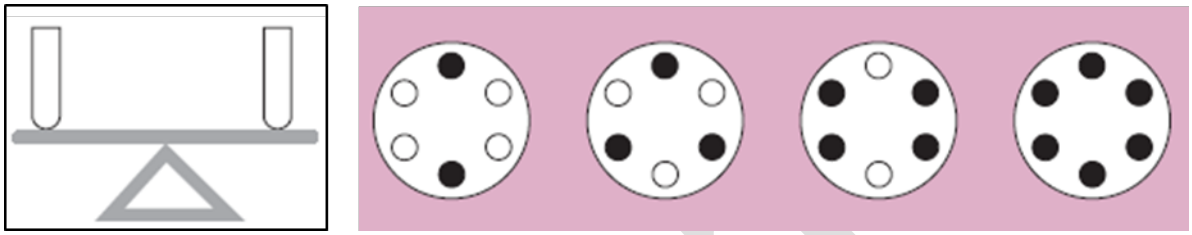

Fig.3 Loading samples symmetrically

- Only 100 ml tubes are currently available in lab for this rotor. Fill tubes at least half full. Speed reduction may be required for fill volumes below 75 percent.
- Load samples and secure the caps.
- Load the filled containers symmetrically into the rotor (fig.3). Opposing tubes must be filled to the same level with liquid of the same density. **The maximum allowable imbalance of opposing loads is 6 grams for FX6100.**

Firmly close the chamber door.

SX4750A:

Table 2 Adapters available in lab

Adapter type	Color code	Nominal bottle volume (mL)	Adapter part number
Modular disk adapter	Green (conical)	15	359151
Modular disk adapter	yellow	50	359153
Bottle adapter	yellow	250	349946
Bottle adapter	Light purple	500	349945
Bottle adapter	blue	750	349846

Symmetrical and balanced loading

- Use weight-matched sets of buckets and adapters. The weight of bucket is marked on the side of each bucket.
- The buckets must be loaded symmetrically with respect to their pivotal axes (fig.4).
- The rotor should be loaded symmetrically with respect to its center of rotation (fig.4).

- Load opposing buckets with the same type of labware containing the same amounts of fluid of equal density and place empty canisters in the other cavities. **Opposing buckets plus the contents inside, must weigh within 50 grams of each other.**

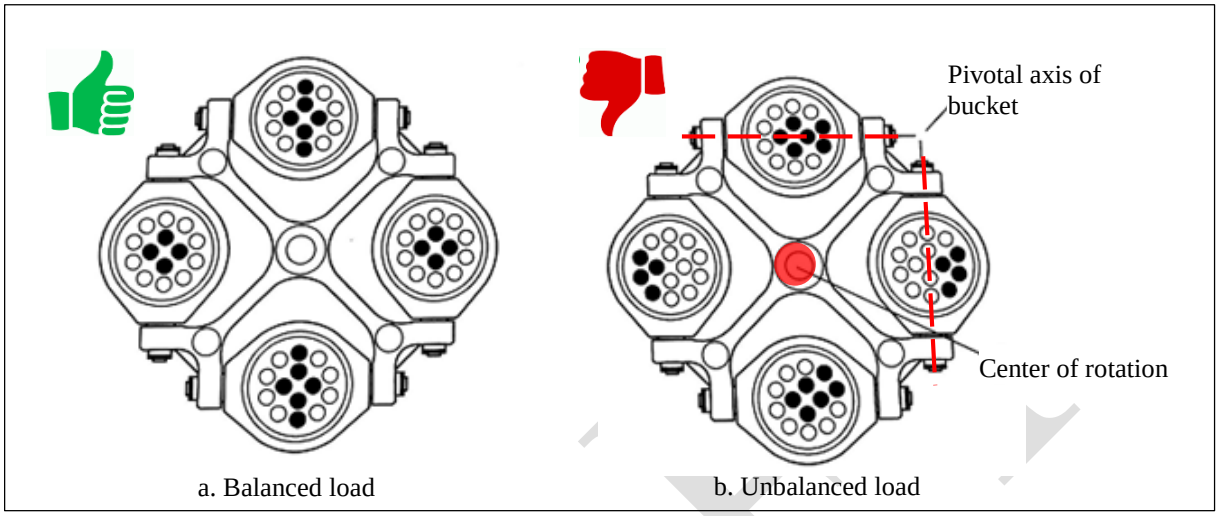

Fig.4 Examples of correctly and incorrectly loaded buckets

- Do not exceed the rated maximum load for any single bucket, which is 1000 grams for tube- and –bottle bucket.
- Fill tubes at least half full. Speed reduction may be required for fill volumes below 75 percent.

Using tubes

- Refer to table 2 to determine the adapter required and remove or add disks to the bail to accommodate shorter or longer tubes (fig.5).

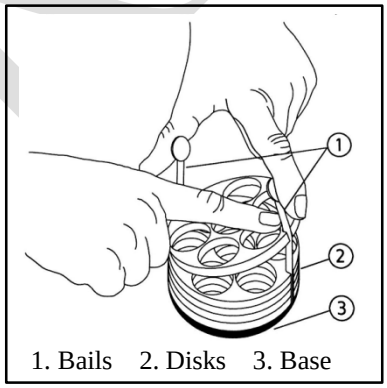

Fig.5 Assembling a modular disk adapter

- If the tubes fit too snugly in the adapter's rubber base, apply a light film of power, such as talcum powder, to prevent the tubes from sticking.
- Placing tubes in modular disk adapters.

- Lower the adapters into the buckets so that the bails line up with the rotor pivot pins (fig.6).

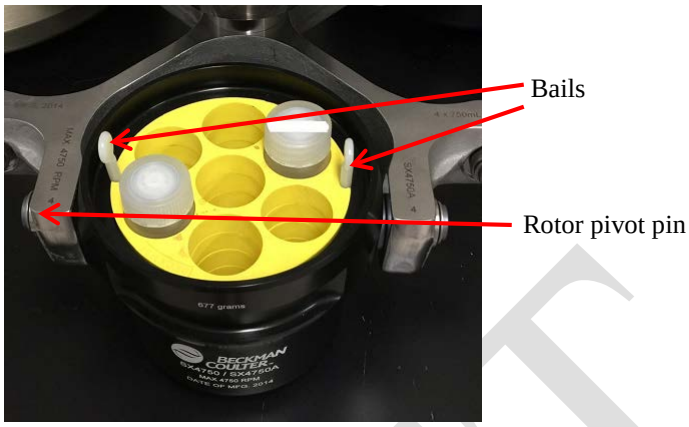

Fig.6 Adapter in bucket

- If only two loaded adapters are run, place them in opposing buckets. The other two should contain empty modular disk adapters to prevent imbalance.
- Manually swing the bucket to the horizontal position, making sure that all tubes will not contact the rotor.

Using bottles

- Load bottles into their appropriate adapters (see table 2), then place the filled adapters in the rotor buckets.
- If only two bottles are run, place them in opposite buckets. Make sure the other two buckets contain at least a minimal “blank” load to prevent imbalance, such as empty modular disk adapter or two water filled bottles.

5.6 Setting method and starting

5.6.1 For low-temperature runs, precool the rotor, labware and sample before use, especially before short runs.

5.6.2 Setting method (manual run) or choosing method (programed run).

Fig.7 Operation panel

Manual run

- Press 

and press the arrow keys  or  to select the rotor name.
- Press 

then use the keypad to enter the required run temperature (-10 to +40 ^{O}C).
- Press 

then use the keypad to enter the run speed. Press 

a second time to toggle between RPM and RCF modes.
- Press 

then use the keypad to enter the run time (to 99 hrs, 59 minutes); or press 

twice to toggle between hold (continuous) run and set time mode. (No entry is made in Hold mode.)
- Press 

then use the keypad or arrow keys to enter the selected acceleration rate number, 1 (SLOW) through 10 (MAX).
- Press 

then use the keypad or arrow keys to enter the selected deceleration rate number, 0 (OFF) through 10 (MAX).

Or **programed run**

- Press 

then use the keypad to enter the program number.

5.6.3 Check that all parameters are correct then press 

.

5.6.4 Press the door firmly to make sure it is well locked.

5.6.5 Press 

to run the machine.

5.7 Shutting down the system

5.7.1 Wait for the set time to count down to zero, or end the run by pressing 

.

5.7.2 When the rotor stops, press 

to open the chamber door; lift the door.

5.8 Removal and sample recovery


Caution: If disassembly reveals evidence of leakage, you should assume that some fluid escaped the rotor. Apply appropriate decontamination procedures to the centrifuge and accessories.

For FX6100:

5.8.1 If removing the rotor, turn the tie-down T-bar to the left (counterclockwise) to release it and lift it straight up and off the drive shaft.

5.8.2 Turn the “daisy” knob counterclockwise to remove the rotor lid and unload the containers.

For SX-4750 swing-bucket rotor:

5.8.3 Remove the buckets or carriers from the centrifuge.

5.8.4 Remove the labware from the buckets or carriers.

5.8.5 If removing the rotor yoke, turn the tie-down T-bar to the left (counterclockwise) to loosen it. Lift the yoke straight up and off the drive shaft.

5.9 Cleaning

5.9.1 Clean the centrifuge and rotor immediately if salts or other corrosive materials are used or if spillage has occurred. Under normal use, clean the centrifuge and rotor frequently to prevent buildup of residues.

5.9.2 Frequently wiping the centrifuge and rotor with a cloth or paper towel.

5.9.3 For through cleaning, wash the centrifuge, rotor and lid with diluted solution 555 (10 parts water to 1 part detergent), thoroughly rinse with DI water and air dry. Do not use acetone.

Note: do not wash rotor in a dishwasher. Do not soak in detergent solution for long periods.

Reference:

1. Instructions for use Allegra X-15R centrifuge, Beckman coulter, PN GXR-IM-4AC, October 2013.

2. Instructions for use FX6100 fixed angle rotor, Beckman coulter, GX-TB-005BA, July 2011.

3. Instructions for use SX4750A Swinging-bucket rotor, JX-TB-004EC, February 2014.

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