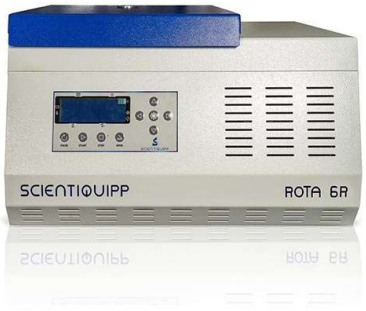
SCIENTIQUIPP™

# ROTA - 6R




## Refrigerated Centrifuge

# Operating Manual

**Please retain for later use**

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# SCIENTIQUIPP
# TECHNICAL OPERATING MANUAL - CENTRIFUGES

**P/N 300579 Rev 1.0**

Preface

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This manual covers the use and maintenance of Scientiquipp centrifuges. **READ BEFORE USING THIS EQUIPMENT**. It is intended for use by trained personnel only. All service and maintenance should be performed by an authorized Scientiquipp Distributor.



**NOTE**: All SCIENTIQUIPP models are class I as per IEC 61140, as the AC supply requires a protective earth ground. These centrifuges are power-driven machines that separate liquids from solid matter, liquid mixtures. These devices have been tested to and are in compliance with IEC 61010-2-020.

# Revision History

This document applies to the latest edition of the ROTA 6 and 4R centrifuge series. When a design change takes place, a new version will be released to the Scientiquipp website.

## Initial Issue

## Version 07/2016, Rev.1.0 of 01/02/2019

**Changes / additions made to the following: -**

- Design changes to centrifuge chassis

## Version 01/2021, Rev 2.0 of 12/01/2021

- Automatic Rotor Identification
- Introduction of new Imbalance switch

**In case of inquiries, please state the following numbers:**

**Order number:**

**Serial number:**

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E-mail: info@scientiquipp.com

**NOTE**

If you would like to utilise our service, please state the type of your centrifuge and its serial number.

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## Explanation of the Symbols and Notes

Scientiquipp operating manuals use the following names and symbols to indicate hazards. Non-observance of these safety standards may lead to serious health problems, life endangering injuries, minor injuries or damage to property.

Scientiquipp operating manuals use the following names and symbols to indicate hazards. Non-observance of these safety standards may lead to serious health problems, life endangering injuries, minor injuries or damage to property.

| | | | |
|---|---|---|---|
|  | Biohazard |  | Explosive substances |
|  | Electric shock |  | Risk of crushing |
|  | Hazard point |  | Material damage |

**Danger levels**

| | |
|---|---|
| **DANGER** | Will lead to severe injuries or death |
| **WARNING** | May lead to severe injuries or death |
| **CAUTION** | May lead to light or moderate injuries |
| **NOTICE** | May lead to material damage |

**Symbols used**

| Depiction | Meaning |
|---|---|
| **1**<br>**2** | Actions in the specified order |
| ► | Actions without a specified order |
| **NOTICE** | May lead to material damage |

## Abbreviations used

**MTP**
Microtiter plate

**PCR**
Polymerase Chain Reaction – PCR

**RCF**
Relative centrifugal force: g-force in m/s²

**RPM**
Revolutions per minute

# General Information

## 1.1 Importance of the Operating Manual

A fundamental requirement for the safe and trouble-free operation of the centrifuge is to be familiar with all potential hazards and corresponding safety instructions.

The operating manual includes important information concerning the safe operation of the centrifuge. Instructions on safety and hazards must be observed by all persons operating the centrifuge. In addition, industries specific safety norms for the prevention of accidents must be complied with.

## 1.2 Intended Use

Centrifuges are power driven-machines that separate liquids from solid matter, liquid mixtures, or solid mixtures by centrifugal force. They are solely intended for this purpose. Any other use beyond this area of application is regarded as improper use.

Scientiquipp cannot be held liable for any damage resulting from improper use. The intended use also includes: -

- Observation of all notes and instructions included in the operating manual.
- Compliance with care, cleaning, and maintenance instructions.

## 1.3 Warranty and Liability

Warranty and liability are subject to the **warranty statement** distributed to the operator upon the conclusion of the contract.

Warranty and liability claims are excluded if they are due to

- Improper use.
- Non-compliance with safety instructions and hazard warnings as included in the operating manual
- Improper installation, start-up, operation or maintenance of the centrifuge.

# 1. General Information

## 1.4 Copyright

The copyright concerning the operating manual remains with Scientiquipp Pvt. Ltd. The operating manual is solely intended for the operator and their personnel. It includes instructions and information that must not be:

- Distributed
- Duplicated, or
- Communicated in any other way.

Non-compliance may be prosecuted under criminal law

## 1.5Standards and Regulations

CE Declaration of conformity
(see chapter 11.6 – ‘‘CE declaration of conformity)

## 1.6 Scope of supply

The centrifuge comprises:

- 1 T- shaped Allen key — Part no.300200
- 1 Operating manual — Part no.300615

## 1.7 Accessories

As per your order confirmation and your delivery note.

## 1.8 Documentation

Operating manual incl. EC Declaration of conformity

# 2. Layout and mode of operation

## Layout and mode of operation

### 2.1 Layout of the Centrifuge

### 2.2 Functional and operating elements

1. Lid
2. User Interface
3. Mains switch
4. Emergency Lid opening
5. Mains Power input

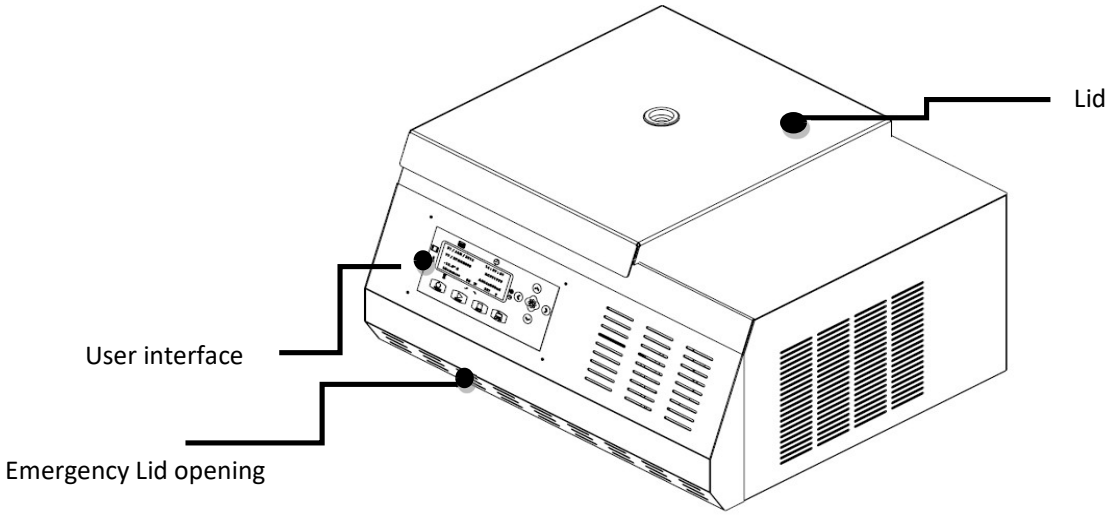
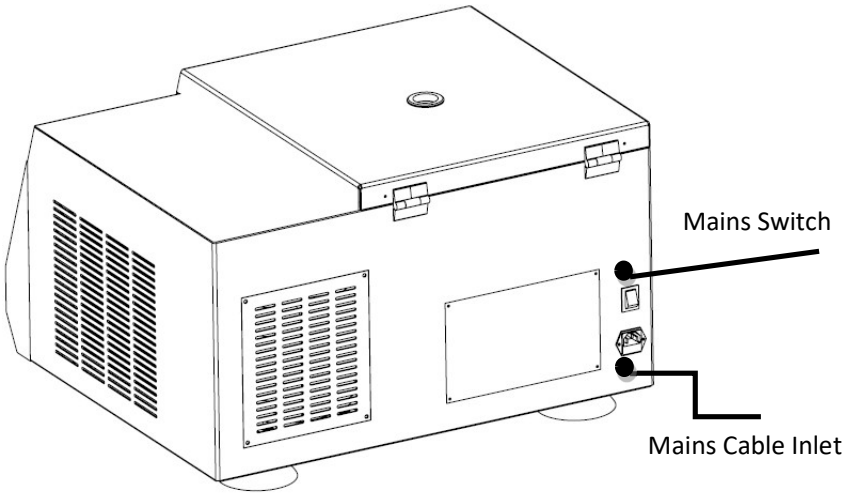
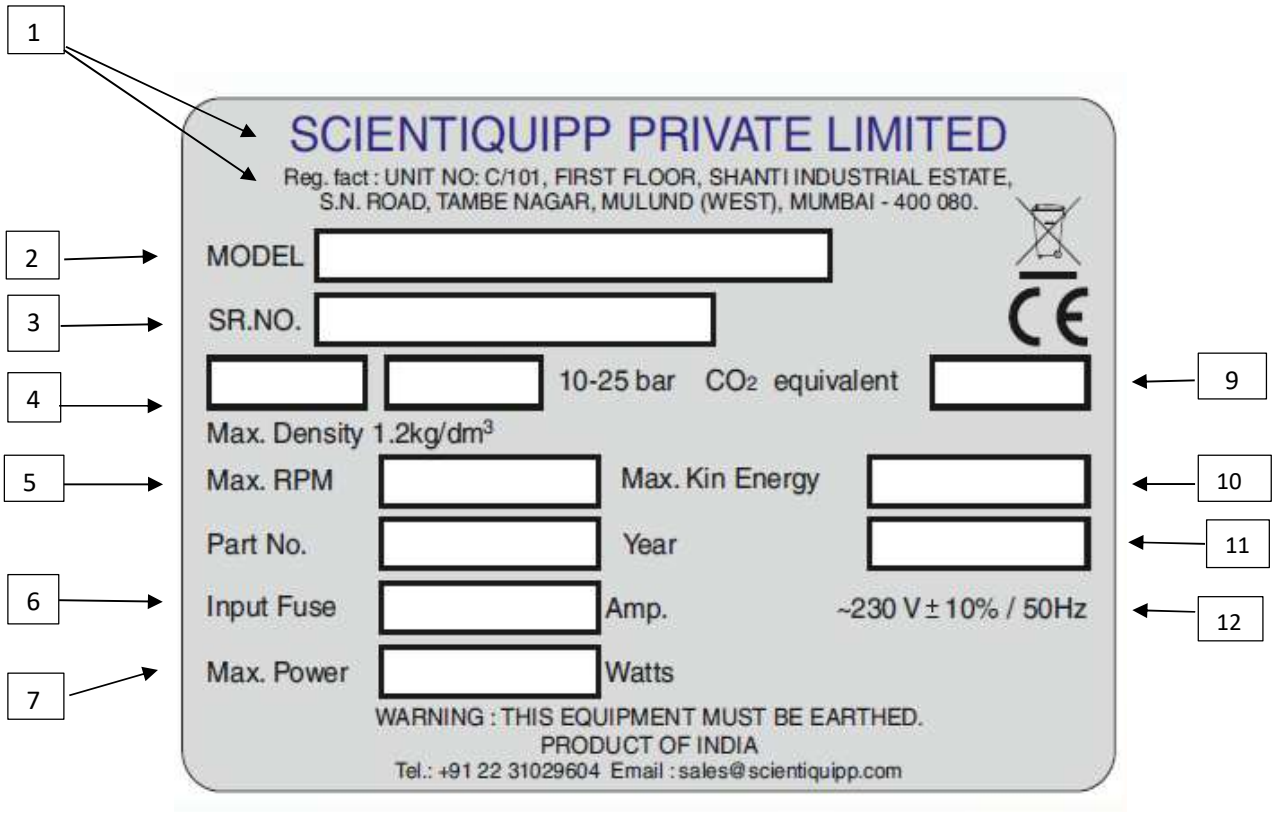



*Fig 1: Total view of the centrifuge*



# 2. Layout and mode of operation

## 2.3 Name Plate




1. Manufacturer and Registered office address.
2. Type
3. Serial number
4. Refrigerant Type.
5. Max. Speed.
6. Input Fuse.
7. Power Consumption.
8. Refrigerant Quantity.
9. CO2 Equivalent.
10. Max. Kinetic Energy.
11. Year of Manufacture.
12. Nominal Voltage.

# 2. Layout and mode of operation

## Mode of operation

## 2.4 Centrifugation Principle

Centrifugation is a process for the separation of heterogeneous mixtures of substances (suspensions, emulsions or gas mixtures) in to their components. The mixture of substances, which rotates on the circular path, is subject to centripetal acceleration that is several times greater than gravitational acceleration.

Centrifuges use the mass inertia inside the rotor chamber for separating substances. Due to their higher inertia, particles or media with a higher density travel outwards, in doing so they displace the components with a lower density, which in turn travel towards the centre.

The centripetal acceleration of an object inside a centrifuge as the effect of centripetal force depends on the distance between the object and the axis of rotation as well as on the angular velocity. It increases linearly as a function of the distance with regard to the axis of rotation and quadratically as a function of the angular velocity. The bigger the radius in the rotor chamber the higher the speed. The higher the centripetal acceleration is. How-ever the forces, acting on the rotor also increase.

## 2.5 Area of Application

The Scientiquipp ROTA 6R (Refrigerated Centrifuge) (Figure 1.1) is a benchtop centrifuge that can be used for the separation of components through the use of Relative centrifugal force.

Figure 1.1 **ROTA 6R Centrifuge**

When used with the ROTA 6R Rotors designed for use in this centrifuge, applications this centrifuge can perform include:

- Cell Harvesting in Cell Culture
- Fermentation Applications
- Protein Isolation and Purification Ultrafiltration
- Molecular Biology
- PCR
- PBMC’s
- Food Technology

# 2. Layout and mode of operation

Depending on the area of application of the centrifuge and also on the particle size, solids content and volume throughput of the mixture of the substances that are to be centrifuged, there are different types of centrifuges.

The areas of application go from household use as a salad spinner or honey separator up to specialised technical applications in the clinical, biological or biochemical context:

For numerous clinical examinations, cellular material must be separated from the liquid to be analysed. The normal separation process can be sped up considerably by using laboratory centrifuges.

## 2.6 Speed, Radius and Relative Centrifugal Force

The acceleration g, which the samples are subject to, can be increased by increasing the radius in the rotor chamber and by increasing the speed. These two parameters are interdependent and linked with each other via the following formula:

***Relative centrifugal force RCF = (RPM)² × 1.118 × 10 $^{-5}$ × r***
*r = radius in cm*
*n = speed in rpm*
*RCF without any dimension*

If two values are entered, the third value is determined by way of the stated formula. If the speed is changed, the resulting relative centrifugal force (RCF) will be recalculated automatically by the control unit. If the RCF is changed, the speed will be adjusted while the specified radius is maintained.
The speed-gravitational-field diagram provides an overview of the relationship between speed, radius and RCF.

## 2.7 Density

The laboratory centrifuge is suitable for the separation of constituents of different densities in mixtures with a maximum density of 1.2 g/cm3. All information concerning the speed of rotors and accessories refers to liquids with a density corresponding to this specification. If the density is above this value, the maximum permissible speed of the centrifuge must be reduced based on the following formula:

$$n = n_{max} \times \sqrt{(1{,}2 / Rho)}$$

*Rho = density in g/cm$^3$*

## 2.8 Responsibility of the Operator

The operator is responsible for authorizing only qualified personnel to work on the centrifuge. The areas of responsibility related to the operation, maintenance and care of the unit must be clearly defined. Safety-compliance at work with respect to the operating manual and relevant site safety regulations must be checked at regular intervals (e.g., every month).

Under the international rules for health and safety at work, the operator is obliged to:

- Take measures in order to prevent all danger to life or health during work.
- Ensure that centrifuges are operated properly and entirely as intended.
- Take protective measures against fire and explosion when working with hazardous substances.
- Take measures for the safe opening of centrifuges.
- The instrument is to be used in the indoors only.

## 2.9 Operating Personnel

Persons operating the unit must be:

- Familiar with the fundamental regulations concerning work place safety and accident prevention.
- Have read and understood this operating manual (and in particular the safety sections and warning notes) and confirmed this with their signature.
- Operating personnel have undergone training by a Scientiquipp accredited service technician.

# 3. Safety

## Safety Instructions

## 3.1 Informal Safety Instructions

- This operating manual is a part of the product.
- The operating manual must be kept at the location of use of the centrifuge. Ensure that it is accessible at all times.
- The operating manual must be handed over to any subsequent owner or operator the centrifuge.
- Any changes made must be added to the operating manual.
- In addition to the operating manual, the general and local rules and regulations concerning the prevention of accidents and protection of the environment must be followed.
- Safety and danger indications on the centrifuge must be kept readable at all times. If necessary, they must be replaced.

## 3.2 Electrical Safety

To reduce the risk of electrical shock, the centrifuge uses a three-wire electrical cord and plug to earth the equipment. To preserve this safety feature:



**DANGER**

- Ensure that the wall socket is properly wired and grounded.
- Check that the mains voltage is compatible with the nominal voltage listed on the name plate.
- Do not place vessels containing liquid on the centrifuge lid or within the safety distance of 30cm around the centrifuge. Spilt liquids may get into the centrifuge and damage electrical or mechanical components.
- Work on the power supply system must only be performed by certified electricians.
- Inspect the electrical equipment of the unit regularly. Defects such as loose or burnt cables must be eliminated immediately.

# 3. Safety

Electrical Plugs and Outlets suitable for the ROTA 6 | 6R Centrifuge

| Part. No | Instrument Rating | Suitable Cord Plug |
|---|---|---|
| 300602 | 15 AMPS 230 V +/-10% 50Hz |  |

Additional electrical specifications can be found in *specifications*

**IMPORTANT:** If there is any question about voltage, have a qualified facility person measure it under load while the drive is operating.

**IMPORTANT:** Mean power supply fluctuations are not to exceed +/-10% of the nominal supply voltage.

# 3. Safety

## 3.3 Mechanical Safety

In order to ensure the safe operation of the centrifuge, observe the following:



**WARNING**

- Do not open the lid when the rotor is in motion.
- Do not reach into the rotor chamber when the rotor is in motion.
- Do not use the centrifuge if installed incorrectly.
- Do not use the centrifuge if the rotors and inserts show signs of corrosion or other defects.
- Only use the centrifuge rotors and accessories that have been approved and supplied by Scientiquipp. In case of doubt contact the manufacturer. (See chapter – **Service Contact**)
- Do not hold your fingers between the lid and the housing while closing the lid to avoid the risk of crushing.
- Defective lid relieving devices could cause the centrifuge lid to fall.
- Do not hit or move the centrifuge during its operation.
- Do not lean against or rest on the centrifuge during its operation.
- Do not spin any substances that could damage the material of the rotors and buckets of the centrifuge in any way. Highly corrosive substances damage the material and affect the mechanical strength of the rotors and buckets.
- Stop the centrifuge immediately in the event of a malfunction. Eliminate the malfunction or inform the service department of Scientiquipp.
- Ensure that all repairs are performed only by authorised and specialised personnel.
- Prior to any start-up, check the centrifuge, rotor and accessories for signs of damage that can be discerned from the outside. Special attention must be paid to all the rubber parts. Defective parts must be replaced immediately.
- Leave the centrifuge open when not in use so that moisture can evaporate.

## 3.4 Fire Prevention



**WARNING**

- Do not spin explosive or inflammable substances.
- Do not use the centrifuge in hazardous locations.

## 3.5 Chemical and Biological Safety

If pathogenic, toxic or radioactive samples are intended to be used in the centrifuge, it is the responsibility of the user to ensure that all necessary safety regulations, guidelines, precautions, practices are adhered to accordingly.



**DANGER**

- Infectious, toxic, pathogenic and radioactive substances may only be used in special aerosol tight rotors in order to prevent the material being released.
- Take suitable precautions for your own safety if there is a risk of toxic, radioactive, or pathogenic contamination.
- Materials that chemically react with each other with a high level of energy are prohibited.

## 3.6 Safety Instructions for Centrifugation

For safe operation, observe the following before starting the centrifuge



**WARNING**

- Ensure that the centrifuge is properly set-up (see Chapter 5 – Set-up and Connection).
- Maintain a safe distance of at least 30cm (12 inches) around the centrifuge.
- Do not store any dangerous goods in the vicinity of the centrifuge.
- Do not remain the safety area longer than what is absolutely necessary for the operation of the centrifuge.
- Only use the centrifuge with rotors and accessories that have been approved by Scientiquipp. We explicitly warn against the use of equipment of poor quality. Breaking glass or bursting tubes can cause dangerous imbalances at high speeds.
- Ensure that the rotors and buckets are correctly fitted
- Observe the instructions on the installation of accessories.
- The rotor must be loaded symmetrically and balanced equally.
  If liquids with a density of >1.2g/cm³ are used, reduce the speed
- Do not use the centrifuge if the rotor is loaded asymmetrically.
- Do not use the centrifuge with tubes that are excessively long or not compatible with Scientiquipp rotors.

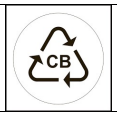
# 3. Safety

## Safety and Regulatory Symbols

Safety symbols alert you to potentially dangerous conditions. The symbols apply to specific procedures and appear as needed.

| Symbol / Regulatory Mark | Title of Symbol / Regulatory Mark | Standard Reference | Meaning of symbol from Standard |
|---|---|---|---|
|  | Recycling symbol WEEE Wheeled Bin Symbol | N/A | The symbol of a crossed-out wheeled bin on the product is required in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Union. The presence of this marking on the product indicates<br>1. The device is not to be disposed via the municipal waste collection of any member state of the European Union |
|  | **Caution** | ISO 7000[a]; 0434a | To indicate that caution is necessary when operating the device or control close to where the symbol is placed, or to indicate that the current situation needs operator awareness or operator action in order to avoid undesirable consequences |
|  | **Biological Hazard** | ISO 7000; W009 | This symbol is used to warn of the potentiality of a virus or toxin biological hazard. |
|  | **CE Mark** | N/A | A ‘‘CE’’ mark indicates that a product has been assessed before being placed on the market, and has been found to meet European Union safety, health and/or environmental protection requirements |

Safety Symbols used for the ROTA 6 | ROTA 6R Centrifuge (*Continued*)

| | | | |
|---|---|---|---|
|  | **On (Power)** | | |
|  | **Off (Power)** | | |
|  | **Heavy Object 2-3 people Needed** | | |
|  | **Packaging Recycle** | | |

ISO 7000, graphical symbols for use on equipment – registered symbols

## Additional Instrument Labels and Symbols

The following symbols are used for all types of centrifuges manufactured by Scientiquipp:



Dangerous voltage



Bio Hazard



Hot surface



Unplug the mains plug when the centrifuge is not in use



Risk of crushing



Arrow indicating the direction of rotation




Read and fully understand the operators manual before using this machine. Failure to follow instructions could result in death or serious injury.



**NOTE**

- Safety indications on the centrifuge must be kept readable at all times. If necessary, they must be replaced.
- Not all of the symbols / labels are used for this centrifuge type.

# Service Life of Rotors and Accessories

## 3.7 Service life

The Rotors and accessories have a limited-service life.



**WARNING**

- Perform regular checks (at least once per month) for safety reasons.
- Pay special attention to changes, such as corrosion, cracks, material abrasion etc.
- After five years they must be inspected by the manufacturer.
- After 50,000 cycles the rotor must be scrapped for reasons of safety.
- If other data concerning the service life of rotors are engraved on the rotor or bucket, these data shall apply accordingly. For example, a rotor with the engraving ‘‘Exp date 5/2026’’ must be scrapped in May 2026 at the latest (See figure)






**WARNING**

- Refer to the table of rotors and accessories with a different service life (see chapter ‘‘Table of the service life of rotors and accessories’’)

## 3.8 Lid lock device

The centrifuge can only be started when the lid is properly closed. The electrical lock must be in the lock position. The lid can only be opened when the rotor has stopped. If the lid is opened by way of the emergency release system during centrifugation, the centrifuge will immediately switch off and decelerate brakeless. If the lid is open, the drive is completely separated from the mains power supply, i.e., the centrifuge cannot be started.

## 3.9 Standstill monitoring system

Opening of the centrifuge lid is only possible if the rotor is at a standstill. This standstill is checked by the microprocessor.

## 3.10 System check

An internal system check monitors the data transfer and sensor signals with regard to plausibility. Errors are detected with extreme sensitivity and displayed as error messages in a dialog box.

## 3.11 Earth conductor check

An earth conductor check can be carried out by authorised and specialised personnel using a suitable measuring instrument. Please contact the Scientiquipp service department.

## 3.12 Imbalance monitoring system

‘‘Imbalance’’ will pop up on the display in order to indicate that the centrifuge is in the inadmissible imbalance range. If the rotor is loaded unevenly, the drive will be switched off in the acceleration phase or during the run.

## 3.13 Rotor monitoring system

When the rotor in installed on the motor shaft, and the run is started, the processor will check three times at an RPM of 800, before confirming the correct speed.

## 3.14Measures in the event of Hazards and Accidents



**DANGER**

- If an emergency arises, switch off the centrifuge immediately.
- If in doubt call the Scientiquipp service team.

## 3.15 Remaining Hazards

The unit has been built according to the accepted safety rules. However danger to the operator or impairment to the unit or other material assets cannot be completely excluded when the unit is being used.

- Use the unit only for the purpose it is intended.
- Use the unit only if it is in perfect running order.
- Immediately eliminate any problems that can affect safety.

## 3.16 Resistance of Plastics

Chemical influences have a strong effect on the polymeric chains of plastics and therefore on their physical properties. Plastic parts can be damaged if solvents, acids or alkaline solutions are used.

# 4. Storage and transport

## 4.1 Storage Conditions

Before storing a centrifuge for an extended period, remove the rotor. Return the centrifuge to its original shipping container to protect it from dust and dirt alternatively you may cover the instrument with a dust proof cover. Temperature and Humidity conditions for storage should meet the operating environment requirements described under.

| | **Air Temperature** | **Relative Humidity** | **Atmospheric pressure** |
|---|---|---|---|
| In transport packaging | -25°C to 55°C | 10 to 75% | 70 to 106 kPa |
| Without transport packaging | -5°C to 45°C | 10 to 75% | 70 to 106 kPa |

## 4.2 Notes on Transport

- Always lift the centrifuge with a lifting device or with a sufficient number of people
- When lifting the centrifuge, always reach under the centrifuge from the side.

| | |
|---|---|
| **WARNING** | **The centrifuge weigh's approx.100 Kg!** |

## 4.3 Packaging

The centrifuge is packaged in a corrugated box.

- After taking of the lid, remove the side panels
- Remove the packaging material
- Lift the centrifuge upwards with a lifting device to lift it safety
- When lifting the centrifuge, always reach under the centrifuge from the side.






- Retain the packaging for any possible future transport of the centrifuge

## 4.4 Removal

- Open the lid by pressing the lid key on the control panel
- If the centrifuge is not connected to the power supply, use the emergency release tool, to open the lid.
- Removal • Open the lid by pressing the lid key. If the centrifuge is not connected to the power supply, use the emergency release of the lid (see chapter 7.1.1 - "Emergency lid release"). • Remove the foamed plastic piece (see figure, item 1) from the rotor chamber, by lifting it carefully on one side.
- Retain the transport safety device for the possibility of the return of the centrifuge.

# 5. Setup and connection

## Set-up and connection

## 5.1 Installation Site

Operate the centrifuge only in closed and dry rooms. All the energy supplied to the centrifuge is converted into heat and emitted to the ambient atmosphere.

- Ensure sufficient ventilation.
- Keep a safe distance of 30 cm around the centrifuge so that the vents in the centrifuge remain fully effective.
- Do not subject the centrifuge to thermal stress e.g. by positioning it near heat generators.
- Avoid direct sunlight (UV radiation).
- The table on which the centrifuge is placed must be stable and have a solid even surface.
- During transport from cold to warmer temperatures condensational water will collect inside the centrifuge. It is important to allow sufficient time for drying (min 24 hrs) before the centrifuge can be used again.

## Power supply

## 5.2 Types of Connection

Scientiquipp centrifuges are units of protection class I. All Scientiquipp centrifuges have a three-wire power cord with an IEC C13 connector. They are equipped with a mains power switch with a slow blow fuse.
They are equipped with a mains power switch with an integrated thermal circuit breaker.

Switch the unit on by actuating the mains power switch. The centrifuge is now ready for operation



**DANGER**

The operating voltage on the name plate must correspond to the local supply voltage.



**NOTE**

The removable power cord must not be replaced with a power cord of inadequate rating!

The centrifuges are equipped with a mains power switch.

- Switch the unit off by actuating the mains power switch
- If it has tripped, let the circuit breaker cool for approximately 2 minutes
- Switch the unit on.
- The centrifuge is now ready for operation.

## 5.3 Fuses

Typically, the centrifuge must be protected with a 20 Amp T or S fuse that is to be provided by the customer.

# 6. Using the centrifuge

## 6.1 Initial start-up



**DANGER**

Before the initial start-up, please ensure that your centrifuge is properly set-up and installed.

## 6.2 Switching the centrifuge on

- Press the mains power switch located at the bottom left side of the machine.
- Once the display illuminates, the centrifuge is ready for operation.

## 6.3 Opening and closing the lid

- Press the lid symbol key to open the closed centrifuge lid.
- To close the lid, press it down gently with both hands until the striker is in contact with the lock.
- The centrifuge cannot be started if the lid is open.



**WARNING**

Do not place your fingers between the lid and the housing when closing the lid. Risk of crushing!

## 6.4 Installation of Rotors and Accessories

### 6.4.1 Installation of a standard rotor

- Open the centrifuge lid by pressing the lid key
- Unscrew the rotor tie-down screw from the motor shaft (counter clock-wise).
- Lower the rotor with its central bore straight down onto the motor shaft.
- Tighten the rotor tie-down screw clockwise with the supplied T shaped Allen key with 4mm. In doing so hold the rotor at its outer rim



**DANGER**

Once a day or after 20 cycles, the rotor tie-down screw must be loosened by some turns, and the rotor must be lifted and fastened again. This ensures a proper connection between the rotor and the motor shaft.

DANGER

When using rotors for microtiter plate formats: Ensure that the plate holders are inserted together with the plates in to the carriers.

NOTE

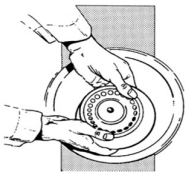
The lid screw serves for the fastening of the lid onto the rotor only, not for the fastening of the rotor onto the motor shaft.

**Removal of a rotor**

- Loosen the rotor tie-down screw by turning it anti-clockwise and remove the rotor.

## 6.5 Installation of the angle rotor

- Lower the rotor straight down onto the drive shaft with shaft adapter



- Tighten the tie-down screw clockwise onto the drive shaft.

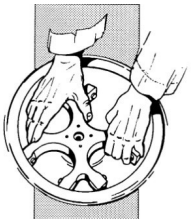




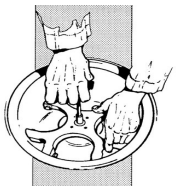
# 6. Using the centrifuge

## 6.6 Installation of the Swing-bucket Rotor

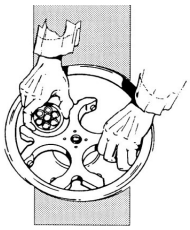
- Lower the rotor with the shaft adapter straight down onto the drive shaft.



- Tighten the tie-down screw clockwise onto the drive shaft.



- Seat the filled buckets onto the pins & be sure to fill all positions of buckets evenly.





# 6. Using the centrifuge

### 6.6.1 How to remove the rotor.

- Remove rotor lid by removing knob anti clockwise
- Use Allen key and remove the rotor tightening screw.
- Place the extractor on rotor and rotate the extractor screw clockwise to grip the rotor properly.
- Hold the rotor with one hand and rotate the extractor handle clockwise to pull the rotor from motor shaft.
- rotor will come out lift with two hands.





# 6. Using the centrifuge

## 6.7 Installation of a standard angle rotor with a hermetic lid

- Open the centrifuge lid by pressing the lid key
- Unscrew the rotor tie-down screw from the motor shaft (counter-clockwise)
- Screw the rotor lid onto the rotor and tighten it
- Lower the rotor with the lid with its central bore straight down onto the motor shaft
- Insert the rotor tie-down screw in to the motor shaft.
- Tighten the rotor tie-down screw clockwise with the supplied rotor wrench with 7.5Nm. In doing so, hold the rotor at its outer rim.
- Follow the safety instructions and hazard warnings.

**NOTE**

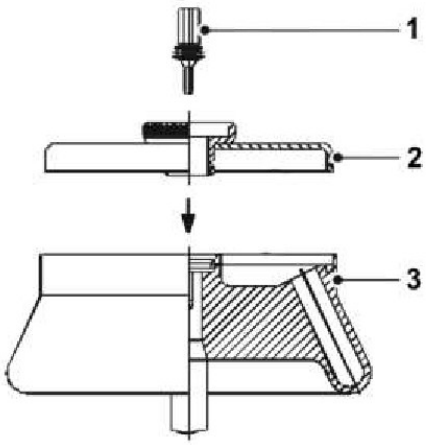
The rotor can also be used without a cover.

**NOTE**

The lid screw serves for the fastening of the lid onto the rotor only, not for the fastening of the rotor onto the motor shaft.

### Removal of a Rotor

- Unscrew the rotor-tie-down screw (Counter clockwise) and remove the rotor with the lid
- Open the lid by turning it counter-clockwise and remove the lid.



# 6. Using the centrifuge

## 6.8 Installation of accessories

**CAUTION! Poor safety due to incorrect accessories and spare parts.**
The use of accessories and spare parts other than those recommended by Scientiquipp may impair the safety, functioning and precision of the device. Scientiquipp cannot be held liable or accept any liability for damage resulting from the use of incorrect or non-recommended accessories and spare parts, or from the improper use of such equipment

- Only use inserts that area suitable for the rotor
- All buckets of the swing-out rotor must be installed for use
- Always load the opposite inserts / buckets of the rotors with the same accessories and fill to avoid imbalance.

**Centrifugation with vessels of various sizes**

Working with vessels of various sizes is possible. In this case, however it is very important that the rotationally symmetrical inserts are identical.

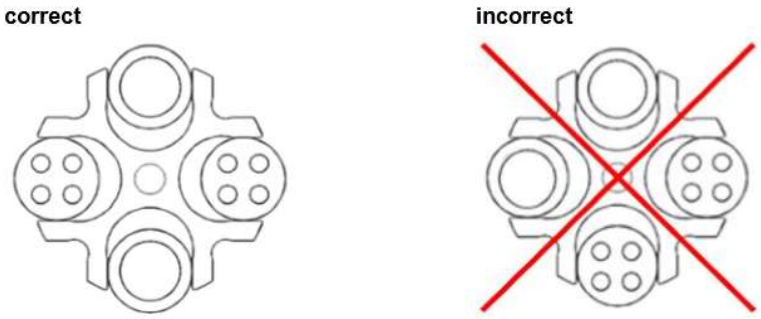



*Fig. 6: Permissible and impermissible loading of a swing-out rotor with vessels of various sizes (example illustration)*

# 6. Using the centrifuge

## 6.9 Centrifugation with low capacity

- Install the tubes symmetrically so that the buckets and their inserts are locked evenly.
- It is not permissible to load angle-rotors on only one axis.
- Install the tubes symmetrically so that the buckets and their inserts are loaded evenly.

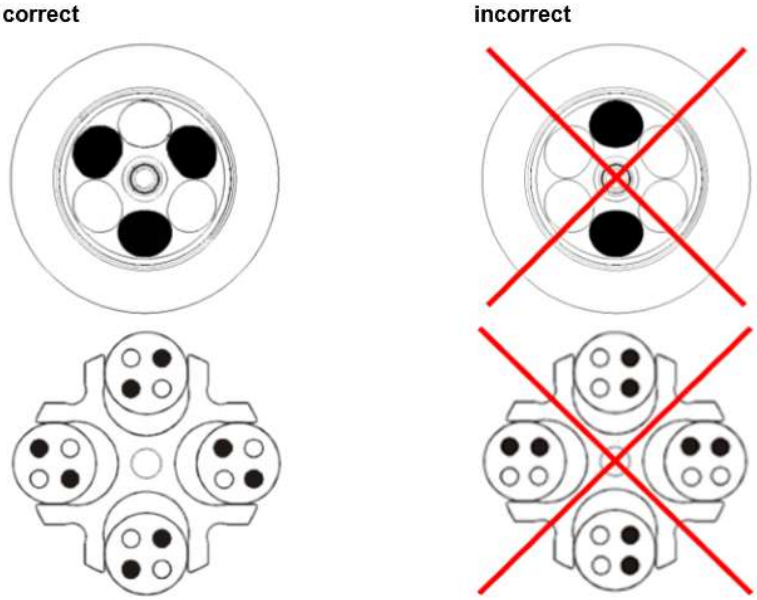



*Fig. 7: Permissible and impermissible loading of an angle rotor and swing-out rotor. (example illustration)*

# 6. Using the centrifuge

## 6.10 Adapters

- Load the opposite adapters with the same number of vessels and with the same weights in order to avoid imbalance
- If all compartments of a carrier are not used, the buckets must be loaded evenly. Do not load only the edges.

## 6.11 Vessels

- Load the tubes outside of the centrifuge. Liquids in the buckets or multiple carriers cause corrosion.
- Fill the tubes carefully and arrange them according to their weight. Imbalances result in the excessive wear of the bearings.
- In high-speed angle rotors, the vessels must be filled up to their indicated volume (the volume stated for the vessel). If the vessels are only partially filled, they will deform. This will result in leakages.

## 6.12 Maximum speed for tubes

Some tubes, such as centrifuge glass tubes, micro tubes, culture tubes, fluoropolymer tubes are especially high-volume tubes can be used in our rotors, buckets, and adapters at higher speeds than their breaking limit.



**NOTE**

When using glass vessels, the maximum value of 4,000 x g must not be exceeded (except special high-strength glass tubes; please refer to the information provided by the manufacturer).

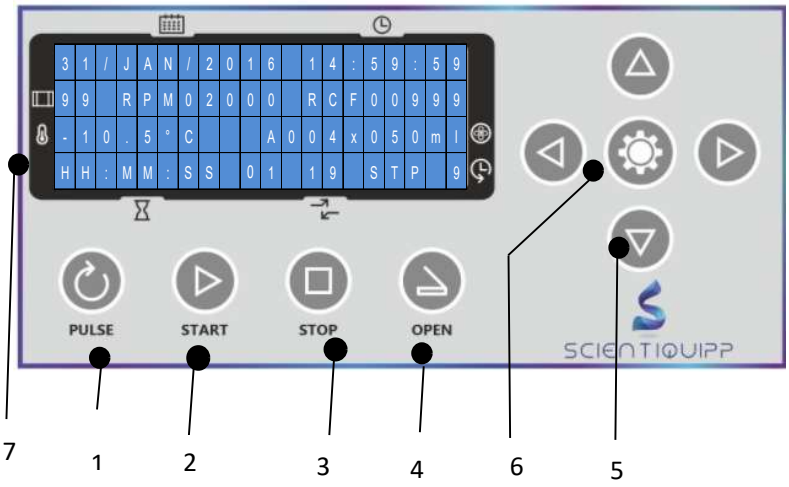
# 6. Using the centrifuge

## “Top spin” control system

### 6.13 User interface

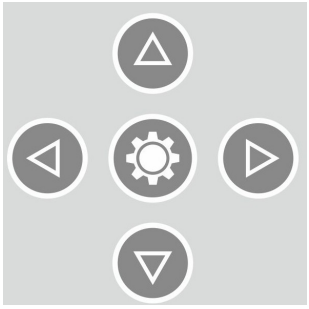
Mounted at an angle on the centrifuge front for easy visibility and access, the control panel comprises parameter keys and digital displays. The power switch isa two-position rocker switch (ON/OFF).

**1** Pulse button
**2** Start button
**3** Stop button
**4** Lid button
**5** Cursor buttons
**6** Settings button
**7** LCD Display




### 6.14 Parameter Keys

Parameter keys are used for the following:



- Start/Stop
- LID open
- Program Number
- Rotor Number
- Speed (RPM/RCF)
- Temperature
- Run Time
- Acceleration /Deceleration
  Last run History

## 6. Using the centrifuge

| Key | Function |
|---|---|
|  | UP & DOWN keys are used in incrementing and decrementing the parameters while programming. |
|  | |
|  | LEFT and RIGHT arrow keys are used in the shift cursor position while programming |
|  | |
|  | SET key is use to enter in setup mode |
|  | PULSE key enables quick spin operation until pressed. |
|  | START key is used for starting the run. |
|  | STOP key is used for stopping the run. |
|  | LID key will operate the lid lock. The micro-processor will enable this operation only if the motor is at rest. |

## 6.15 Manual mode

### 6.15.1 Starting a centrifugation run

The centrifuge is ready for operation when the start key is pressed. Press the start key in order to start a centrifugation run.

### 6.15.2 Interrupting a centrifugation run

Press the stop key in order to interrupt the centrifugation run. The centrifugation run will be terminated prematurely.

### 6.15.3 Quick stop

Press the stop key
The centrifuge decelerates with the maximum deceleration curve.
After a quick stop, the centrifuge lid must be opened before a new centrifugation run can be started

### 6.15.4 Interrupting a deceleration process

Press the start key during a deceleration process in order to interrupt it and to restart the centrifuge

### 6.15.5 Selection, display and modification of data

The ‘‘standard’’ menu is displayed.

- Press the settings button. The display starts to flash and the modification mode is active
- Use the cursor keys in order to scroll to the various fields and modify the data.
- Press the settings button to set the value of the selected field.
- Once the values are set, you can press the start button to start the process.

### 6.15.6 Standard menu

- The ‘‘standard menu’’ will be displayed on the display after the centrifuge has been switched on. In this menu, the parameters of a centrifugation run can be displayed and modified.

### 6.15.7 Display & Function

When the centrifuge power is switched on, the digital display shows the operating parameters of the previous run.

### 6.15.8 Speed

In the second row, the actual speed of the centrifuge is displayed. The values are stated in revolutions per minute (min-1 = rpm) and depend on the RCF values (see chapter 2.2.2.1 - "Speed, radius, and relative centrifugal force"). The maximum speed values depend on the rotor that is used. Desired speed from 900 to 20,000 RPM can be selected depending on the rotor.

# 6. Using the centrifuge

## 6.15.9 Relative centrifugal force (RCF)

The relative centrifugal force is the acceleration that the sample is subjected to during the centrifugation run. The set value of this parameter is displayed on the right side of the second row. The value is stated in g (gravitational acceleration) and depends on the speed value. The maximum RCF value depends on the rotor that is used.

## 6.15.10 Temperature

The set temperature is displayed in the third row on the left side of the display, with the current chamber temperature shown. Temperatures between -10°C and 40°C can be preselected.

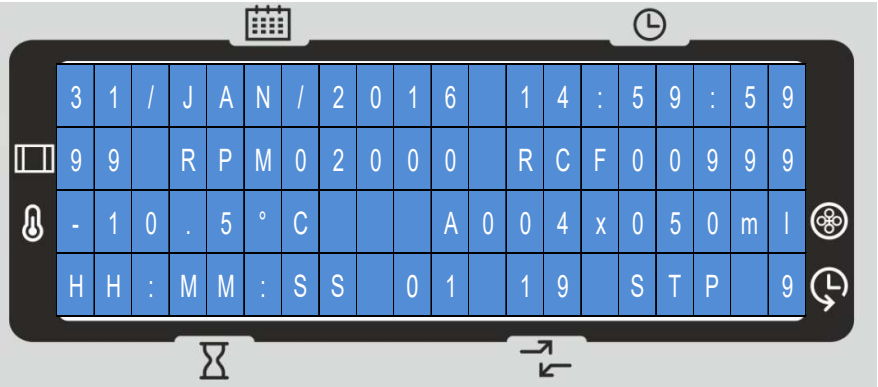
## 6.15.11 Run-time

The set runtime is displayed in the lower left section of the display. The runtime is defined as the period from the start of the centrifuge to the beginning of the deceleration phase. The maximum value is 99 h 59 min 59 sec.

## 6.16 Short run or pulse

A short run can be started if no run is active.

- Keep the pulse button pressed during the short run.
- During the short run, the centrifuge accelerates with pre-set acceleration curves until the maximum speed of the rotor is reached.
- The runtime is counted and in the speed field the message "SPN"(SPIN) flashes & stopwatch starts.
- When the PULSE button is released, the centrifuge decelerates with the pre-set deceleration curve to a standstill.
-




- The Seven parameters are displayed on the 20x4 LCD.
- The appropriate legend is printed near each display.

### 6.16.1Date
This field shows the current date in the following format: day / month / year

### 6.16.2 Real time clock
This field shows the current time

### 6.16.3 Program Number
This field shows the program that is currently loaded. When the field is selected, the program list is displayed. The users can store up to 99 different programs + pre-cooling; predefined program 00.

### 6.16.4 Continuous Run
During the continuous run, the run-time of the centrifuge is unlimited and must be stopped manually. The centrifuge accelerates during the continuous run until the set speed is reached.

## 6.17 Rotor, rotor selection list
This field shows the rotor that is currently being used. A list with all of the possible rotors is pre-programmed on the machine. Once the Rotor is mounted on the motor shaft and the process is started, the instrument will automatically recognize the deployed rotor.

## 6.18 Automatic Rotor identification (ARIS)
The centrifuge automatically identifies the rotor that is currently being used, when it reaches a speed of 800RPM. If the system identifies a different rotor than the one that is set, the rotor input will be adapted automatically. If the system cannot identify the rotor, an error message will be displayed. The rotor cannot be used in the centrifuge. This prevents the maximum permissible speed from being exceeded.

## 6.19 Acceleration ↗
This function is used to select an acceleration curve. One can select a linear rise (curves 0-9) or a quadratic rise (10-19).

## 6.20 Deceleration (brake) ↘
This function is used to select a curve that decelerates the centrifuge to a standstill. Deceleration curves are inverted images of the acceleration curves and are labeled with identical numbers. Deceleration curve no. 0 represents a brakeless deceleration.

## 6.21 Pre-cooling
The centrifuge may require pre-cooling depending on the substance being centrifuged.
Precooling prevents cool samples in the uncooled centrifuge from heating up to an inadmissible temperature. If the Pre-cooling function is activated, the centrifuge starts to precool after it is switched on and ‘‘PRE-COOL’’ is displayed in the temperature field. The lid must be shut.

# 6. Using the centrifuge



**CAUTION**

- Unmoved air in the rotor chamber leads to an incorrect measuring and control behavior and causes the compressor to freeze over.
- At temperatures below 0°C, aqueous liquids will freeze, thereby preventing sedimentation.
- Do not cool the rotor below 0°C at a standstill.

## 6.22 Display temperature unit

The temperature can be displayed in °C (Celsius) or °F (Fahrenheit).



**CAUTION**

Cooling is inactive when the lid is open. This will cause the samples to warm-up.

## 6.23 System history cycles

This field shows the last 9 cycles, the run-time of the rotor and the date and time of use.

## 6.24 Changing an acceleration curve

- Select the "curve" from the menu.
- Select a curve number between 00 to 19 in the input fields.
- The maximum total runtime of a curve depends on the slope of the curve and the final speed of the rotor.



**NOTE**

Curves cannot be changed during a centrifugation run.

## 6.25 Program mode

- A program contains all the data required for a centrifuge run.
- Programs can be loaded, executed, edited and deleted when the Centrifuge is at a standstill.
- A maximum of 99 programs can be stored under the numbers 1-99.
- The program "Pre-Cool" does not occupy any storage location and cannot be deleted. It is used to bring the centrifuge to a specific temperature without any vessels.
- "--" means that the values that are currently set are not a stored program.

# 7. Malfunction and error correction

## Malfunction and error correction

### 7.1 General Malfunctions

Malfunctions are indicated by a dialog box. If the acoustic signal is activated, it sounds when the error message is displayed.

Eliminate the source of the problem (see table below).



**NOTE**

- Error messages can be eliminated by pressing the STOP key.
- The error itself will not be eliminated, but the centrifuge can't be operated again.

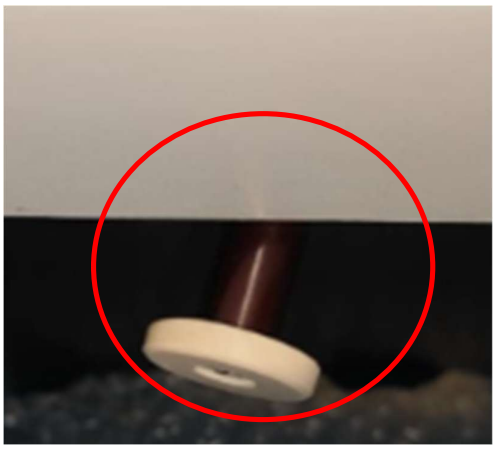
| Type of Error | Possible Reason | Correction |
|---|---|---|
| No indication on the display | • No power in the mains supply<br>• Power cord not plugged in<br>• Fuses have tripped<br>• Mains power is switched off | • Check fuse in the main supply<br>• Plug in the power cord correctly<br>• Switch mains power on |
| Centrifuge cannot be started:<br>Start key is not functioning | • Several | • Power off/on the centrifuge. If the error occurs again contact service |
| Centrifuge cannot be started. Lid open indication on display | • The lid lock is not closed correctly | • Open and close the lid. If the error occurs again, contact service |
| Centrifuge decelerates during operation | • Brief mains power failure<br>• System error | • Press the start key in order to re-start the centrifuge<br>• Power on/off. If the error occurs again contact service |
| Imbalance dialog box is displayed | • Improper loading<br>• Centrifuge is inclined<br>• Drive problem<br>• Centrifuge was shifted during the run<br>• Ungreased load-bearing bolts | • Balance load and restart the centrifuge<br>• If he error occurs again contact service<br>• Clean and grease load bearing bolts |
| Lid cannot be opened | • Lid lock has not been released<br>• Lid seal sticks | • Unlock the lid manually<br>• Clean the lid seal and apply talcum powder to the gasket |
| Temperature value cannot be reached (only for refrigerated centrifuges) | • Condenser dirty (only refrigerated units) | • Clean the condenser If the error occurs again contact service |

# 7. Malfunction and error correction

## 7.2 Emergency lid release

In the event of a power failure, it is possible to manually open the centrifuge lid.

- Switch off the mains power switch and disconnect the power cord from the socket.
- Pull the pulley located directly below the display panel after the rotor comes to a standstill.





**WARNING**

- Do not unlock or open the lid unless the rotor is at a standstill.
- If the lid is opened via the emergency lid release system during a centrifuge run, the centrifuge rotor will commence deceleration in an un-braked manner.

# 7. Malfunction and error correction

## 7.3 Table of error codes

| Kind of error | Measures | Note |
|---|---|---|
| System error | ▪ Allow to slow down<br>▪ Power OFF/ON | ▪ All these errors stop the<br>▪ centrifuge or cause it to<br>▪ decelerate brakeless |
| Temperature error (only for refrigerated centrifuges) | ▪ Allow to slow down<br>▪ Power off | ▪ With this, centrifuge may run but without temperature control<br>▪ Display shows "— NC—" |
| Imbalance error | ▪ Allow to slow down<br>▪ Power off<br>▪ Eliminate the imbalance | ▪ Centrifuge decelerates<br>▪ Display shows "IMBALANCE" |
| Lid error | ▪ Press lid key<br>▪ Close lid<br>▪ Remove foreign matter from the opening of the lid lock device | ▪ Centrifuge may not start<br>▪ Display shows "LID OPEN" |
| Communication error | ▪ Allow to slow down<br>▪ Power OFF/ON | ▪ Centrifuge decelerates<br>▪ Display shows "VFD Error" |



**NOTE**

If it is impossible to eliminate the errors, contact service!

## 7.4 Service contact

In the event of queries, malfunctions, or spare part enquiries:

**From India**

**Scientiquipp Pvt. Ltd**
Unit No C/101, First Floor, CWing, Shanti Industrial Premises,
S N Road, Tambe Nagar, Mulund West, Mumbai – 400080.
Maharashtra, India
**Outside India**

Contact our agency in your country. All agencies are listed at
www.scientiquipp.com [sales partners]



**NOTE**

- If you would like to utilise our service, please state the type of your centrifuge and its serial number.

# 8. Maintenance and Service

## 8.1 Maintenance

The centrifuge, rotor and accessories are subject to high mechanical stress. Thorough maintenance performed by the user extends the service life and prevents premature failure.



**CAUTION**

If corrosion or other damage occurs due to improper care, the manufacturer cannot be held liable or subject to any warranty claims.

- Use soap water or other water soluble, mild cleaning agents with a pH value between 6 and 8 for cleaning the centrifuge and accessories (see also chapter 8.2 – sterilisation and disinfection of the rotor chamber and accessories")
- Avoid corrosive and aggressive substances
- Do not use solvents
- Do not use agents with abrasive particles
- Do not expose the centrifuge to intensive UV radiation or thermal stress.

## 8.2 Centrifuge

- Unplug the mains power plug before cleaning.
- Carefully remove all liquids, including water and particularly all the solvents, acids, and alkaline solutions from the rotor chamber, using a cloth in order to avoid damage to the motor bearings.
- If the centrifuge has a built-in solenoid condensate drain, flush out the same by pouring a few drops of water with a mild cleaning agent.
- 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).



**WARNING**

Take suitable precautions for your own safety if there is a risk of toxic, radioactive, or pathogenic contamination.

### 8.3 Condenser (only refrigerated centrifuges)

In order to cool the refrigerant that is compressed by the refrigeration unit, a condenser is used. It is cooled by air. Dust and dirt obstruct the cooling flow of air. The dust on condenser pipes and the lamellas, reduces the heat exchange and thus the performance of the refrigeration unit. This is why the installation site should be as clean as possible.

- Check the condenser at least once a month for dirt and clean it if necessary.
- If you have any queries, please contact service (see chapter ''service contact'').

# 8. Maintenance and Service

## 8.4 Accessories



**WARNING**

Take suitable precautions for your own safety if there is a risk of toxic, radioactive, or pathogenic contamination.

- 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 in order to clean the bores of angle rotors.
- Turn the rotor upside down and allow it to dry completely.
- Remove accessories from the centrifuge, and clean at least once a 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 (depending on the type of contamination).
- Take suitable precautions for your own safety if there is a risk of toxic, radioactive, or pathogenic contamination.
- Dry the accessories with a soft cloth or in a drying chamber at approx. 50°C.



**CAUTION**

For the care of the accessories, special safety measures must be considered, as these are measures that will ensure operational safety.

## 8.5 Plastic accessories



**WARNING**

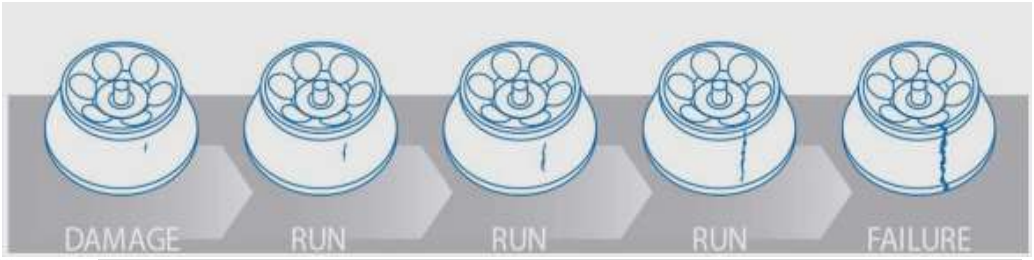
Plastic accessories must not be greased!

## 8.6 Rotors, buckets and carriers

- Rotors, buckets and carriers are produced with the highest precision, in order to withstand the permanent high stress from high gravitational fields.
- Chemical reactions as well as stress-corrosion (combination of oscillating pressure and chemical reaction) can affect or destroy the metals.
- Barely detectable stress fractures on the surface can expand and weaken the material without any visible signs.
- Check the material regularly (at least once a month) for
  – Cracks
  – Visible damage of the surface

– Pressure marks
– Signs of corrosion
– Other changes

- Check the bores of the rotors and multiple carriers.
- Replace any damaged components immediately for your own safety.
- Grease the rotor tie-down screw after cleaning with grease for load bearing bolts and spread the grease with a cloth.




**CAUTION**

- Do not clean the accessories in a dishwasher.
- Cleaning in a dishwasher removes the anodized coating; the result is cracking in areas that are subject to stress.

## 8.7 Load bearing bolts

- Only greased load bearing bolts ensure the even swinging of the buckets, and therefore the quiet run of the centrifuge. Non-greased bolts can lead to a system shut-down due to imbalances.
- Apply a small quantity of grease to the load bearing bolts of the rotor and buckets after each cleaning.

## 8.8 Glass breakage

- Glass particles will damage the surface coating (e.g. anodizing) of the buckets, which will then lead to corrosion.
- Glass particles in the rubber cushions of the buckets will cause glass breakage again.
- Glass particles on the pivot bearing of the load- bearing bolts prevent the buckets and carriers from swinging evenly, which will cause an imbalance.
- Glass particles in the rotor chamber will cause metal abrasion due to the strong air circulation. This metal dust will not only pollute the rotor chamber, rotor, and materials to be centrifuged, but also damage the surfaces of the accessories, rotors, and rotor chamber.

# 8. Maintenance and Service



**CAUTION**

In the case of glass breakage, immediately remove all glass particles (e.g. with a vacuum cleaner). Replace the rubber cushions, since even thorough cleaning will not remove all glass particles.

In order to completely remove glass particles and metal dust from the rotor chamber:

- Grease the upper third of the rotor chamber with e.g. Vaseline.
- Then, let the rotor rotate for a few minutes at a moderate speed (approx. 2000 rpm). The glass and metal particles will now collect at the greased part.
- Remove the grease with the glass and metal particles, with a cloth.
- If necessary, repeat this procedure.
-

## 8.9 Sterilization and disinfection of the rotor chamber and accessories

- Use commercially available disinfectants such as, Isopropyl Alcohol available at chemist's shops or drugstores).
- The centrifuge and the accessories consist of various materials.
- A possible incompatibility must be considered.
- Before using cleaning or decontamination agents that have not been recommended by us, contact the manufacturer to ensure that such a procedure will not damage the centrifuge.
- For autoclaving, consider the continuous heat resistance of the individual materials.

Please contact us if you have any queries



**DANGER**

If dangerous materials (e.g., infectious and pathogenic substances) are used, the centrifuge and accessories must be disinfected.

## 8.10 Autoclaving

The service life of the accessories essentially depends on the frequency of autoclaving and use.

- Replace the accessories immediately when the parts show leakage or changes in color or structure.
- During autoclaving, the caps of the tubes must not be screwed on, in order to avoid the deformation of the tubes.

# 8. Maintenance and Service



**NOTE**

Plastic parts, e.g., lids or carriers, may deform during autoclaving.

## 8.11 Service



**DANGER**

In the event of service work that requires the removal of panels, there is a risk of electric shock or mechanical injury. Only qualified specialist personnel are authorized to perform this service work.

The centrifuge is subject to high mechanical stress. In order to be able to withstand this high level of stress, high-quality components have been used during the manufacture of the centrifuge. Nevertheless, wear cannot be excluded and it may not be visible from the outside (especially the rubber parts that are – among other things, – part of the motor suspension, which are subject to ageing). This is why we recommend having the centrifuge checked by the manufacturer once a year, in the operating state, and once every three years in the dismantled state. Rubber parts should be replaced every three years.

Information and appointments:

**In India**
Contact
Scientiquipp Pvt. Ltd



**NOTE**

- If you would like to utilise our service, please state the type of your centrifuge and its serial number.

# 8. Maintenance and Service

## 8.12 Return of defective centrifuges or parts

Although we exercise great care during the manufacture of our products, it may be necessary to return a unit or accessory. In order to ensure the quick and economical processing of returns of centrifuges, spare parts, or accessories, we require complete and extensive information concerning the process.

Please fill in the forms completely, sign them, enclose them with the return package, and send them together with the product to:

**Scientiquipp Pvt. Ltd**
Unit No C/101, First Floor, C Wing, Shanti Industrial Premises,
S N Road, Tambe Nagar, Mulund West, Mumbai – 400080.
Maharashtra
India

## 8.13 Declaration of Decontamination

As a certified company and due to the legal regulations for the protection of our employees and of the environment, we are obliged to certify the harmlessness of all incoming goods. For this purpose, we require a declaration of decontamination.

- The form must be filled in completely and signed by authorized and specialized personnel only.
- Affix the original form in a clearly visible manner, to the outside of the packaging.



**NOTE**

We will return the unit if no declaration of decontamination is provided

## 8.14 Forms for the Return of Defective Parts

This form is for product related data. This facilitates the assignment, and enables the quick processing of the return. If several parts are returned together in one package, please enclose a separate problem description for each defective part. A detailed problem description is necessary in order to perform the repair quickly and economically.



**NOTE**

If the form does not include a description of the malfunction, neither a refund nor a credit note can be issued. In this case, we reserve the right to return the parts to you at your expense.

Upon request, we will prepare and submit to you a cost estimate prior to performing the repair. Upon request, we will prepare and submit to you a cost estimate prior to performing the repair. Please confirm such cost estimate within 14 days. If the cost estimate has still not been confirmed after4 weeks, we will return the unit. Please note that you must bear the incurred costs. The unit must be packaged in a transport-safe manner. Please use the original packaging, if possible. If the product is dispatched to us in unsuitable packaging, you will be charged the cost for returning it to you in new packaging.

## 8.15 Disposal of the Centrifuge



In case the product is to be disposed, the relevant legal regulations are to be observed. Information on the disposal of electrical and electronic devices can be found on our website.

## 8.16 Disposal of the Packaging

Use the packaging to return the centrifuge for disposal or dispose of the packaging, after having separated the individual materials.

Comply with all local rules and regulations.

## 8.17 Ambient Conditions



**NOTE**

- At a nominal voltage of 230V, a tolerance of +10% / -5% applies.
- For indoor use only.
- Permissible ambient temperature +5°C to +35°C.
- Max. relative humidity of air 80% up to 31°C with a linear decrease to67% relative humidity of air at 35°C.
- Maximum altitude: 2,000 m above sea level.

# 9.Technical data

## 9.1 Technical data

| | |
|---|---|
| **Manufacturer** | **SCIENTIQUIPP PVT. LTD**<br>UNIT NO C/101, FIRST FLOOR, CWING, SHANTI INDUSTRIAL PREMISES,<br>S N ROAD, TAMBE NAGAR, MULUNDWEST,<br>MUMBAI – 400080.<br>MAHARASHTRA<br>INDIA |
| Type | **ROTA 6R V/FM** |
| **Connection requirements** | |
| Electrical connection | See name plate |
| Protection class | I |
| IP code | 20 |
| Connected load (kva) | 1.35 |
| Power consumption (kw) | 1700 W |
| Voltage \| Hz | 230 V +/-10% 50Hz |
| Input fuse (at) | 20 (AMP) |
| **Performance data** | |
| Max speed (rpm): | 14,000 |
| Max capacity (ml): | 2000ml (Swing-out Rotor - 4x500ml) |
| | 1500ml (Fixed-angle Rotor – 6x250ml) |
| Max. gravitational field (x g) | 25,901xg |
| **Other parameters** | |
| Time range | 10 sec – 99h 59min, short run continuous run |
| Temperature range | -20°C to +40°C |
| | |
| **Physical data** | |
| Height (mm): | 450 mm |
| Height with open lid (mm): | 980 mm |
| Width (mm): | 810 mm |
| Depth (mm): | 700 mm |
| Weight (kg): | 100 (KG) |
| Noise level (db(a)): | ≤58 db (a) |
| | |
| **Refrigerant data** | |
| Refrigerant: | R-134a |
| Filling quantity (kg): | 0.800 |
| Pressure (bar): | 25 |
| CO2 equivalent (t) | 0.715(t) |

Scientiquipp reserves the right to change technical specification without prior notice.

# 9. Technical data

## 9.2 Ambient conditions

The figures are valid for an ambient temperature of +23°C and a nominal voltage of ±10%. The minimum temperature is ≤ +4°C and depends on the rotor type, speed and ambient temperature.

- For indoor use only
- Allowable ambient temperature +5°C to +35°C
- Max. relative humidity of air 80% up to 31°C with a linear decrease to 67% relative humidity of air at 35°C
- Maximum altitude 2,000 meters above sea level.

## 9.3 Technical documentation

For environmental reasons, the comprehensive technical documentation of the centrifuge (e.g. circuit diagrams) and the safety data sheets of the manufacturers of refrigerants and lubricants are not attached to this documentation. You can order these documents from our service department.

# 10. Appendix

## Appendix

### 10.1 Range of accessories

The complete list of accessories can be downloaded from **www.scientiquipp.com**

### Rotor Radius

The information in the accessories table concerning the radius refers to the values of the respective rotor as shown below. The radius calculation is described in chapter ‘‘speed, radius and relative centrifugal force’’.

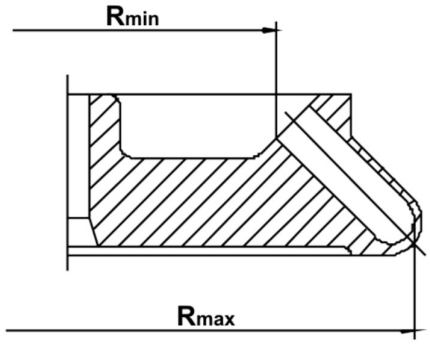



*Fig.30: Minimum and Maximum radius of an angle rotor*

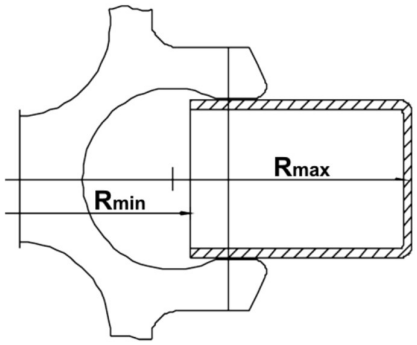



*Fig.31: Minimum and Maximum radius of a swing-out rotor*

# 10. Appendix

## 10.2 Speed Gravitational-Field Diagram (Nomo-graph)

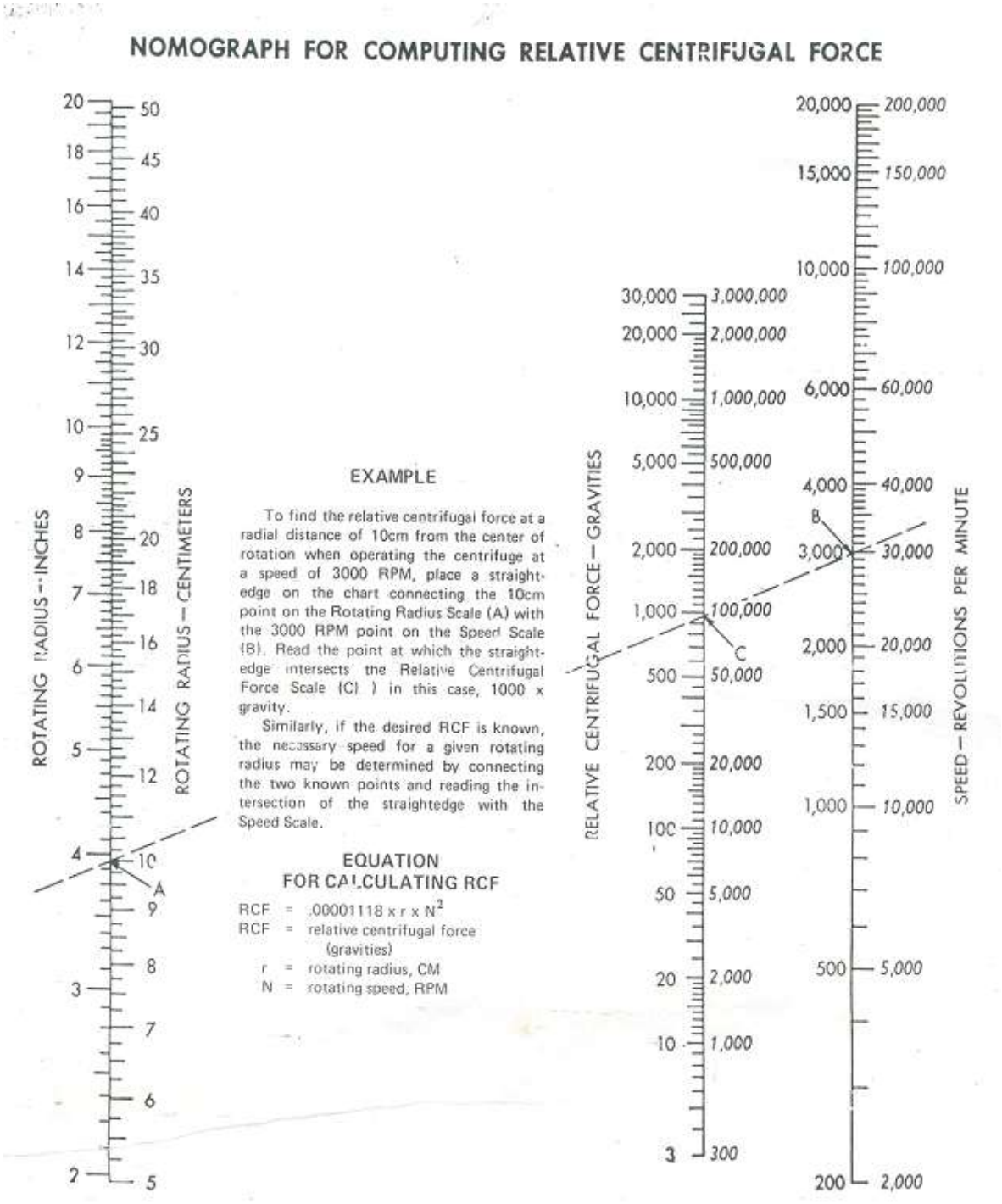



*Fig.32: Speed gravitational field diagram*

# 10. Appendix

## 10.3 Acceleration and Deceleration Curves

Linear as well as quadratic curves are numbered in the direction of increasing acceleration. The deceleration curves are inverted images of the acceleration curves and are assigned the same numbers. An exception is curve 0. It decelerates brakeless (spin-out). In general, the runtime, until the set speed is reached, depends on the moment of inertia of the rotor.

## 10.4 Linear Curves

The slope of the fixed acceleration curves defines the time that is required to accelerate the rotor by 1,000 rpm. Curve 9 is a special case compared to the other curves. The centrifuge accelerates with maximum power. The runtime, until the set speed is reached, depends solely on the moment of inertia of the rotor.

| Acceleration & Deceleration Value On LCD | Time Required To Achieve Zero To Set Speed & Set Speed To Zero |
|---|---|
| **Linear curve no. 0** | Slope of 4 [rpm/sec] |
| **Linear curve no. 1** | Slope of 6 [rpm/sec] |
| **Linear curve no. 2** | Slope of 8 [rpm/sec] |
| **Linear curve no. 3** | Slope of 17 [rpm/sec] |
| **Linear curve no. 4** | Slope of 25 [rpm/sec] |
| **Linear curve no. 5** | Slope of 33 [rpm/sec] |
| **Linear curve no. 6** | Slope of 50 [rpm/sec] |
| **Linear curve no. 7** | Slope of 100 [rpm/sec] |
| **Linear curve no. 8** | Slope of 300 [rpm/sec] |
| **Linear curve no. 9** | Slope of 1000 [rpm/sec] |

**Fig.33: Slope of linear curves**

## 10.5 Quadratic Curves

Curve 19 is a special case compared to the other curves. The centrifuge accelerates with maximum power. The runtime depends solely on the moment of inertia of the rotor.

| Quadratic curve no. | Time until 1,000 rpm | Slope as of 1,000 |
|---|---|---|
| 10 | 500 sec | 4 [rpm/sec] |
| 11 | 333 sec | 6 [rpm/sec] |
| 12 | 250 sec | 8 [rpm/sec] |
| 13 | 118 sec | 17 [rpm/sec] |
| 14 | 80 sec | 25 [rpm/sec] |
| 15 | 60 sec | 33 [rpm/sec] |
| 16 | 40 sec | 50 [rpm/sec] |
| 17 | 20 sec | 100 [rpm/sec] |
| 18 | 08 sec | 300 [rpm/sec] |
| 19 | 2 sec | 1.000 [rpm/sec] |

## Linear Curves

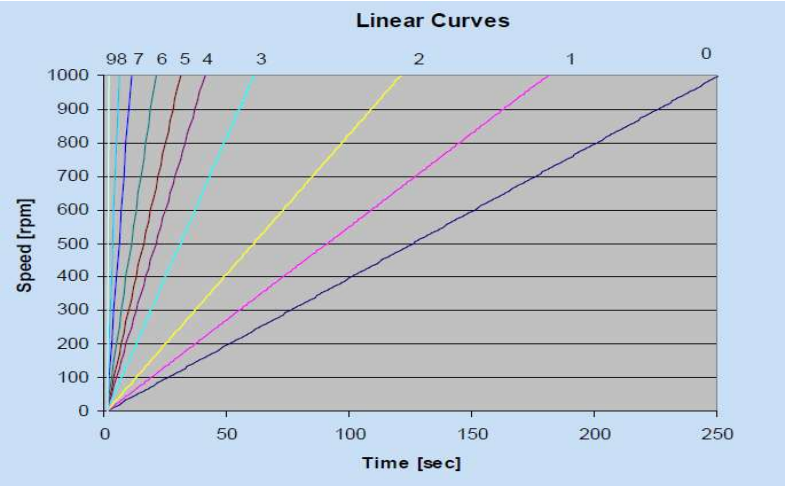



Fig.35: Diagram of Linear curves

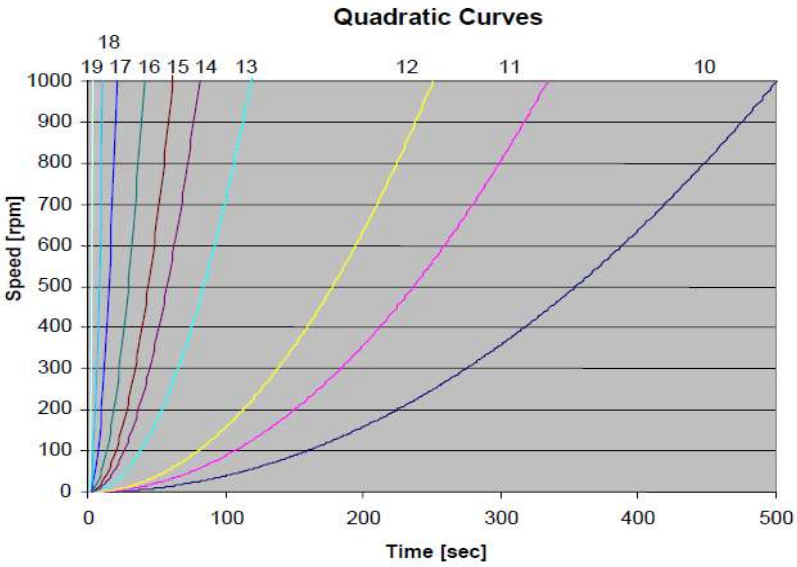



Fig.36: Diagram of Quadratic curves

# 10. Appendix

## 10.6Resistance data

| NOTE | This data refers to resistance at 20° |
|---|---|

| - no data<br>1 resistant<br>2 practically resistant<br>3 partially resistant<br>4 not resistant | | Concentration | High Density Polyethylene | Polyamide | Polycarbonate | Polyoxymethylene | Polypropylene | Polysulfone | Polyvinyl chloride, hard | Polyvinyl chloride, soft | Polytetrafluorethylene | Acrylonitrile-butadiene-caoutchouc | Aluminium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Medium** | **Formula** | **[%]** | **HDPE** | **PA** | **PC** | **POM** | **PP** | **PSU** | **PVC** | **PVC** | **PTFE** | **NBR** | **AL** |
| Acetaldehyde | $C_2H_4O$ | 40 | 3 | 2 | 4 | 2 | 3 | 4 | 4 | - | 1 | 4 | 1 |
| Acetamide | $C_2H_5NO$ | saturated | 1 | 1 | 4 | 1 | 1 | 4 | 4 | - | 1 | - | 1 |
| Acetone | $C_3H_6O$ | 100 | 1 | 1 | 4 | 1 | 1 | 4 | 4 | - | 1 | 4 | 1 |
| Acrylonitrile | $C_3H_3N$ | 100 | 1 | 1 | 4 | 3 | 3 | 4 | 4 | 4 | 1 | 4 | 1 |
| Allyl alcohol | $C_3H_6O$ | 96 | 1 | 3 | 3 | 2 | 2 | 2 | 2 | 4 | 1 | 1 | 1 |
| Aluminium chloride | $AlCl_3$ | saturated | 1 | 3 | 2 | 4 | 1 | - | 1 | - | 1 | 1 | 4 |
| Aluminium sulfate | $Al_2(SO_4)_3$ | 10 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Ammonium chloride | $(NH_4)Cl$ | aqueous | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| Ammonium hydroxide | $NH_3 + H_2O$ | 30 | 1 | 3 | 4 | 1 | 1 | 2 | 1 | - | 1 | - | 1 |
| Aniline | $C_6H_7N$ | 100 | 1 | 3 | 4 | 1 | 2 | 4 | 4 | 4 | 1 | 4 | 1 |
| Anisole | $C_7H_8O$ | 100 | 3 | 4 | 4 | 1 | 4 | 4 | 2 | - | 1 | 4 | 1 |
| Antimony trichloride | $SbCl_3$ | 90 | 1 | 4 | 1 | 4 | 1 | - | 1 | - | 1 | - | 4 |
| Benzaldehyde | $C_7H_6O$ | 100 | 1 | 3 | 4 | 1 | 1 | 3 | 4 | 4 | 1 | 4 | 1 |
| Benzene | $C_6H_6$ | 100 | 3 | 2 | 4 | 1 | 3 | 4 | 4 | - | 1 | 4 | 1 |
| Boric acid | $H_3BO_3$ | aqueous | 1 | 3 | 1 | 2 | 1 | - | - | - | 1 | 1 | 1 |
| Butyl acrylate | $C_7H_{12}O_2$ | 100 | 1 | 2 | 4 | 2 | 3 | 4 | 4 | 4 | 1 | - | 1 |
| Butyl alcohol, normal | $C_4H_{10}O$ | 100 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 4 | 1 | 1 | 1 |
| Calcium chloride | $CaCl_2$ | alcoholic | 1 | 4 | 2 | 3 | 1 | - | - | 4 | 1 | 1 | 3 |
| Carbon disulfide | $CS_2$ | 100 | 4 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 1 | 3 | 1 |
| Carbon tetrachloride (TETRA) | $CCl_4$ | 100 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 4 | 1 | 3 | 1 |
| Chlorine | $Cl_2$ | 100 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | - | 3 |
| Chlorine water | $Cl_2 \times H_2O$ | | 3 | 4 | 4 | 4 | 3 | - | 3 | 3 | 1 | - | 4 |
| Chlorobenzene | $C_6H_5Cl$ | 100 | 3 | 4 | 4 | 1 | 3 | 4 | 4 | 4 | 1 | 4 | 1 |
| Chloroform | $CHCl_3$ | 100 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 1 | 4 | 3 |

# 10. Appendix

| - no data<br>1 resistant<br>2 practically resistant<br>3 partially resistant<br>4 not resistant | | Concentration | High Density Polyethylene | Polyamide | Polycarbonate | Polyoxymethylene | Polypropylene | Polysulfone | Polyvinyl chloride, hard | Polyvinyl chloride, soft | Polytetrafluorethylene | Acrylonitrile-butadiene-caoutchouc | Aluminium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Medium** | **Formula** | **[%]** | **HDPE** | **PA** | **PC** | **POM** | **PP** | **PSU** | **PVC** | **PVC** | **PTFE** | **NBR** | **AL** |
| Chromic acid | $CrO_3$ | 10 | 1 | 4 | 2 | 4 | 1 | 4 | 1 | - | 1 | 4 | 1 |
| Chromic potassium sulphate | $KCr(SO_4)_2 \times 12H_2O$ | saturated | 1 | 2 | 1 | 3 | 1 | - | 1 | - | 1 | - | 3 |
| Citric acid | $C_6H_8O_7$ | 10 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Citric acid | $C_6H_8O_7$ | 50 | 1 | 3 | 1 | 2 | 1 | - | - | - | 1 | 1 | 1 |
| Copper sulphate | $CuSO_4 \times 5H_2O$ | 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |
| Cyclohexanol | $C_6H_{12}O$ | 100 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 4 | 1 | 2 | 1 |
| Decane | $C_{10}H_{22}$ | 100 | - | 1 | 2 | 1 | 3 | - | - | - | 1 | 2 | 1 |
| Diaminoethane | $C_2H_8N_2$ | 100 | 1 | 1 | 3 | 1 | 1 | - | 3 | 4 | 1 | 1 | 1 |
| Diesel fuel | — | 100 | 1 | 1 | 3 | 1 | 1 | - | 1 | 3 | 1 | 1 | 1 |
| Dimethyl formamide (DMF) | $C_3D_7NO$ | 100 | 1 | 1 | 4 | 1 | 1 | 4 | 3 | - | 1 | 3 | 1 |
| Dimethyl sulfoxide (DMSO) | $C_2H_6SO$ | 100 | 1 | 2 | 4 | 1 | 1 | 4 | 4 | - | 1 | - | 1 |
| Dimethylaniline | $C_8H_{11}N$ | 100 | - | 3 | 4 | 2 | 4 | - | - | - | 1 | - | 1 |
| Dioxane | $C_4H_8O_2$ | 100 | 2 | 1 | 4 | 1 | 3 | 2 | 3 | 4 | 1 | 3 | 1 |
| Dipropylene glycol (mono)methyl ether | $C_4H_{10}O$ | 100 | 3 | 1 | 4 | 1 | 4 | 4 | 4 | 4 | 1 | - | 1 |
| Ethyl acetate | $C_4H_8O_2$ | 100 | 1 | 1 | 4 | 1 | 1 | 4 | 4 | 4 | 1 | 4 | 1 |
| Ethylene chloride | $C_2H_4Cl_2$ | 100 | 3 | 3 | 4 | 1 | 3 | 4 | 4 | 4 | 1 | - | 1 |
| Ferrous chloride | $FeCl_2$ | saturated | 1 | 3 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | - | 4 |
| Formaldehyde solution | $CH_2O$ | 30 | 1 | 3 | 1 | 1 | 1 | - | - | - | 1 | 2 | 1 |
| Formic acid | $CH_2O_2$ | 100 | 1 | 4 | 3 | 4 | 1 | 3 | 3 | 1 | 1 | 2 | 1 |
| Furfural | $C_5H_4O_2$ | 100 | 1 | 3 | 3 | 2 | 4 | - | - | - | 1 | 4 | 1 |
| Gasoline | $C_5H_{12} - C_{12}H_{26}$ | 100 | 2 | 1 | 3 | 1 | 3 | 3 | 2 | - | 1 | 1 | 1 |
| Glycerol | $C_3H_8O_3$ | 100 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| Heptane, normal | $C_7H_{16}$ | 100 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 4 | 1 | 1 | 1 |
| Hexane, n- | $C_6H_{14}$ | 100 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 4 | 1 | 1 | 1 |
| Hydrogen chloride | HCl | 5 | 1 | 4 | 1 | 4 | 1 | 1 | 1 | - | 1 | 2 | 4 |
| Hydrogen chloride | HCl | concentrated | 1 | 4 | 4 | 4 | 1 | 1 | 2 | 3 | 1 | 4 | 4 |
| Hydrogen peroxide | $H_2O_2$ | 3 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | - | 1 | 3 | 3 |
| Hydrogen peroxide | $H_2O_2$ | 30 | 1 | 4 | 1 | 4 | 1 | 1 | 1 | - | 1 | 3 | 3 |
| Hydrogen sulphide | $H_2S$ | 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 1 |
| Iodine, tincture of | $I_2$ | | 1 | 4 | 3 | 1 | 1 | - | 4 | 4 | 1 | 1 | 1 |

# 10. Appendix

| - no data<br>1 resistant<br>2 practically resistant<br>3 partially resistant<br>4 not resistant | | Concentration | High Density Polyethylene | Polyamide | Polycarbonate | Polyoxymethylene | Polypropylene | Polysulfone | Polyvinyl chloride, hard | Polyvinyl chloride, soft | Polytetrafluorethylene | Acrylonitrile-butadiene-caoutchouc | Aluminium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Medium** | **Formula** | **[%]** | **HDPE** | **PA** | **PC** | **POM** | **PP** | **PSU** | **PVC** | **PVC** | **PTFE** | **NBR** | **AL** |
| Isopropyl alcohol | $C_3H_8O$ | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | - | 2 |
| Lactic acid | $C_3H_6O_3$ | 3 | 1 | 3 | 1 | 2 | 1 | 1 | 2 | - | 1 | 1 | 1 |
| Magnesium chloride | $MgCl_2$ | 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mercuric chloride | $HgCl_2$ | 10 | 1 | 4 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mercury | Hg | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 |
| Methyl acetate | $C_3H_6O_2$ | 100 | 1 | 1 | 4 | 2 | 1 | - | 4 | 4 | 1 | - | 1 |
| Methyl alcohol | $CH_4O$ | 100 | 1 | 2 | 4 | 1 | 1 | 3 | 1 | 3 | 1 | 2 | 1 |
| Methyl benzene | $C_7H_8$ | 100 | 3 | 1 | 4 | 1 | 3 | 4 | 4 | 4 | 1 | 4 | 1 |
| Methyl ethyl ketone (MEK) | $C_4H_8O$ | 100 | 1 | 1 | 4 | 1 | 1 | 4 | 4 | 4 | 1 | 4 | 1 |
| Methylene chloride | $CH_2Cl_2$ | 100 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 1 | - | 1 |
| Mineral oil | — | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | 1 | 1 | 1 |
| Nitric acid | $HNO_3$ | 10 | 1 | 4 | 1 | 4 | 1 | 1 | 1 | - | 1 | 4 | 3 |
| Nitric acid | $HNO_3$ | 100 | 4 | 4 | 4 | 4 | 4 | - | 4 | - | 1 | 4 | 1 |
| Nitrobenzene | $C_6H_5NO_2$ | 100 | 3 | 4 | 4 | 3 | 2 | 4 | 4 | 4 | 1 | 4 | 1 |
| Oleic acid | $C_{18}H_{34}O_2$ | 100 | 1 | 1 | 1 | 2 | 1 | - | 1 | - | 1 | 3 | 1 |
| Oxalic acid | $C_2H_2O_4 \times 2H_2O$ | 100 | 1 | 3 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| Ozone | $O_3$ | 100 | 3 | 4 | 1 | 4 | 3 | 1 | 1 | - | 1 | 4 | 2 |
| Petroleum | — | 100 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 |
| Phenol | $C_6H_6O$ | 10 | 1 | 4 | 4 | 4 | 1 | 4 | 1 | 3 | 1 | 3 | 1 |
| Phenol | $C_6H_6O$ | 100 | 2 | 4 | 4 | 4 | 1 | 3 | 4 | 3 | 1 | 3 | 1 |
| Phosphoric acid | $H_3PO_4$ | 20 | 1 | 4 | 2 | 4 | 1 | - | - | - | 1 | 2 | 4 |
| Phosphorus pentachloride | $PCl_5$ | 100 | - | 4 | 4 | 4 | 1 | - | 4 | 4 | 1 | - | 1 |
| Potassium hydrogen carbonate | $CHKO_3$ | saturated | 1 | 1 | 2 | 1 | 1 | - | - | - | 1 | - | 4 |
| Potassium hydroxide | KOH | 30 | 1 | 1 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | - | 4 |
| Potassium hydroxide | KOH | 50 | 1 | 1 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | - | 4 |
| Potassium nitrate | $KNO_3$ | 10 | 1 | 1 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 |
| Potassium permanganate | $KMnO_4$ | 100 | 1 | 4 | 1 | 1 | 1 | - | 1 | - | 1 | 3 | 1 |
| Pyridine | $C_5H_5N$ | 100 | 1 | 1 | 4 | 1 | 3 | 4 | 4 | 4 | 1 | 4 | 1 |
| Resorcinol | $C_6H_6O_2$ | 5 | 1 | 4 | 2 | 3 | 1 | 4 | 2 | - | 1 | - | 2 |
| Silver nitrate | $AgNO_3$ | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 |

# 10. Appendix

| - no data<br>1 resistant<br>2 practically resistant<br>3 partially resistant<br>4 not resistant | | Concentration | High Density Polyethylene | Polyamide | Polycarbonate | Polyoxymethylene | Polypropylene | Polysulfone | Polyvinyl chloride, hard | Polyvinyl chloride, soft | Polytetrafluorethylene | Acrylonitrile-butadiene-caoutchouc | Aluminium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Medium** | **Formula** | **[%]** | **HDPE** | **PA** | **PC** | **POM** | **PP** | **PSU** | **PVC** | **PVC** | **PTFE** | **NBR** | **AL** |
| Sodium bisulphite | $NaHSO_3$ | 10 | 1 | 1 | 2 | 4 | 1 | - | - | - | 1 | 1 | 1 |
| Sodium carbonate | $Na_2CO_3$ | 10 | 1 | 1 | 1 | 1 | 1 | - | - | - | 1 | - | 3 |
| Sodium chloride | NaCl | 30 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| Sodium hydroxide | NaOH | 30 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 |
| Sodium hydroxide | NaOH | 50 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | - | 1 | 2 | 4 |
| Sodium sulfate | $Na_2SO_4$ | 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Spirits | $C_2H_6O$ | 96 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | - | 1 |
| Styrene | $C_8H_8$ | 100 | 4 | 1 | 4 | 1 | 3 | - | 4 | 4 | 1 | 4 | 1 |
| Sulphuric acid | $H_2SO_4$ | 6 | 1 | 4 | 1 | 4 | 1 | 1 | 1 | - | 1 | 2 | 3 |
| Sulphuric acid | $H_2SO_4$ | fuming | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 4 | 3 |
| Tallow | — | 100 | 1 | 1 | 1 | 1 | 1 | - | 1 | 1 | 1 | 1 | 1 |
| Tetrahydrofuran (THF) | $C_4H_8O$ | 100 | 3 | 1 | 4 | 1 | 3 | 4 | 4 | 4 | 1 | 3 | 1 |
| Tetrahydronaphthalene | $C_{10}H_{12}$ | 100 | 3 | 1 | 4 | 1 | 4 | 4 | 4 | 4 | 1 | - | 1 |
| Thionyl chloride | $Cl_2SO$ | 100 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 4 | 1 | - | 3 |
| Tin chloride | $SnCl_2$ | 10 | 1 | 4 | 2 | 2 | 1 | - | - | - | 1 | 1 | 4 |
| Transformer oil | — | 100 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | - | 1 | 1 | 1 |
| Trichloroethane | $C_2H_3Cl_3$ | 100 | 3 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 1 | 4 | 4 |
| Urea | $CH_4N_2O$ | 10 | 1 | 1 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 |
| Urine | — | 100 | 1 | 1 | 1 | 1 | 1 | - | 1 | 1 | 1 | - | 2 |
| Vinegar | $C_2H_4O_2$ | 10 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| Vinegar | $C_2H_4O_2$ | 90 | 1 | 4 | 4 | 4 | 1 | 3 | 1 | 4 | 1 | - | 1 |
| Wax | — | 100 | - | 1 | 1 | | 1 | - | - | - | 1 | - | 1 |
| Wines | — | 100 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | - | 4 |
| Xylene | $C_8H_{10}$ | 100 | 3 | 1 | 4 | 1 | 4 | 4 | 4 | 4 | 1 | 4 | 1 |

# 10. Appendix

## 10.7Rotors & Accessories

**Table of the Service Life of Rotors and Accessories**
If no other data concerning the service life is engraved on the rotor or accessory, rotors and buckets must be checked by the manufacturer after 10,000 cycles. After 50,000 cycles rotors must be scrapped for safety reasons

### SWINGOUT ROTOR

| No | Part No | Rotor Name | RPM | RCF | Rotor Angle | AC | DC |
|---|---|---|---|---|---|---|---|
| 1 | 200384 | S004x500ml | 4,500 | 4,369 | 90° | 07 | 07 |
| 2 | 200317 | S004x250ml | 4,500 | 4,302 | 90° | 07 | 07 |
| 3 | 200414 | S004x4MTP | 3,000 | 1,841 | 90° | 07 | 07 |
| 4 | 200365 | S002x4MTP | 3,700 | 2,189 | 90° | 07 | 07 |

### FIXED ANGLE ROTOR

| No | Part No | Rotor Name | RPM | RCF | Rotor Angle | AC | DC |
|---|---|---|---|---|---|---|---|
| 1 | 200442 | A006x250ML | 10,000 | 15,540 | 26° | 08 | 08 |
| 2 | 200600 | A014x50ML | 10,000 | 17,217 | 34° | 08 | 08 |
| 3 | 200367 | A006x100ML | 11,000 | 15,422 | 30° | 08 | 08 |
| 4 | 200378 | A040x15ML | 5,500 | 5,310 | 45° | 08 | 08 |
| 5 | 200550 | A006x085ML | 12,000 | 18,514 | 36° | 08 | 08 |
| 6 | 200436 | A008X50ML | 12,000 | 17,065 | 26° | 08 | 08 |
| 7 | 200422 | A012x30ML | 12,000 | 18,675 | 30° | 08 | 08 |
| 8 | 200368 | A006x50ML | 12,100 | 20,133 | 45° | 08 | 08 |
| 9 | 200421 | A020x10ML | 12,000 | 15,777 | 30° | 08 | 08 |
| 10 | 200434 | A012x15ML | 13,100 | 23,791 | 40° | 08 | 08 |
| 11 | 200379 | A024x5ML | 13,100 | 25,901 | 45° | 08 | 08 |
| 12 | 200375 | A048x1.5/2ML | 14,000 | 21,475 | 45° | 08 | 08 |
| 13 | 200416 | A096x0.2ML | 14,000 | 19,722 | 45° | 08 | 08 |

Note: Please note that the RCF values indicated refer only to rotor performance. The max. permissible RCF of tubes used should be verified with the individual manufactures.

# 11. EC Declaration

SCIENTIQUIPP

CE

## DECLARATION OF CONFORMITY
**(2014/35/EC, 2014/30/EC)**

The product named below fulfils the requirements of directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid. This declaration of conformity is issued under the sole responsibility of the manufacturer.

**Product name:** Laboratory Centrifuge (Refrigerated / Ventilated / Heated)

**Model numbers:** Centrifuge ROTA 4R, Centrifuge ROTA 4, Centrifuge ROTA 3R, Centrifuge ROTA 3, Centrifuge ROTA 2H, Centrifuge ROTA 2,Centrifuge Super-spin R, Centrifuge Super-spin, Centrifuge ROTA 5R, Centrifuge ROTA 5, Centrifuge ROTA 6R, Centrifuge ROTA 6, Centrifuge ROTA 7R, Centrifuge ROTA 7

**Relevant directives / standards:**

**Directive(s):**

**2014/35/EC:** The Low voltage directive

**2014/30/EC:** The Electromagnetic compatibility Directive
**IEC 61010-2-020 [Edition 3.0: 2016-05]**
Safety Requirements for Electrical Equipment for measurement, control and laboratory use (Particular requirements for Laboratory centrifuges)

**IEC 61010-1-2010:** Safety requirements for Laboratory centrifuges

**EN 61326-1:** Electrical equipment for measurement, control & laboratory use
EMC – General requirements

We **Scientiquipp Private Limited** located at "Unit 101, 1st floor C wing, Shanti Industrial premises, S.N Road, Tambe Nagar, Mulund (W), Mumbai – 400080; India hereby declare that the equipment named above with the listed model names have been designed to comply with the relevant sections of the above referenced specifications. The products comply with all applicable and essential requirements of the Directives. However, while testing the product, it was tested with typical configuration and the results were obtained with the test conditions as per the typical test program conducted on it.

Mr. Vikram Apte

Managing Director

SCIENTIQUIPP PRIVATE LIMITED

For: **Scientiquipp Private Limited**
1st April 2026

# 12. Index

# 13 Service Contact

In the event of queries, malfunctions, or spare part enquiries:

**From India Contact:**

**Scientiquipp Pvt. Ltd**
Unit No C/101, First Floor, Shanti Industrial Estate,
S.N. Road, Tambe Nagar, Mulund West, Mumbai,
Maharashtra 400080
India
Tel: +91-22-31029604

Email: info@scientiquipp.com

**Other Regions:**

Contact our agency in your region. All agencies are listed at www.scientiquipp.com/salespartners



**NOTE**

If you would like to utilise our service, please state the type of your centrifuge and its serial number.

# 14 Notes

# UP TO SPEED

**WHITE PAPER** | January 2023 | SCIENTIQUIPP PVT.LTD | MUMBAI



WHITE PAPER

## Routine Maintenance of Centrifuges

Cleaning, Maintenance and Disinfection of Centrifuges, Rotors and Adapters

**Ashish Surve;** Scientiquipp | Mumbai, India

### Executive summary

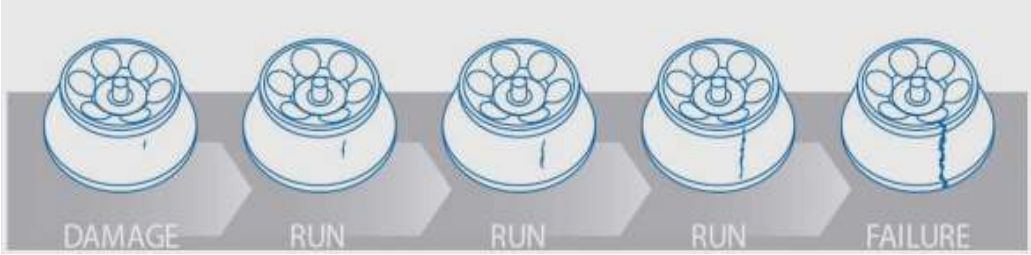
The operation of centrifuges is safe, as long as high-quality accessories and components are used, such as anodized or PTFE coated aluminium rotors for instance, and the following conditions are met: the centrifuges and their equipment are used properly, are in an undamaged condition and maintained as recommended here. Prevention from long-term exposure to residues like salts or aggressive chemicals through routine maintenance by customers themselves can help in avoiding extensive corrosion incidents and to achieve the full lifetime of the instrument. Therefore, instructions, how centrifuges and their accessories can be cleaned,

autoclaved, lubricated and decontaminated by the user himself are presented here. Finally, information is given in case professional inspection and certification services are required in labs with the highest safety demands.

## Introduction

Centrifuge maintenance is an everyday tool to maintain optimal condition and safety of your instrument. Scientiquipp cleaning and maintenance standard operating procedures are highly important in case of contamination with salts and chemicals. In case of long-term exposure aggressive chemicals can develop corrosive spots on rotors and rotor buckets, which may constantly grow to form small holes if ignored **(Fig.1)**. IF small scratches and cracks are already present on the rotor surface, this further facilitates corrosion processes as protective coatings are missing on those spots. In case of advanced corrosion, rotors or buckets could be damaged in a wat that makes centrifugation processes unsafe. In the worst-case scenario, damaged rotors can even lead to a crash.

**(Fig.1)**.




Scientiquipp centrifuges are manufactured according to IEC standards and ensure no harm will be done to persons operating the centrifuge or surrounding lab equipment, if used in accordance with the operating instructions. However, the centrifuge and rotor themselves maybe destroyed.

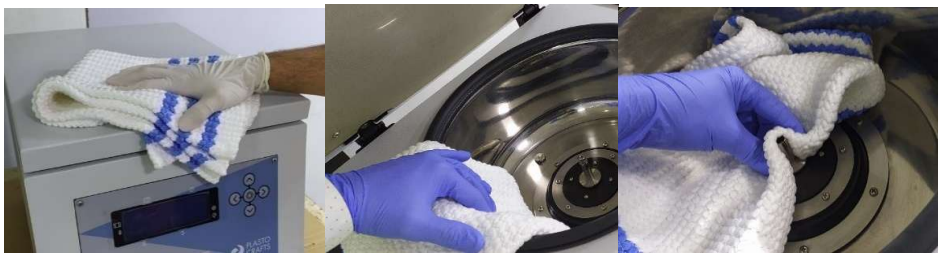
High quality aluminium rotors and buckets are protected against corrosion caused by commonly used laboratory chemicals, for instance by means of an anodized coating. Nevertheless, aggressive chemicals can still damage the equipment! Such chemicals include concentrated and mild alkalis, concentrated acids, solutions containing mercury ions, copper ions and other heavy-metal ions, chlorinated hydrocarbons, and concentrated saline solutions.

We recommend checking the rotors and rotor bores visually for residue and corrosion on a weekly and monthly basis. Rotors, buckets, lids or adapters, which have been subject to chemical or mechanical damage or which have exceeded their maximum operating life, should not be used any longer. Damaged tubes or plates should not be centrifuged **(Fig.2).**

Important information regarding cleaning and maintenance can not only be found in this paper, but also in the are operating manual of your centrifuge. If you are unsure about the cleaning or decontamination methods of the centrifuge or rotor, one should contact the service team at Scientiquipp for their recommendation. If in doubt whether a rotor is still safe, an authorized service technician should be contacted.

## Cleaning, Maintenance and Disinfection

Remove the buckets and the rotor from the centrifuge. For refrigerated centrifuges: Leave the centrifuge lid open and defrost the ice on the rotor chamber surface. Wipe the rotor chamber with a moist cloth. The outside of the centrifuge and the rotor chamber should be cleaned regularly with a moist cloth and neutral detergents **(Fig.3)**. Switch off the centrifuge, before you do so.



In the event of contamination caused by high-risk substances (bio-hazardous or aggressive chemical reagents and radioactive reagents) wear a laboratory coat, gloves and goggles. If there is broken glass: Retrieve the bigger broken glass with forceps, remove small and powder shards with a damp lint free cloth. Absorb blood with gauze or paper towel and subsequently, seal the material in a biohazard bag for safe disposal. Wipe the contaminated parts with neutral agents for cleaning and disinfection (e.g., diluted neutral alcohol-based disinfectant or 70% isopropanol mixture). Use a soaked gauze or lint-free cloth.

If necessary, remove the contaminated rotor, rotor lid, buckets, adapters out of the centrifuge to decontaminate areas which are difficult to access. After de-contamination, the instrument and accessories should be wiped clean with distilled water or Type 3 lab water.

## Rotors, adapters, buckets and rubber seal

User neutral cleaning solutions (alcohol or alcohol-based disinfectant) and a soft cloth to clean your rotors and accessories. Wipe contaminated parts with neutral agents for cleaning and disinfection (e.g., diluted neutral alcohol-based disinfectant or 70% isopropanol mixture). Use a lint-free cloth. In case of spilling some aggressive liquid on the centrifuge chamber, please clean it immediately. If there is a stubborn stain, clean with a plastic scrub pad and rinse the area with distilled water or type 3 water.

Avoid immersing the rotor in water as liquid could flow into rotor cavities, and dry thoroughly with a soft cleaning cloth. As salt crystals located on the metal surface will corrode the surface, we strongly recommend cleaning rotors and buckets immediately. If there is a need to clean the rotors tube cavities or boreholes, use a stiff test-tube brush that has bristles and a non-metallic tip. For swing-bucket rotors ensure the grooves in which the buckets are fitted are free of contamination. Take care to ensure that the buckets can still swing freely.



After decontamination, the instrument should be wiped with distilled water. If needed, autoclave the rotor, rotor lids at 121°C for 20 minutes as recommended. Never use UV, beta, gamma radiation or any high energy radiation source. Place the parts on a dry cloth upside down to dry.

**Caution**
Do not use acetone, caustic detergents, or detergents that contain chlorite ions. Corrosion is most frequently caused by using chlorite ion solutions, such as sodium hypochlorite (household bleach). Do not use steel wool, wire brushes, abrasives, or sandpaper, since they may damage the rotor coating (anodized coating) and thus increase the risk for corrosion. We do not recommend usage of dishwashers for rotors or lids due to the aggressive cleaning agents used in these devices. These agents may result in corrosion.

## Autoclaving

In order to protect human beings from pathogens or samples from contamination, sterilization of rotors and accessories is recommended. Sterilization is a term referred to a process that eliminates all forms of microbial life, including transmissible agents such as bacteria, viruses, fungi, spore forms etc. A widely used method for heat sterilization is autoclaving, where hot steam sterilizes equipment and other objects. We recommend autoclaving be performed at 121°C and 2 bar atmospheric pressure for 15-20 minutes for rotors and rotor lids.

Scientiquipp aluminium rotors have been vigorously tested for autoclaving at 121°C and approved within this setting. They possess a special anodized coating which protects the metal from deeper corrosion effects. If you are in doubt about your rotor, please contact a member of the Scientiquipp service team.

In order to achieve an outstanding chemical resistance against phenol, acetonitrile, DMSO, acetone, trichloroacetic acid and sodium hypochlorite, Scientiquipp offers the option of PTFE coated aluminium fixed angle rotors. This coating is applied on top of the actual anodic coating.

However, prions, such as those associated with Creutzfeldt Jakob disease, may not be destroyed by autoclaving at the typical 121 °C for 20 minutes. Some manufacturers state that autoclaving at 134 °C for at least 18 minutes should usually be sufficient [1]. But in some cases, this also is not enough to deactivate the agent of disease, especially if you use material with

very high infectiousness. The prions are generally quite resistant to heat, although their infectivity can be reduced by such a treatment. To destroy prions, rotors which are only tested to be autoclaved at a max temperature of 121 °C are therefore not suitable for such an application. According to available marketing material, only a few rotors in the market are allowed to be autoclaved at higher temperatures. But are the rotors really tested within this setting? Only very few companies can provide customers with rotors really being tested with higher temperatures than 121 °C. So, in this application field, the customer has a very limited choice of available rotors, including Scientiquipp high quality aluminium made rotors. Selected Scientiquipp rotors were extensively tested at 142 °C for 2 hours. Scientiquipp rotors can be used with confidence for such an application.

## Decontamination / Disinfection

Even when working accurately, a contamination of the rotor by biological (for example blood) or radioactive material may happen. Please consult your laboratory safety officer first about suitable methods of cleaning and disinfecting any hazardous spill within the centrifuge/ rotor. Successful disinfection can only be granted by the suppliers of the chemicals. Before using any cleaning or disinfection method other than the one recommended by the centrifuge manufacturer, please check that the intended method will not damage the rotors, accessories, or other parts of the centrifuge. For decontamination, disinfection with alcohol-containing liquids and autoclaving are the recommended methods. Scientiquipp recommends the following disinfectants.

**Table 1: Recommended Disinfectants**

| Disinfectant | Supplier | Anodized Rotors | Anodized Buckets | Stainless Steel | Metal Chassis |
|---|---|---|---|---|---|
| **Sterillium™** | Bode-Chemie | S | S | S | S |
| **Sodium Hypochloride** | Any | S | S | S | S |
| **Isopropanol** | Any | S | S | S | S |

## About Scientiquipp Pvt Ltd

Since the 1980’s, the Scientiquipp brand has been synonymous with customer-oriented processes and innovative products, such as laboratory devices. Today, we serve as experts and advisors, using our unique knowledge and experience to support laboratories and research institutions around India. The foundation of the company’s expertise is its focus on its customers. Scientiquipp exchange of ideas with its customers results in comprehensive solutions that in turn become industry standards. Scientiquipp will continue on this path in the future, true to the standard set by the company’s founders: that of sustainably improving people’s living conditions.

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