I. Principle:

- Rotors on high-speed centrifuge and ultracentrifuge units are subject to powerful mechanical stress that can result in rotor failure. In addition, improper loading and balancing of rotors can cause the rotors to break loose while spinning. For these reasons, centrifuges must be properly used and maintained.

II. Training and Repair

1. Before using any centrifuge, review the owner’s manual.
   a. If a manual is not available, obtain a copy from the manufacture.
   b. Do not operate a centrifuge until you have read the owners manual and have been shown proper operations by an experienced operator

2. Centrifuges should be repaired only by the manufacturer or authorized dealer representative.
   a. Do not attempt repairs yourself. Centrifuges in need of repair should be tagged and locked-out while awaiting service

3. Familiarize yourself with emergency and log book maintenance procedures prior to operation

Rotor Care

1) If the rotor is not kept clean and chemicals remain on the rotor, corrosion will result.
   a. Moisture left for an extended time can also initiate corrosion. It is important that the rotor is left clean and dry after use. (Wash with mild detergent and warm water using a nylon bottle brush if necessary).
   b. Dry the rotor thoroughly and store upside down with the cover and tubes removed.

2) Do not autoclave rotors at temperatures above 100°C

3) To avoid corrosion, do not expose aluminum rotor components to strong acids or bases, alkaline lab detergents or salts (chlorides) of heavy metals (e.g., cesium, lead, silver, or mercury

4) Check that the centrifuge chamber, drive spindle, and tapered mounting surface of the rotor are clean and free of scratches or burrs

5) Make sure the rotor itself is clean, corrosion and crack free, and that there are no scratches or burrs around its rim

6) Damaged rotors must not be used

7) Wipe drive surfaces prior to installing the rotor

8) Make sure rotor, tubes, and spindle are dry and that the rotor is properly seated and secured to the drive hub.
   a. Do not operate the centrifuge without the appropriate rotor cover securely fitted with seals in place.
      i. 9. If the temperature of the chamber is below room temperature, pre-cool the rotor to the lower temperature before securing the rotor (this will minimize, the chance of it seizing to the tapered spindle)
   b. 10. Always complete the machine log book since the number of hours of operation determines the life of the rotor
c. 11. High-speed rotor heads are prone to metal fatigue. Each rotor should be
ampanied by its own logbook indicating the number of hours run at top or
derated speeds.
d. Do not exceed the design mass for the maximum speed of the rotor. Failure
i. to observe this precaution can result in dangerous and expensive rotor
ii. disintegration
9) Never exceed the maximum stated speed for any rotor
10) De-rate the rotor speed whenever
   a. the rotor speed/temp combination exceeds the solubility of the gradient
      i. material and causes it to precipitate or
   b. the compartment load exceeds the maximum specified. Failure to reduce
      i. rotor speed under these conditions can cause rotor failure
11) Balance the rotor to within the limits specified (take care that materials of similar
   i. densities are in opposite positions of the rotor

Tube Care
12) Before use, tubes should be checked for cracks. The inside of cups should be inspected for
   rough walls caused by corrosion and adhering matter should be removed. Metal or plastic
   tubes (other than nitrocellulose) should be used whenever possible
13) Make sure each tube compartment is clean and corrosion free
14) Tubes must be properly balanced in rotor (½ gram at 1 G is roughly equivalent to 250 Kg @
   500,000 G’s)
15) Check compatibility of tube material to solvent medium (some solvents may cause the tubes
   to swell or crack in the rotor)
16) Never fill centrifuge tubes above the maximum recommended by the manufacturer
17) Use only correctly fitting tubes
18) Use sealed rotors, sealed buckets, or a guard bowl cover complete with gasket as well as
    safety centrifuge tubes (tube or bottle carrier with sealable cap or “O” ring cap)
    1.

Miscellaneous
19) Once a run is complete, make sure the rotor has COMPLETELY STOPPED before opening
   the centrifuge lid. Never attempt to open the lid of a centrifuge or slow the rotor by hand or
   open the lid while rotor is in motion as serious injuries may result
20) If a tube breaks, the centrifuge should be turned off, allowed to stand undisturbed for 15
    minutes before opening. Clean and disinfect the rotor. If infectious material was placed in the
    centrifuge, plan proper decontamination and cleanup. Cleaning and disinfection of tubes,
    rotors and other components requires considerable care. No single method is suitable for all
    items, and the various manufacturer recommendations must be followed to avoid rotor
    fatigues, distortion and corrosion
21) After use, tubes, rotors, and centrifuge interiors should be cleaned and/or disinfected
22) Clean up spills immediately, using appropriate spill response procedures