

CENTRIFUGE SAFETY GUIDE

Version	Date	Comments
1	July, 2012	Initial <i>Centrifuge Safety Guide</i>
2	January, 2015	Update and revision

A. INTRODUCTION

A centrifuge is a commonly used piece of equipment in molecular biology and biomedical laboratories. User error accounts for 90 percent of centrifuge failure and can result in extremely expensive damage to equipment as well as injury to personnel in the lab. The most common hazardous failure is sample containers breaking and releasing biological or chemical aerosols. This Guide is intended to outline precautions, safe procedures, and practical information that can be utilized by personnel to safely operate centrifuges at George Mason University.

B. SCOPE

This guide applies to all centrifuges and users of centrifuges at George Mason University.

C. TRAINING

Personnel must receive proper training before using any centrifuge at the university. Principal Investigators and Laboratory Supervisors (PI/LS) should provide hands-on training specific to the centrifuges used by their personnel.

D. GENERAL CENTRIFUGE SAFETY PRACTICES

Different centrifuge rotors have different characteristics for load sizes, speed, and duration. Rotors fail for three main reasons: stress, metal fatigue, and stress corrosion. For these reasons, it is important to review and understand the owner's manual before using any centrifuge for the first time. Always ensure the owner's manual is readily available in case questions or concerns arise during operation.

- Before use, check inside of the centrifuge to ensure that the bowl is dry, and the drive spindle is clean.
- Before use, ensure all parts (tubes, adaptors, rotor, and centrifuge) are compatible with each other and with the centrifuge.
- Check tubes, bottles, safety cups, O-rings, and rotors for cracks, deformities, or debris prior to use. Do not use cracked or deformed equipment in the centrifuge.
- Check the O-ring seal of the safety bucket.

- Bring the rotor you are going to use to the biosafety cabinet. Always use a cart to transport rotors, as they can be heavy and cumbersome. Dropping a rotor can cause personal injury and damage to the rotor.
- Fill centrifuge tubes or bottles in the biosafety cabinet. Never overfill centrifuge tubes as leakage may occur when tubes are filled to capacity. The maximum for most centrifuge tubes is $\frac{3}{4}$ full. Some ultracentrifuge tubes must be filled to the top to prevent collapse, therefore check your product literature for filling recommendations.
- Place caps tightly on centrifuge tubes.
- Place the tubes in the rotor within the biosafety cabinet. Balance tubes in the rotor or safety cup holder. Unbalanced tubes may break and damage the rotor during centrifugation. When using swinging bucket rotors, ensure all buckets are hooked correctly and move freely. If the rotor has an overspeed disk, check that it is in place on the bottom of the rotor.
- Seal the rotor and wipe the outside of the rotor with disinfectant before removing it from the biosafety cabinet.
- Transport the sealed rotor or safety cups to the centrifuge.
- Make sure that the rotor is seated on the drive hub correctly; check that it is balanced, and that the lid is in place.
- Set the proper run speed each time the centrifuge is used. Do not exceed safe rotor speed.
- Do not leave the centrifuge unattended until full operating speed is achieved.
- When the run is finished, wait 5 minutes before opening the lid to allow any aerosols to settle.
- Once the lid is opened, check for any leaks or damage. If a spill is detected, follow the guidelines outlined below.
- If no spill is detected, transport the rotor back to the laboratory and open the rotor in the biosafety cabinet.
- Ensure that the aluminum oxide layer of the rotor is not scratched or damaged.
- Rotor cavities and buckets must never be cleaned with an ordinary bottle brush with sharp wire ends. Always use plastic coated brushes.
- Do not use alkaline detergents or cleaning solutions that may remove the anodized coating.
- If corrosive materials have been run or spilled on the rotor, wash it immediately.
- Air dry the rotor after it has been cleaned and thoroughly rinsed with deionized water.
- Store all fixed angle vertical tube and near-vertical tube rotors upside down, with the lids or plugs removed.
- Swinging bucket rotors should be stored with the bucket caps removed.
- Store all rotors in a dry environment, not in the centrifuge.
- If a centrifuge is not working properly, discontinue use immediately. Post a sign alerting others not to use the centrifuge. Notify the PI/LS so that the equipment can be properly repaired or replaced.

E. SPILL CLEAN-UP

If a spill is detected in the centrifuge, follow the guidelines listed below.

- Assume aerosols have been generated. Turn off the centrifuge if safe to do so and let the centrifuge stand unopened for at least 15 minutes after the rotor has stopped rotating.
- Notify others to leave the room to allow potential aerosols to settle.
- Place disinfectant soaked towels over the rotor before removing it from the centrifuge. Cover every surface of the rotor including the underside. Allow for a contact time of 20 minutes.
- Clean surrounding surfaces with disinfectant and decontaminate any equipment that may have been splashed.
- Remove absorbent material from the outside in and discard as regulated medical waste.
- Remove rotor from centrifuge and place in secondary containment on a cart for transport to the biosafety cabinet. Transfer rotor to biosafety cabinet while still in secondary container.
- Decontaminate inside of centrifuge with disinfectant.
- Wipe down all surfaces in the lab with disinfectant.
- Open rotor within the biosafety cabinet and fill the rotor with disinfectant. Allow a contact time of 20 minutes.
- Rinse the rotor with water in the laboratory sink.