STANDARD OPERATING PROCEDURE-CENTRIFUGE

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| **CONTACT INFORMATION** | | | |
| **Location** | Building: | | Room: |
| **Street Address:** |  | | |
| **Lab Safety Contact:** | Name: | | |
| Lab Phone: | Office Phone: | |
| **Emergency Contact** | Name: | Phone: | |
| **TYPE OF STANDARD OPERATING PROCEDURE** | | | |
| Indicate which type of Standard Operating Procedure applies  Specific Process or Equipment  Specific Hazardous Chemical  Hazard Class for a Group of Chemicals | | | |
| **DESCRIBE PROCESS/EQUIPMENT, HAZARDOUS CHEMICAL or HAZARD CLASS** | | | |
| **• BECKMAN COULTER Optima MAX-TL Ultracentrifuge (A95761, CTL15D01)**  **• BECKMAN COULTER Allegra X-14R Refrigerated Centrifuge (A99465, ALF15E50)**  **• THERMO SCIENTIFIC Sorvall™ Legend™ Micro 21R Refrigerated Microcentrifuge (75002446, 41888149)** | | | |
| **HAZARD SUMMARY** | | | |
| Fire, electric shock, spark, explosion, biological and chemical hazard by dispersion of aerosols. | | | |
| **SPECIAL HANDLING AND STORAGE REQUIREMENTS** | | | |
| Do not use the centrifuges in a manner other than stated in the manual. These centrifuges are designed for the laboratory environment and should only be used by persons knowledgeable in safe laboratory practices.  To avoid rotor failure, keep a log book for high speed rotors recording the length of time and speed for each use. Track and discard rotors according to the manufacturer's recommended schedule.  REMEMBER TO FILL THE CENTRIFUGE LOG EVERY TIME YOU USE A CENTRIFUGE  Electrical safety:  Use only properly wired and earth-grounded outlets to avoid shock hazard.(the centrifuges use a 3-wire electrical cord and plug to connect the equipment to earth-ground)  Check that the line voltage agrees with the voltage listed on the name rating plate affixed to the centrifuge.  Never use a 3-to-2 plus adapter; never use a 2-wire extension cord or a 2-wire grounding type of multiple outlet receptacle strip.  Do not place containers holding liquid on or near the chamber door. If they spill, liquid may get into the centrifuge and damage electrical or mechanical components.  Safety against risk of fire/spark/explosion:  Fuses protect certain electrical circuits within the centrifuge against over-current conditions. For continued protection against the risk of fire, replace only with the same type and rating specified.  Do not use with materials capable of developing flammable or explosive vapors, or hazardous chemical reactions. Do not centrifuge such materials in the instrument nor handle or store them within the 30 cm (1 ft) surrounding the centrifuge.  Mechanical safety:  Use only rotors and accessories designed for use in the centrifuge  Before starting the centrifuge, make sure that the rotor tie-down device (in centrifuges requiring them) is securely fastened.  Do not exceed the maximum rated speed of the rotor in use. Rotors are designed for use at the speeds indicated (engraved on the rotor or listed in the rotor manual) Also, speed reduction may be required because of weight considerations (weight of the tubes, caps, adapters, density of the solution being centrifuged).  ALWAYS ensure that the load is balanced. A difference of 0.5 grams at 500000 x g is equivalent to a 250 kilogram difference.  NEVER attempt to slow or stop the rotor by hand. NEVER run the centrifuge with the door open.  Do not lift or move the centrifuge while the rotor is spinning.  NEVER attempt to override the door interlock system while the rotor is spinning.  In case of a power failure, do not attempt to retrieve the sample from the centrifuge until the rotor has completely stopped. Depending on the speed of the rotor and rotor type, this may take several hours.  When using glass tubes, be careful of breakage inside the chamber bowl. Examine and clean the gasket and chamber bowl with care as glass fragments may have become embedded in them.  Do not use sharp tools on the rotor that could cause scratches in the rotor surface. Corrosion begins in scratches and may open fissures in the rotor with continued use.  The strength of glass and plastic containers can vary between lots and will depend on handling and usage. Pretest labware in the rotor (using buffer or solution of equivalent density to the intended sample) to determine optimal operating conditions. Check for cracks or stress marks on labware before using in the centrifuge. Scratches (even microscopic ones) significantly weaken glass tubes.  Ensure that the buckets (or carriers) are properly hooked to the crossbars or pivots pins of swinging bucket rotors. A mishooked bucket cannot swing freely to a horizontal position during centrifugation and could cause a rotor mishap. Attach all buckets, loaded or empty, to the rotor as described in the rotor manual.  High speed rotor heads (for ultracentrifuge) are prone to metal fatigue. Each rotor should be accompanied by its own log book indicating the number of hours run at top or de-rated speeds. Do not exceed the design mass for the maximum speed of the rotor. Failure to observe this precaution can result in dangerous and expensive rotor disintegration.  Chemical and biological safety:  Use appropriate hand and eye protection when handling biological samples or hazardous chemicals. Always wear gloves when handling tubes or rotors.  Because leaks, spills or loss of sample containment may generate aerosols, observe all proper safety precautions for aerosols containments and decontamination.  Instrument gaskets have not been designed as bioseals for aerosols or liquid containment. However some swinging bucket covers are Bio-Certified.  Avoid the use of celluloid tubes with biohazards. If celluloid tubes must be used, an appropriate chemical disinfectant must be used to decontaminate them.  Always use sealed safety cups, safety buckets, or sealed rotors with O-ring as secondary containment when centrifuging infectious materials  Fill centrifuge tubes, load into rotors, remove from rotors, and open tubes within a biological safety cabinet if biological safety cabinet.  Wipe exterior of tubes or bottles with disinfectant prior to loading into rotor or bucket. Seal rotor or bucket, remove outer gloves, and transport to the centrifuge.  Always cap tubes before spinning. Use screw cap tubes  Never overfill centrifuge tubes as leakage may occur when tubes are filled to capacity. The maximum capacity for centrifuge tubes is 3/4 full.  Always wait at least 10 minutes after the run to allow aerosols to settle before opening the centrifuge. Check for possible spills or leaks.  High- speed centrifuge (ultracentrifuge) chambers are connected to a vacuum pump. If there is a breakage or accidental dispersion of infected particles, the pump and pump oil will become contaminated. A HEPA filter should be placed between the centrifuge inner chamber and the vacuum pump when containment is needed.  Decontaminate centrifuge interior, safety cups or buckets, and rotors after use with biological or radioactive materials and before requesting service. Use 10% bleach for 30 minutes followed by 70% ethanol and let air dry to clean rotors and cups.  Dispose of all waste according to appropriate environmental health and safety guidelines. | | | |
| **ENGINEERING AND VENTILATION CONTROLS** | | | |
| Centrifuges must be used within a fume hood or under a snorkel exhaust if potentially hazardous vapors or biological aerosols are be generated (leakage, breakage…). If fume hood or snorkel exhaust not available, use respirators with appropriate filters or supplied air. | | | |
| **PERSONAL PROTECTIVE EQUIPMENT** | | | |
| **PPE Requirements:**  Long pants or clothing that covers all skin below the waist  Shoes that cover the entire foot  Gloves; indicate type: Nitrile or latex  Inspect gloves before use. Use proper glove removal technique to avoid skin contact with outer surface of glove. Wash hands after removing gloves.  Safety goggles  Safety glasses  Face shield  Lab coat  Flame-resistant lab coat  Other: respirators with appropriate filters or supplied air for emergency use (spill, breakage…)  If the use of an N95, half mask, or full face respirator is requested, the individual and/or their supervisor must first contact Environmental Health & Safety for a consultation to determine if respirator use is necessary. If EH&S determines the use of a respirator is necessary, the individual must participate in the University’s respirator program. This includes a medical evaluation; respirator fit test, and training. | | | |
| **EMERGENCY PROCEDURES** | | | |
| In case of fire or large and/or extremely hazardous chemical releases pull the fire alarm and evacuate the area  If someone is seriously injured or unconscious  **CALL 911 or CAMPUS POLICE AT <enter your campus PD #>**  From a safe place, provide as much information as possible to the emergency responders including chemical name, volume, hazards, injuries, and location.  **Chemical Exposure**: Remove any contaminated clothing, and IMMEDIATELY flush contaminated skin with water for at least 15 minutes following any skin contact. For eye exposures, IMMEDIATELY flush eyes with water for at least 15 minutes. Consult SDS for guidance on appropriate first aid. Where medical attention is required, bring the SDS(s) of chemical(s) to aid medical staff in proper diagnosis and treatment.  **Evacuation Procedure**   * Immediately evacuate the building via the nearest exit when the fire alarm is activated. * If unable to evacuate due to a disability, shelter in the area of rescue / refuge, typically a stairwell landing, and wait for assistance from drill volunteers or emergency responders. * Instruct visitors and students to evacuate and assist them in locating the nearest exit. * Do not use elevators to exit the building during an evacuation as they may become inoperable. * Carry only those personal belongings that are within the immediate vicinity. * Close doors to limit the potential spread of smoke and fire. * Terminate all hazardous operations and power off equipment. * Close all hazardous materials containers. * Remain outside of the building until the building is released for reentry. * Do not restrict or impede the evacuation. * Convene in the designated grassy gathering area and await instruction from emergency responders or drill volunteers. Avoid parking lots. * Report fire alarm deficiencies, (e.g., trouble hearing the alarm) to facilities personnel for repair. * Notify evacuation drill volunteers or emergency responders of persons sheltering in the areas of rescue/ refuge. * **Never assume that an alarm is a “false alarm”. Treat all fire alarm activations as emergencies. Get out of the building!**   **Incident and Near Miss Reporting**: Report any incident that occurs in any University of South Florida affiliated teaching or research laboratory/studio or field research project. An incident means any unplanned event within the scope of a procedure that causes, or has the potential to cause, an injury or illness and/or damage to equipment, buildings, or the natural environment. Due to medical privacy concerns, no personal identifying information of the person involved in the incident shall be entered or submitted with the form.  <http://www.usf.edu/administrative-services/environmental-health-safety/reporting/index.aspx>  **Workers’ Compensation Procedure:** Call AmeriSys at 800-455-2079 to report a work-related injury or illness. Complete the Supervisor’s Accident Investigation Report available at the link above and send it to EH&S within 24 hours. | | | |
| **WASTE DISPOSAL** | | | |
| All chemical waste generated within USF System laboratories is considered hazardous waste and must be disposed of as hazardous waste in accordance with the USF Hazardous Waste Management Procedure, the U.S. EPA, and the FDEP. The USF Hazardous Waste Management Procedure can be found using the following link, <https://www.usf.edu/administrative-services/environmental-health-safety/documents/hazwaste-managementprocedure.pdf> | | | |
| **TRAINING REQUIREMENTS** | | | |
| All individuals working with chemicals in USF laboratories must take EH&S’s Laboratory Safety Training. To register for Laboratory Safety Training, please use the following link, <https://www.usf.edu/administrative-services/environmental-health-safety/training/course-descriptions.aspx#labsafety>  This procedure may warrant additional safety training per the PI, EH&S, or an authorizing unit such as the Biosafety or Radiation Safety programs. Check training requirements for this activity below:  Research Specific Training from the PI/Lab Supervisor or their designee  EH&S Laboratory Safety Training  EH&S Hazard Communication  EH&S Hazardous Waste Awareness and Handling  EH&S Respirator Fit Test  EH&S Biomedical Waste  EH&S Hazardous Waste Pharmaceutical Training  EH&S Fire Prevention Safety  EH&S Slips, Trips, and Falls  RIC Biosafety Core Course  RIC Shipping Biohazardous Materials  RIC BSL 3  RIC Radiation Safety  RIC Laser Safety  RIC Boating Safety  RIC Scientific Diving  Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| **PRIOR APPROVALS** | | | |
| This activity requires prior approval from the PI/designee.  If this box is checked, working alone is not allowed. | | | |

By signing and dating here the Principal Investigator/ or a designee certifies that the Standard Operating Procedure (SOP) for ***Biosafety Cabinets*** is accurate and effectively provides safe standard operating procedures for employees and students in this lab who will handle this hazardous chemical.

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Signature Printed Name Date

I affirm that I have read and understand the Standard Operating Procedure for ***Biosafety Cabinets*** and have undergone the EH&S Laboratory & Research training and any lab specific training regarding this SOP.

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| Printed Name | Signature | Date |
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