**Purpose**

The purpose of this SOP is to describe and explain how to operate the Microfuge 20 and effectively use and maintain the machine in a laboratory setting.

**Scope of policy**

This SOP aims to instruct the user how to operate the Microfuge 20. This equipment should only be handled by qualified personnel and laboratory workers. Appropriate PPE should always be worn when handling/cleaning the Microfuge.

**Safety information**

Electrical safety: do not place containers holding liquid on or near the chamber door. If they spill, liquid may get into the instrument and damage electrical or mechanical components. Work on the power supply system must be performed by certified electricians. Inspect the electrical equipment of the unit regularly. Defects such as loose or burnt cables must be eliminated immediately.

Safety against risk of fire: this centrifuge is not designed for use with materials capable of developing flammable or explosive vapours. Do not centrifuge such materials (such as chloroform or ethyl alcohol) in this centrifuge nor handle or store them within the 30cm clearance envelope surrounding the centrifuge.

Mechanical safety:

* Use only the rotors and accessories designed for use in this centrifuge.
* Before starting the centrifuge, ensure the rotor tie-down is securely fastened.
* Do not exceed the maximum rated speed of the rotor in use.
* Never attempt to slow or stop the rotor by hand
* Never attempt to override the door interlock system while the rotor is spinning.
* Never bring any flammable substances within the 30cm surrounding the centrifuge
* Never operate the instrument without a rotor installed.

Chemical and biological safety: observe all cautionary information printed on the original solution containers prior to their use. Handle body fluids with care because they can transmit disease, some are extremely virulent, further emphasising the need for aerosol protection.

Ensure the correct PPE is always worn when handling body fluids. Dispose of all waste solutions according to appropriate environmental health and safety guidelines. Do not centrifuge materials that could result in a hazardous chemical reaction. It is the responsibility of the owner to decontaminate the centrifuge and accessories before requesting service by Beckman Coulter.

Features:

An electromechanical door-locking mechanism to prevent operator contact with spinning rotors. When the door is closed, it automatically locks. It can be unlocked by pressing the OPEN key only when the power is on and the rotors are not moving.

The centrifuge feet, made of rubber, have been designed to minimise possible rotations in the event of a rotor mishap.

An overspeed system continuously monitors the sensor signals to confirm that they are within the expected values. Malfunctions are indicated by error messages in the speed/RCF display. See manual when troubleshooting.

For the microfuge 20R, if the temperature inside the rotor chamber rises above 50C, the drive system will be switched off automatically. The centrifuge cannot be restarted until it has cooled.

**Operation**

Preparation and loading

1. Press the power switch to on
2. Press the OPEN key and lift the door up; it remains in the open position
3. Use the T-handle wrench to turn the rotor tie-down screw to the left (counter clockwise). Remove the tie-down screw
4. Remove the rotor
5. Make sure the tapered sleeve is in place at the base of the centrifuge drive shaft and wipe the sleeve to be sure that it is clean and dry. The rotor rests on the sleeve while spinning and does not operate properly if the sleeve is missing.
6. Install the rotor according to the instructions in the rotor manual.
7. Close the centrifuge door and push firmly down on both sides of the door front until the clicking (latching) sound stops.
8. Remove the rotor from the centrifuge if a long period between runs in anticipated
9. Select the correct rotor code

Timed run

1. Press MENU key until the time unit flashes on the display. Program mode ends if no other keys are pressed within 15 seconds
2. Press the or cursor key until the required run duration is displayed. Pressing and holding either key causes the parameter to change more rapidly
3. Press the MENU key until all screen functions stop flashing, to confirm the selection. The time setting will be saved after approximately 15 secs if no other key is pressed within this time period

Continuous run

1. Press the MENU key until the time unit flashes on the display. Program mode ends if no other keys are pressed within 15 seconds
2. Press the cursor key until the display switches from ***00:10*** to ***--:--∞***, after 99 minutes and 59 seconds, any additional run time will no longer be displayed, but the centrifugation will continue
3. Press the MENU key until all screen functions stop flashing, to confirm the selection. The time setting will be saved after approximately 15 seconds if no other key is pressed within this time period
4. Close the centrifuge door and push firmly down on both sides of the door until the clicking (latching) sound stop
5. Press the START/STOP key. The continuous run will start. During centrifugation the TIME display begins counting up when the rotor starts to spin.

To stop a continuous run

* Press the START/STOP key. Deceleration begins immediately. The elapsed time shows during deceleration. The run ends.

Starting a run

1. Check that all parameters are correct and the door is closed and latched.
2. Press the START/STOP key. An actual set speed greater than the rotors maximum permitted speed, results in an error code and the centrifuge shuts down.

**Maintenance and cleaning**

Preventative maintenance

Regularly inspect the interior of the rotor chamber or accumulations of sample, dust or glass particles from broken sample tubes. Clean as required, as those accumulations can result in rotor vibrations.

Regularly check the air intake and exhaust vents for obstructions. Keep vents clean and clear.

To prevent the rotor from sticking, lubricate the drive shaft with Spinkote at least once a month, and after each cleaning.

Cleaning

To prevent accumulations of sample, dust, and/or glass particles from broken sample tubes, keep the interior of the rotor chamber clean and dry by frequent wiping with a cloth or paper towel.

Clean the drive shaft, shaft cavity, threads, and the tie-down screw at least once a week using a mild detergent such as solution 555 and a soft brush. Dilute the solution with water (10 parts water to 1 part detergent). Rinse thoroughly and dry completely. Lubricate the drive shaft with Spinkote after cleaning.

Wash the bowl using mild detergent such as solution 555. Rinse thoroughly and dry completely. If a cleaning other than solution 555 is used, contact the cleaning solution vendor to verify that the solution will not damage the centrifuge.

Clean the centrifuge case and door by wiping with a cloth dampened with solution 555. Dilute the detergent with water (10 parts water to 1 part detergent). Do not use acetone or other solvents. If the centrifuge has been contaminated with toxic, radioactive or pathogenic substances, clean the rotor chamber immediately with a suitable decontamination agent (depending on the type of contamination).

Always wear PPE while performing service, maintenance, and troubleshooting procedures.

Immediately rinse off the rotor, buckets or accessories under running water if they have come into contact with any liquids that may cause corrosion. Use a brush for test tubes to clean the bores of angle rotors. Turn the rotor upside down and allow it to dry completely.

Clean the accessories outside the centrifuge once per week or preferably after each use. Adapters should be removed, cleaned and dried.

If the rotors or accessories have been contaminated with toxic, radioactive or pathogenic substances, clean them immediately with a suitable decontamination agent. Take suitable precautions for your own safety.

Dry accessories with a soft cloth or in a drying cabinet at approx. 50˚C

Aluminium parts are especially susceptible to corrosion. Avoid the use of cleaning agents that contain acid or that are alkaline on aluminium parts.

Sterilisation and disinfection

The centrifuge is finished with urethane paint. Ethanol (70%) may be used on this surface.