



HOW TO  
**MAXIMIZE THE PERFORMANCE**  
AND LIFE  
**OF YOUR CENTRIFUGE**



# HOW TO MAXIMIZE THE PERFORMANCE AND LIFE OF YOUR CENTRIFUGE

**Centrifuges are an essential tool in any modern laboratory** and are used for many applications in both research and clinical laboratories. Centrifuge technology has advanced to offer greatly improved functionality. However, proper use and care on a daily basis remain critical to maximize performance and extend the service life of the equipment.

## Before Getting Started

Prior to beginning a centrifuge run, some basic checks must be completed to ensure safety and reliable results.

## Rotor Lock

### Verify That the Rotor is Properly Locked on to the Centrifuge Drive Shaft

Common procedure in the past required an operator to set a rotor in place on the drive shaft, tighten the connection using a hand tool, then manually confirm that the rotor will not lift if pulled upwards.

New technology is available which automatically locks a rotor in place when that rotor is placed onto the drive shaft. This automatic lock simplifies rotor installation and reduces the chances a malfunction due to improper use of tools.

The operator should still try to gently lift a rotor after installation to confirm it is locked into place, but a tool is no longer required. Consult the manufacturer's user manual on the correct procedure to install a rotor, confirm that it is locked into place, and check rotor integrity to verify there is no damage that could affect performance and safety.

## Proper Loading

### Select the Correct Rotor, Bucket, and Inserts, and Properly Balance Load

It is critical that the centrifuge is loaded properly. If a swinging bucket rotor is in use, always run it with all four buckets. If biocontainment lids are in use, ensure they are locked into place on the bucket. Improperly secured lids may become



**Click-Spin™** allows installation or removal of rotors in seconds, no tools required. A twist of the knob in the center of the rotor produces an audible "click" indicating a proper connection / disconnection.

separated while in use and damage the chamber. If the lids use O-rings, the rings must be secured and wiped with silicone grease for a proper seal.



*When using a swinging bucket rotor, be certain to properly install and balance the appropriate buckets and lids.*

## Adapters and Tubes

Verify that the proper adapters are in use. For example, to spin 50 milliliter (ml) tubes with round bases, an adapter designed for 50 ml round tubes is required. An adapter with the correct diameter for the desired 50 ml round tube, but which is designed for a tube with a conical base will not properly support the tube, or the sample it contains. This risks tubes breaking, leakage of samples, and damage to the centrifuge.



*A tube with a round base should not be used in an insert designed for a conical base [A]. Improperly supported tubes may fail while in use [B].*

## Maximum Speed

Tube specifications should be reviewed to verify to determine if a tube is rated to the speed the centrifuge will spin. A tube rated to a maximum speed of 5,000 revolutions per minute (RPMs), can not be used for a high-speed run at 8,000 RPMs or greater without risk of failure.

## Fill Level and Balance

The centrifuge manual should be consulted to determine the appropriate fill height for a given tube and insert combination. Centrifugation requires tubes to be balanced and symmetrical, so tubes must be as uniform as possible.

## Operating Temperature

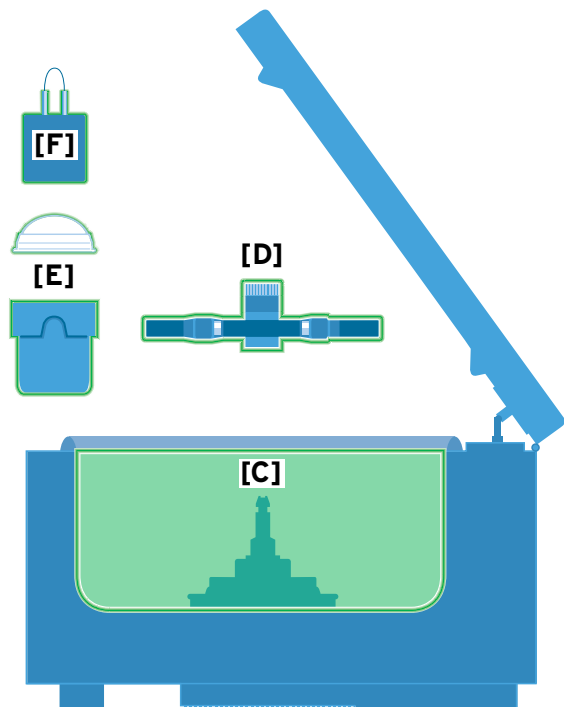
### Consider Ambient and Internal Temperature

During a period of disuse, such as overnight, a centrifuge may warm to room temperature (20 to 22 Celsius). It is important to complete a “cool cycle” to return the centrifuge to the correct operating temperature. Failing to complete a cool cycle will cause the centrifuge to decrease towards the setpoint while in use in use, raising the temperature of the samples.

## Cleaning and Preventative Maintenance

### Following a Regular Schedule of Cleaning and Maintenance Extends Service Life

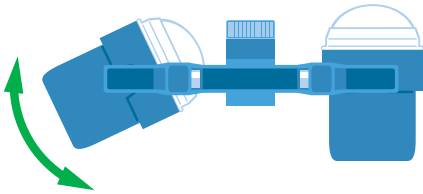
The centrifuge bowl and accessories should be cleaned and disinfected periodically with 70 percent isopropyl alcohol. Do not use harsh bleaches. When cleaning the **bowl [C]**, also remove, clean, and disinfect the **rotor [D]**, **buckets [E]**, and **inserts [F]**. If rotors are left in place for extended periods of time, torque may seize the rotor to the drive shaft. It is also recommended to remove rotors at the end of each day. Clean the rotor, including tube cavities, and place it on the stand provided by the manufacturer to dry.



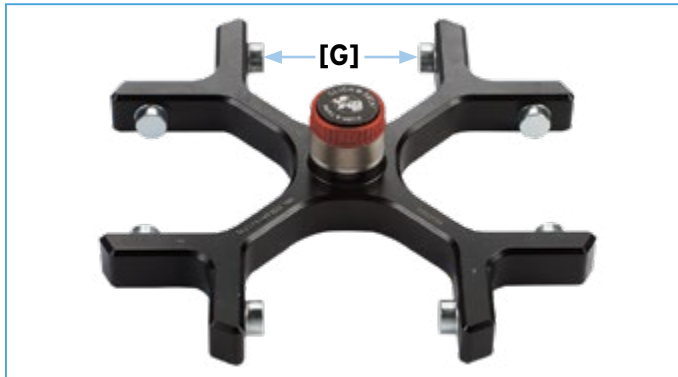
## Grease

### Reduce Friction to Reduce Wear

Apply a small amount of silicon grease to rotor trunnions **[G]** after each cleaning. Without proper lubrication, metal-to-metal contact increases friction, causing wear. Dust produced by wear due to friction may accumulate, preventing the buckets from swinging out evenly. The result is an imbalance that causes the centrifuge to stop and display an error.



*Damage to Lid Gasket*



*Crack in a Centrifuge Rotor*

## Moisture

### Control Water Vapor and Condensation

After cleaning, the lid should be kept open to allow the centrifuge to thoroughly dry. Failing to do this can trap excess moisture inside. In centrifuges with a refrigeration system, condensation and frost can accumulate inside of the centrifuge throughout the day. When the centrifuge heats up during a run, the condensation eventually puddles at the bottom and can negatively affect performance.

## Inspection and Service

### Verify Centrifuge is Running as Specified, Check for Signs of Wear or Damage

With proper cleaning, lubrication, and operation, a centrifuge should last many years. Nonetheless, it is still important to frequently inspect equipment for damage or signs of wear.

Some manufacturers may even offer a courtesy check, calling several years after a purchase to let you know the centrifuge has likely reached its cycle limit. Ultra-centrifuges, which are capable of running at speeds as high as one million g-force (approx. 9800 km/s<sup>2</sup>), should be inspected and serviced yearly. Many benchtop centrifuges are certified to verify that they are running the correct speed, temp, etc., but they do not require annual certification.

## Summary

According to OSHA, most centrifuge accidents are a result of user error. Therefore, following the care and operating instructions outlined in your user manual is important both for the functionality of equipment as well as employee safety. If you suspect any issues with your centrifuge, immediately contact the manufacturer or contracted service agency, who should work with you to identify the issue and offer a solution.