INTRODUCTION

Centrifuge is a common tool in laboratory research that uses centrifugal force to separate substances according to density differences and particle size. Typical maximum speed and relative centrifugal force of most lab centrifuges is 15,000 rpm (21,380 x g). Imagine spinning your samples up to this relative speed per minute on a daily basis, a scheduled preventive maintenance should certainly be employed. Poor maintenance of centrifuges will result in inefficient lab operations and various physical and exposure hazards can arise. Proper care of this instrument and routine cleaning based on the manufacturer's recommendations are vital in maintaining a safe atmosphere for laboratory workers.

Upkeeping this instrument is fundamental to avoid possible damage to the sample, tube, adapters, rotors, and other accessories, and to minimize the risks to the operators due to mechanical and aerosol hazards. Thus, comprehensive guidelines on how this equipment should be cleaned, decontaminated, autoclaved, and inspected is discoursed here.

As an **E**xcellent **S**ervice **Co**mpany, Esco offers service programs to meet your individual needs and to keep your equipment in excellent working condition.

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ESCO SERVICES

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PREVENTIVE MAINTENANCE SERVICES

Scheduled Maintenance

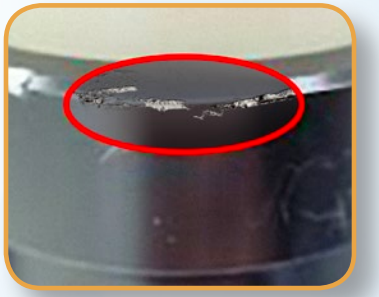
No.	Description of Task to Perform	Maintenance to be carried out			
		Before using	After using	Yearly	As Needed
1	Check if all components of the unit is grease-free and damage-free	√			
2	Maintenance procedure including cleaning of rotors and accessories		√		
3	Lubrication of the rotor insert bolts and lid thread		√		
4	Autoclaving and sterilization				√
5	Removing the adherent dust from the ventilation slots of the centrifuge				√
6	General inspection			√	
7	Calibration of speed and temperature (if applicable)			√	

Notes:

- Lubricants containing molykote and graphite are not allowed.
- Avoid corrosive substances.
- Do not perform disinfection with UV-, beta- and gamma-rays or other high energy radiation.
- Accessories made of polypropylene (PP) and cannot be autoclaved at 134°C.
- Do not grease the rotor cone.

- **Check if all components of the unit is grease-free and damage-free**

Before using the unit, check if the following are not greased and damage-free: lid lock, motor shaft, and rotor.



- **Cleaning of unit, rotors, and accessories**

Clean the rotors and accessories daily after use. Use pH-neutral detergents only in cleaning the chamber, rotor, adapters, and external surfaces. Ensure that all parts are dried thoroughly.

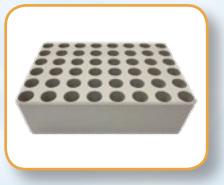
- **Lubrication of the rotor insert bolts**

Apply a thin layer of rotor grease to the rotor bolts of the swing-bucket rotor if the rotor does not swing freely every after cleaning and autoclaving. Ensure that the rotor cross pivots and the bucket grooves are free from contamination.

In fixed-angle rotors, apply a thin layer of rotor grease to the lid thread on the rotors. Also, ensure to grease the sealing of bucket caps regularly. Be sure that the lid is tightly sealed.

- **Autoclaving and sterilization**

Before autoclaving, the materials must be carefully washed with distilled water. The recommended time for autoclaving: 12-20 min at 121°C (1bar). Adapters, tubes, and rotors can be sterilized with ethylene oxide. Afterwards, apply enough airing on the items before reusing.



- **Removing the adherent dust from the ventilation slots of the centrifuge**

Remove the adherent dust from the ventilation slots of the centrifuge every six months using a soft brush.

- **General Inspection**

Check the following regularly– at least annually:

- Tightness of screw hinges, sight glass, and rotor lid
- Functional check of the operating panel and device control including emergency switch
- Electrical safety check in accordance with the relevant regulations

- **Calibration of speed and temperature (if applicable)**

- The speed and temperature can be calibrated to reference instruments
- It is recommended to calibrate at least once a year to ensure continuous and optimal performance of the centrifuge

TROUBLESHOOTING AND PARTS REPLACEMENT

Esco provides replacements for consumable elements as well as any components that might fail while the product is in service.

IQ/OQ VALIDATION

Esco provides our customers instructions for Installation / Operation Qualification (IQ/OQ) protocol of our products. Esco also can perform these services directly on behalf of its customers or arrange them through independent approved local certifiers. The availability may vary from country to country and region to region. Also, Esco can train customer employees to perform IQ/OQ as described in the Aftermarket Support section later in this document.

TRAINING AND WORKSHOPS

Esco offers training for users of Laboratory Centrifuges on the procedures in its User and Service Manuals.

SERVICES TO OTHER BRANDS

Esco does not only provide services to its own product line but also for other brands. Esco assures that your laboratory centrifuge will be properly checked according to your needs.