

**VWR<sup>®</sup> Mega Star 1.6 / 1.6 R**  
**VWR<sup>®</sup> Mega Star 4.0 / 4.0 R**

**INSTRUCTION MANUAL**

**European Catalogue Number(s):**

<b>521-2658</b>	<b>VWR Mega Star 1.6 without rotor</b>
<b>521-2659</b>	<b>VWR Mega Star 1.6 package</b>
<b>521-2660</b>	<b>VWR Mega Star 1.6R without rotor</b>
<b>521-2661</b>	<b>VWR Mega Star 1.6R package</b>
<b>521-2662</b>	<b>VWR Mega Star 4.0 without rotor</b>
<b>521-2663</b>	<b>VWR Mega Star 4.0 package</b>
<b>521-2664</b>	<b>VWR Mega Star 4.0R without rotor</b>
<b>521-2665</b>	<b>VWR Mega Star 4.0R package</b>



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# Preface

Before starting to use the centrifuge, read through these instructions for use carefully and follow the instructions. The information contained in these instructions for use is the property of VWR; it is prohibited to copy or pass on this information without explicit approval in writing by its owner.

Failure to follow the instructions and safety information in these instructions for use will result in the expiration of the seller's warranty.

## About this Manual

This manual is subdivided into the following chapters:

- **Preface** (this chapter): Contains general introductory information, explains how to identify your centrifuge, spells out the intended use, explains the safety labels, and contains precautions.
- **Transport and Setup**: Contains the list of items supplied, explains how to transport the centrifuge to its intended location, how to connect power and Ethernet cables and how to accomplish the basic set-up.
- **Operation**: Contains instructions for centrifugation, including basic operations like loading and installing the rotor, entering centrifugation parameters, and running the centrifuge.
- **LCD Control Panel**: Explains the LCD display, its front-panel controls and its functions.
- **Maintenance and Care**: Explains how to perform basic care activities like cleaning, disinfection, decontamination of the centrifuge and its rotors, and explains which parts are suitable for autoclaving. Also lists regular maintenance tasks like visual inspection, ventilation grid cleaning, and more specific maintenance tasks for selected rotor types, plus parts to be replaced by VWR authorized service during preventive maintenance. And it contains general advice for storage and shipping.
- **Troubleshooting**: Explains how to use the emergency door release in order to open the centrifuge lid when the device is out of power, how to remove icing from the centrifugation chamber, how to troubleshoot error messages that appear on the display, and how to gather device information before you call VWR service.
- **Technical Specifications**: Lists the technical data for all centrifuge models described in this manual.
- **Rotors**: Contains rotor tables for all centrifuge models described in this manual as well as specifications and accessory information for all compatible rotors.
- **Chemical Compatibility Chart**: Contains a reference chart that indicates how centrifuge and rotor materials respond to attack through frequently-used chemical agents.
- **Index**: Lists keywords in alphabetical order, with pointers to pages where they occur.

## Where Do I Find Information about my Centrifuge?

This manual covers multiple VWR Mega Star Series centrifuge models.

You can identify your centrifuge model by gathering two items of information:

- the product series from the front panel—for example, VWR Mega Star Series
- the product number and product name from the nameplate—for example, “521-2658” and “VWR Mega Star 1.6” as shown in “List of VWR Centrifuges” on page ix.

## Intended Use

### Intended Use for Laboratory Use Centrifuges

This centrifuge is designed to separate sample mixtures of different densities like chemicals, environmental samples and other non-human body samples.

### Intended User

This centrifuge must be operated by trained personnel only.

Trained personnel can be a clinical laboratory technologist, a medical laboratory technician, or a person with an equivalent education.



VWR Centrifuges	
Article No.	Benchtop Centrifuge
521-2658	VWR Mega Star 1.6 without rotor
521-2659	VWR Mega Star 1.6 package with rotor TX-400, 4 round buckets and 4 ClickSeal caps
521-2660	VWR Mega Star 1.6R without rotor
521-2661	VWR Mega Star 1.6R package with rotor TX-400, 4 round buckets and 4 ClickSeal caps
521-2662	VWR Mega Star 4.0 without rotor
521-2663	VWR Mega Star 4.0 package with rotor TX-1000, 4 round buckets and 4 ClickSeal caps
521-2664	VWR Mega Star 4.0R without rotor
521-2665	VWR Mega Star 4.0R package with rotor TX-1000, 4 round buckets and 4 ClickSeal caps

Table i: List of VWR Centrifuges

## Signal Words and Symbols

Signal Word and Colors	Degree of Hazard
<b>WARNING</b>	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
<b>CAUTION</b>	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
<b>NOTICE</b>	Indicates information considered important, but not hazard-related.

Table ii: Signal Words and Symbols

## Symbols used on Unit and Accessories

Observe the information contained in the instructions for use to keep yourself and your environment safe.








	General hazard		Refer to instruction manual
	Biological hazard		Disconnect mains plug
	Danger of cuts		Direction of rotation
	Reminds you to ensure that the rotor is installed properly by lifting it slightly at the handle.		

Table iii: Symbols used on Unit and Accessories

## Symbols used in the Instructions for Use

Observe the information contained in the instructions for use to keep yourself and your environment safe.










	General hazard		Electrical hazard
	Biological hazard		Danger of cuts
	Hazard caused by flammable materials		Indicates information considered important, but not hazard-related.
	Risk of crushing		Wear protective gloves
	Wear protective goggles		

Table iv: Symbols used in the Instructions for Use

## Safety Instructions



### WARNING

Not following these safety instructions can lead to hazardous situations that, if not avoided, could result in death or serious injury.

Observe the safety instructions.

The centrifuge is to be used for its intended use only. Improper use can cause damages, contamination, and injuries with fatal consequences.

The centrifuge must be operated by trained personnel only.

It is the obligation of the operator to make sure that the proper protective clothing is used. Mind the “Laboratory Biosafety Manual” of the World Health Organization (WHO) and the regulations in your country.

Keep a safety zone of minimum 30 cm around the centrifuge. Refer to “Figure 1–1: Safety Zone”. Persons and hazardous substances must be kept out of this safety zone while centrifuging.

Do not modify the centrifuge and its accessories in any unauthorized way.

Do not operate a centrifuge if its housing is open or incomplete.



### WARNING

#### **Risk of damage due to incorrect power supply.**

Make sure that the centrifuge is plugged only into a power outlet that has been properly grounded.



### WARNING

#### **Risk from handling hazardous substances.**

When working with corrosive samples (salt solutions, acids, bases), the accessories and the centrifuge have to be cleaned thoroughly.

Extreme care should be taken with highly corrosive substances that can cause damage and impair the mechanical stability of the rotor. These should only be centrifuged in fully sealed tubes.

The centrifuge is neither inert nor protected against explosion. Never use the centrifuge in an explosion-prone environment.

Do not centrifuge toxic or radioactive materials or any pathogenic micro-organisms without suitable safety precautions.

When centrifuging any hazardous materials mind the “Laboratory Biosafety Manual” of the World Health Organization (WHO) and any local regulations. When centrifuging microbiological samples from the Risk Group II (according to the “Laboratory Biosafety Manual” of the World Health Organization (WHO)), aerosol-tight biological seals have to be used. Visit the internet page of the World Health Organization ([www.who.int](http://www.who.int)) for the “Laboratory Biosafety Manual”. For materials in a higher risk group, extra safety measures must be taken.

If toxins or pathogenic substances have contaminated the centrifuge or its parts, appropriate disinfection measures have to be taken (“Disinfection” on page 4-4).

If a hazardous situation occurs, turn off the power supply to the centrifuge and leave the area immediately.

Make sure to use the proper accessories for your applications to avoid hazardous contamination.

In any case of severe mechanical failure, such as rotor or bottle crash, personnel should be aware that the centrifuge is not aerosol-tight. Leave the room immediately. Contact the customer service. Aerosols need time to settle before opening the centrifuge after a crash. Ventilated centrifuges bear a higher risk of being contaminated after a crash than refrigerated centrifuges.



### WARNING

#### **Risk of contamination.**

Potential contaminations will not remain in the centrifuge while the device is operated.

Take appropriate protection measures to prevent spread of contaminations.

A centrifuge is no closed containment.

**WARNING****Damage to health from centrifuging explosive or flammable materials or substances.**

Do not centrifuge explosive or flammable materials or substances.

**WARNING****Serious injuries can occur if you touch a spinning rotor with your hands or tools.**

A rotor can still be spinning after a power failure occurs.

Do not open the centrifuge before the rotor has stopped spinning. Do not touch a spinning rotor. Open the centrifuge only if the rotor has stopped spinning.

Never use your hands or tools to stop a spinning rotor.

The emergency door release may be used in emergencies only to recover the samples from the centrifuge, for example, during a power failure ("Mechanical Emergency Door Release" on page 5-1).

**WARNING**

The magnets built into the rotors can have a negative effect on active implants, such as cardiac pacemakers.

The magnets are mounted on the bottom of the rotor.

Always keep a distance of 20 cm between the rotor and the active implant, as the product generates permanent magnetic fields. The magnetic field strength at a distance of 20 cm is less than 0.1 mT, so there should be no interference.

**CAUTION****Risk of injuries from defective gas spring**

Make sure that the centrifuge lid can be opened completely and that it will stay in its position.

Regularly check gas springs for their proper function.

Let an authorized service technician replace defective gas springs.

**CAUTION****Safety can be impaired by wrong loading and worn accessories.**

Always make sure that the load is as equally distributed as possible.

Do not use rotors and accessories which show any signs of corrosion or cracks. Contact customer service for further information.

Do not operate the centrifuge with an unbalanced rotor. Use only rotors which have been loaded properly.

Never overload the rotor.

Make sure that rotors and accessories are installed properly before operating the centrifuge. Follow the instructions in section "How to Install and Remove a Rotor" on page 2-4.

**CAUTION****Physical harm caused by ignoring operative basics.**

Operate the centrifuge with a properly installed rotor.

Do not move the centrifuge while it is running.

Do not lean on the centrifuge.

Do not put anything on the centrifuge while it is running.

The centrifuge housing is not to be opened by the operator.

**CAUTION****Due to air friction sample integrity may be affected.**

The temperature of the rotor may rise significantly while the centrifuge is spinning.

Ventilated units lead to a heat up of the rotor above the ambient temperature.

Refrigerated units can have a deviation from displayed and set temperature to the sample temperature.

Make sure the centrifuge temperature control capabilities meet your application specification. If necessary make a test run.

**Protection capability may be impaired due to using unapproved accessories.**

Use only accessories for this centrifuge which have been approved. For a list of approved accessories refer to “Rotor Specifications” on page B-1.

**NOTICE**

Exceptions to this rule are commercially available glass or plastic centrifuge labware, provided they have been designed to fit in the rotor or the adapter cavities and are approved for the speed or the RCF value of the rotor.

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**Damage to device or malfunction due to a damaged touch screen.**

Do not operate the device.

Power off the centrifuge. Disconnect the mains plug. Let an authorized service technician replace the touchscreen.

**NOTICE****To shut down the centrifuge:**

Press the “Stop” key. Turn off the centrifuge at the main switch. Pull out the power supply plug. In an emergency disconnect the power supply.

**NOTICE**

Make sure that the main switch and power supply plug can be accessed easily when setting up the centrifuge. The grounded electrical socket should be well accessible and located outside of the safety zone.

# 1. Transport and Set Up

## NOTICE

It is your responsibility to ensure that all requirements are met for safety reasons.

## 1.1. Unpacking

The shipping carton should be inspected upon delivery. When received, carefully examine for any shipping damage before unpacking. If damage is discovered, the delivering carrier should specify and sign for the damage on your copy of the delivery receipt.

Open the carton carefully making certain that all parts (Table 1–1) are accounted for before packaging materials are discarded. Remove the packaging completely. After unpacking, if damage is found, report it to the carrier and request a damage inspection. Dispose of the packaging in accordance with local waste disposal regulations.

Failure to request an inspection of damage within a few days after receipt of shipment absolves the carrier from any liability for damage. You must call for a damage inspection.

### Items Supplied

Item	Quantity
Centrifuge	1
Power Supply Cable (EU & UK)	2
Instruction manuals on USB stick	1
Anti-corrosion oil	1

Table 1–1: Items Supplied

If any parts are missing, please contact the nearest VWR representative.

## 1.2. Location

Operate the centrifuge only indoors.

The set up location must meet these requirements:

- Keep a safety zone of minimum 30 cm around the centrifuge. Refer to “Safety Zone” on page 1-2.  
Persons and hazardous substances must be kept out of this safety zone while centrifuging.  
Centrifuges cause vibrations. Do not store sensitive devices or dangerous objects or substances in the safety zone.  
**⚠ WARNING** Risk of impact. The centrifuge can crush objects and persons in a radius of 30 cm while spinning. Keep a safety zone of 30 cm around the centrifuge for safe operation. Make sure that no one is in the safety zone while the centrifuge is spinning.
- The supporting structure must meet these requirements:
  - » Be stable, solid, rigid and free of resonance.
  - » Be applicable for horizontal set up of the centrifuge.  
It is not allowed to put anything under the centrifuge to compensate for an uneven surface.  
Do not operate the centrifuge on carts or stand-alone shelving that could move during operation or is inadequately sized for the centrifuge.
  - » Be able to hold the weight of the centrifuge.
- The centrifuge is not equipped with any means for leveling. The supporting structure must be suitably level to allow proper set up.  
**⚠ CAUTION** If you do not level the centrifuge, the centrifuge can crash because of imbalance. If you move the centrifuge, you must level it again. Do not move the centrifuge with a rotor attached to the drive shaft because damage can occur to the drive. Do not put anything below the centrifuge feet to level the centrifuge.
- Do not expose the centrifuge, accessories and samples to heat and strong sunlight.  
**⚠ CAUTION** UV rays reduce the stability of plastics. Do not subject the centrifuge, rotors and plastic accessories to direct sunlight.
- The set up location must be well ventilated at all times.
- The main switch and power supply plug must be easily accessible at all times. The grounded electrical socket should be well accessible and located outside of the safety zone.

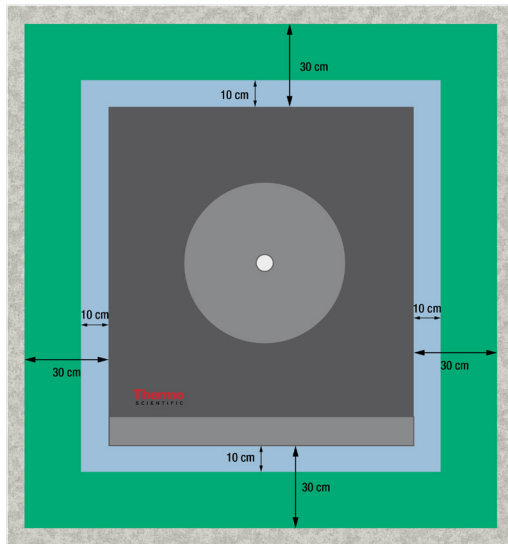


Figure 1-1: Safety Zone

### 1.3. Transporting

Before transporting a centrifuge make sure that

- the power supply cable is unplugged and removed from the centrifuge.
- the rotor is removed.
  - ⚠ **CAUTION** Damage to centrifuge or drive shaft due to movement of an installed rotor. Always remove the rotor before you transport the centrifuge.
- the centrifuge door is closed.
  - ⚠ **CAUTION** Hands can be squeezed by an open centrifuge door. Always close the centrifuge door before you transport the centrifuge.

Before transporting a rotor make sure that

- all components, like adapters and buckets are removed to prevent dropping damage.

#### 1.3.1. Handling Benchtop Centrifuges

When handling a benchtop centrifuge make sure that

- the centrifuge is lifted at both sides and not at the front or back.

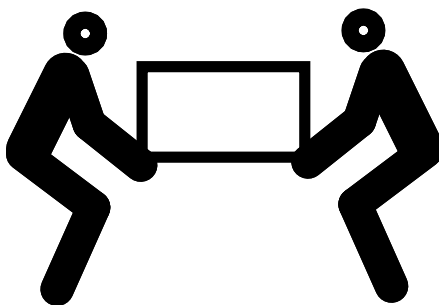


Figure 1-2: Lifting the Tabletop Centrifuge at Both Sides

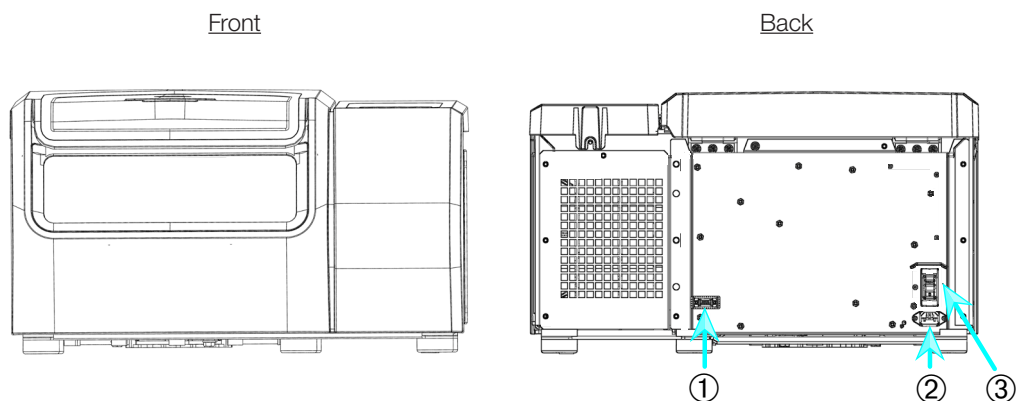
⚠ **WARNING** Always lift the centrifuge on both sides. Never lift the centrifuge by its front or back. The centrifuge is heavy (see “Technical Specifications” on page A-1). Assign a minimum of 4 persons to lift and carry a refrigerated centrifuge. Assign a minimum of 2 persons to lift and carry a ventilated centrifuge.

## 1. 4. Product Overview

This chapter describes the locations of signal and power connectors, and the main power switch.

### 1. 4. 1. 1 L Refrigerated Benchtop Centrifuges

#### With LCD Control Panel

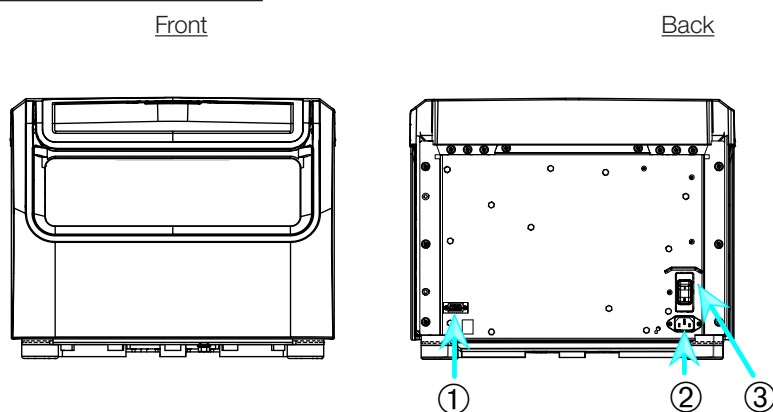


① RS232; ② Mains Connection; ③ Power Supply Switch

Figure 1-3: Product overview – refrigerated 1 L benchtop centrifuge with LCD control panel

### 1. 4. 2. 1 L Ventilated Benchtop Centrifuges

#### With LCD Control Panel

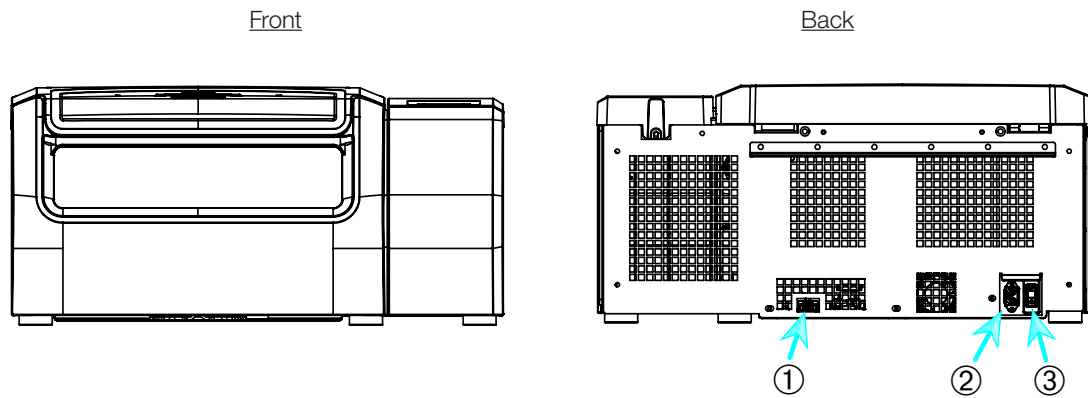


① RS232; ② Mains Connection; ③ Power Supply Switch

Figure 1-4: Product overview – ventilated 1 L benchtop centrifuge with LCD control panel

### 1. 4. 3. 4 L Refrigerated Benchtop Centrifuges

#### With LCD Control Panel

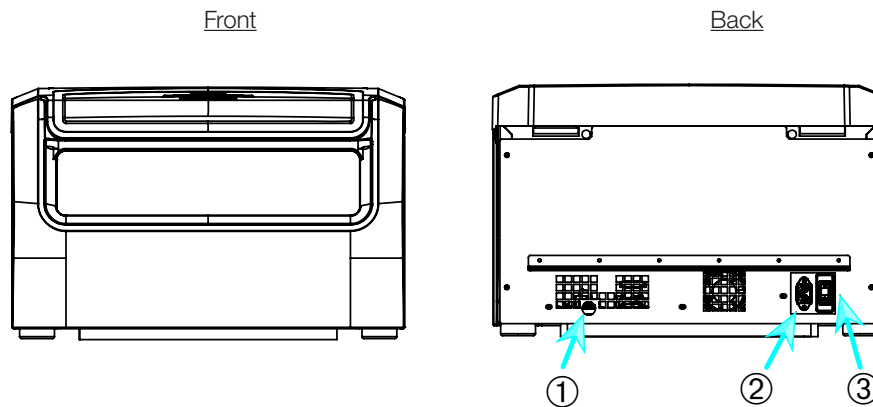


① RS232; ② Mains Connection; ③ Power Supply Switch

Figure 1-5: Product overview — refrigerated 4 L benchtop centrifuge with LCD control panel

### 1. 4. 4. 4 L Ventilated Benchtop Centrifuges

#### With LCD Control Panel



① RS232; ② Mains Connection; ③ Power Supply Switch

Figure 1-6: Product overview — ventilated 4 L benchtop centrifuge with LCD control panel



## 1. 5. Connections

### 1. 5. 1. Mains Connection

**NOTICE**

Connect the centrifuge into grounded electrical sockets only.

1. Turn off the Power Supply Switch.
2. Make sure that the power supply cable specification agrees with the safety standards of your country.
3. Make sure that the voltage and frequency are the same as the figures on the nameplate.
4. Make sure that the power supply cable is plugged in properly.

### 1. 5. 2. RS232

The centrifuge has a RS232 interface, which can be used to connect to a terminal device.

### 1. 5. 3. Ethernet

Some centrifuge models have a RJ45 ethernet interface, which can be used to connect to a Local Area Network (LAN). Use only equipment conforming to the IEC 60950-1 standard with the RJ45 ethernet interface.

### 1. 5. 4. USB

Some centrifuge models have an USB-A 2.0 port, which can be used with an USB drive. Use only equipment conforming to the USB 2.0 standard with the USB connection.

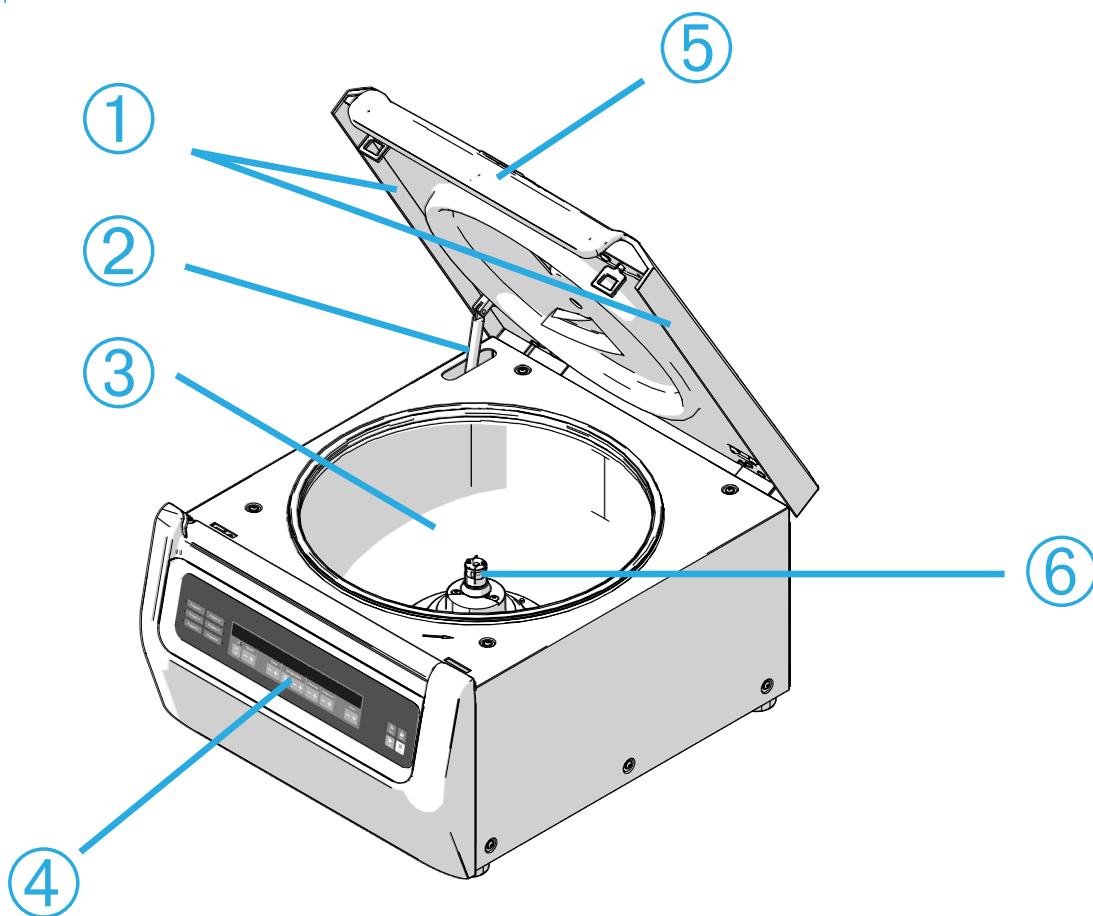
## 1. 6. Initial Startup

### Centrifuges with a LCD control panel

LCD control panel centrifuges are factory setup using English as preset language. Settings can be changed later. Refer to "System Menu" on page 3-8.

## 2. Operation

### 2. 1. Position of parts



① Particle Deflection Seal; ② Gas spring; ③ Centrifugation chamber; ④ User Interface; ⑤ Centrifuge lid; ⑥ Drive shaft

Figure 2-1: Position of centrifuge parts shown on a ventilated centrifuge with LCD control panel



① Rotor body; ② Cavity; ③ Rotor lid mounting

Figure 2-2: Position of rotor parts shown on a fixed angle rotor



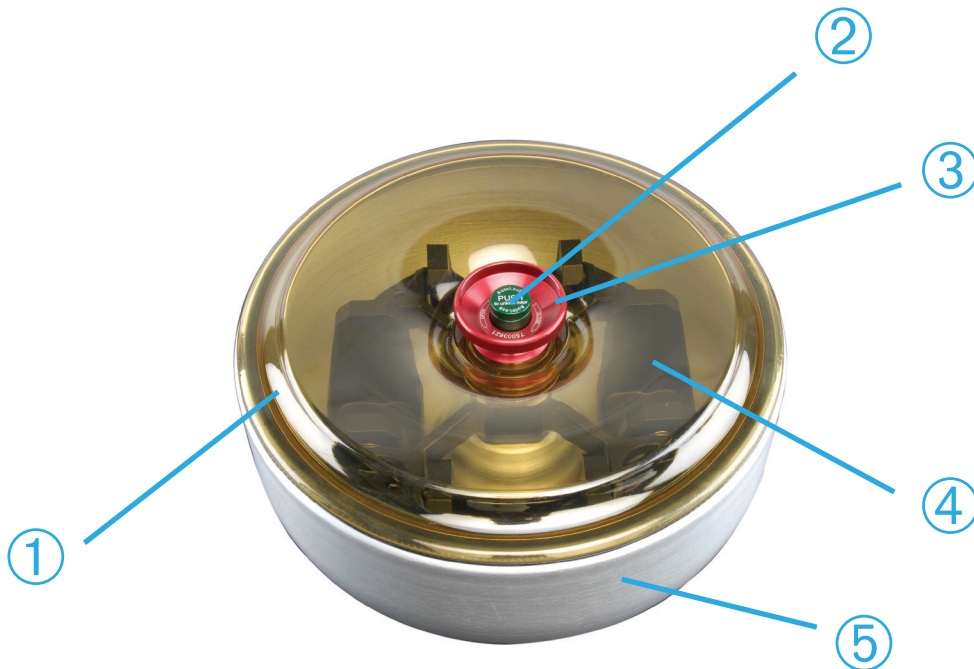
① Slot; ② Key

Figure 2-3: Position of the slot in the bucket and the corresponding adapter key



① Bucket; ② Cap latch; ③ Bucket cap; ④ Rotor knob; ⑤ Auto-Lock button; ⑥ Rotor cross

Figure 2-4: Position of rotor parts shown on a swinging bucket rotor



① Rotor lid; ② Auto-Lock button; ③ Rotor lid knob; ④ Rotor cross with buckets within the windshield bowl; ⑤ Windshield bowl

Figure 2-5: Position of rotor parts shown on a windshilded swinging bucket rotor

## 2. 2. Power on/off the Centrifuge

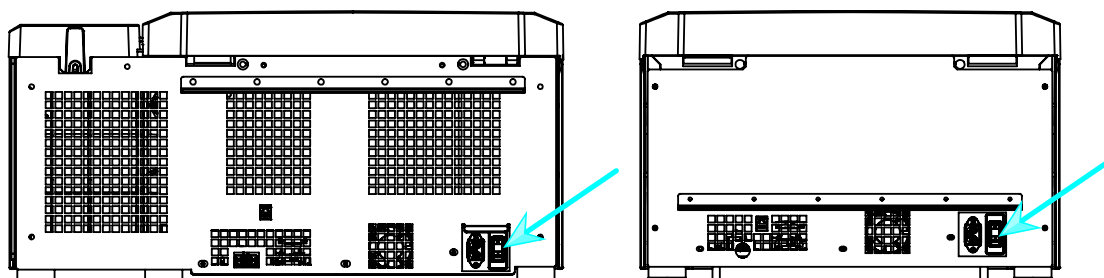


Figure 2-6: Rear view of benchtop centrifuge, position of the mains switch

### To power on the centrifuge:

Push on the mains switch of the centrifuge to “1” to power it on.

When the centrifuge has completed booting it is ready for operation.

Once you have started running the centrifuge with your own parameters, it will show the settings from the last session after powering up.

### To power off the centrifuge:

Set the mains switch of the centrifuge to “0” to power it off.

## 2. 3. Open/Close the Centrifuge Lid

### To open the centrifuge lid:

Press the Lid Open button  on the LCD control panel.

### To close the centrifuge lid:

Close the centrifuge lid by pressing down on it lightly in the middle or on both sides. The locking mechanism engages to close the lid safely. The lid should audibly click into place.


Double-check whether the locking mechanism has engaged properly.

**⚠ WARNING** Do not reach into the gap between the lid and the casing. The lid is drawn shut automatically and may pinch your fingers.

**⚠ WARNING** Do not use the mechanical emergency door release as regular procedure to open the centrifuge. Use the mechanical emergency door release only if a malfunction or power failure occurs and only when you have made sure that the rotor has stopped spinning (see “Mechanical Emergency Door Release” on page 5-1).

## 2. 4. How to Install and Remove a Rotor

### To install a rotor:

1. Press the Open button  on the LCD control panel to open the lid of the centrifuge.
2. Place the rotor over the drive shaft and let it slide down slowly.  
The rotor clicks into place automatically.
3. Make sure that the rotor is properly installed by lifting it slightly on the handle. If the rotor can be pulled up, then it must be reclamped to the drive shaft.
4. Make sure the rotor spins freely by turning it manually.
5. Swinging bucket rotors only: make sure that a full complement of buckets is installed before operating the rotor.
6. Rotor lid installation:
  - a. Put the rotor lid on the rotor.  
Make sure the rotor lid is put centered on the rotor.

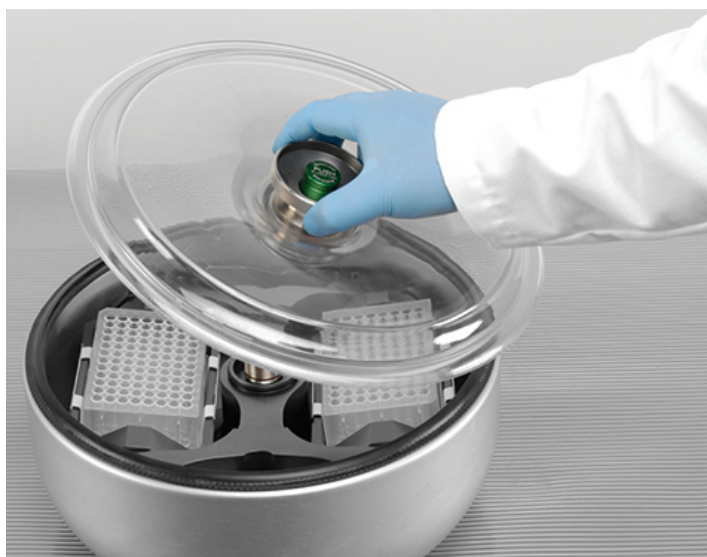


Figure 2-7: Put on/off the rotor lid

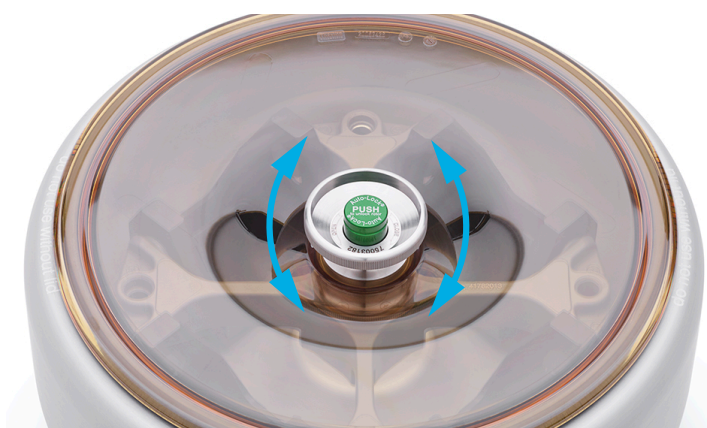




Figure 2-8: Turn the rotor knob

### **Before installing a rotor:**

- Remove any dust, foreign objects or residue from the chamber, if necessary.
- Wipe the drive shaft and the rotor hub from the bottom side of the rotor with a clean cloth.
- Inspect the Auto-Lock and O-ring (Figure 2-10); both must be clean and undamaged.

### To remove a rotor:

1. Press the Open button  on the home screen or  on the control panel to open the lid of the centrifuge.
2. Remove samples, adapters or buckets.

3. Grasp the rotor handle with both hands.
4. Press the Auto-Lock key and, at the same time, pull the rotor directly upwards and away from the drive shaft with both hands. Make sure you do not tilt the rotor while lifting it.



Figure 2-9: Pressing the Auto-Lock key

**CAUTION** Do not force the rotor onto the drive shaft. If the rotor is very light, it may be necessary to carefully press it onto the drive shaft with little force.

**WARNING** If the rotor cannot be properly locked in place after several attempts, then the Auto-Lock is defective and you are not permitted to operate the rotor. Check for any damage to the rotor: Damaged rotors must not be used. Keep the drive shaft area of the rotor clear of objects.

**CAUTION** Make sure that the rotor is properly locked on the drive shaft before each use by pulling at its handle.

**Supplementary Information**

**CAUTION** Unapproved or incorrectly combined rotors and accessories can cause serious damage to the centrifuge.

**NOTICE** Some rotors may be too heavy to be handled by a single person. Assign a second person to assist when handling a heavy rotor. Refer to “Rotor Specifications” on page B-1 for the weight of a rotor.

The approved rotors are listed in the “Rotor Program” on page A-4. Operate the centrifuge only with rotors and accessories from this list. Make sure that all components of a rotor are safely fixed when carried.

The centrifuge is equipped with a Thermo Scientific™ Auto-Lock™ locking feature that automatically locks the rotor to the drive shaft.

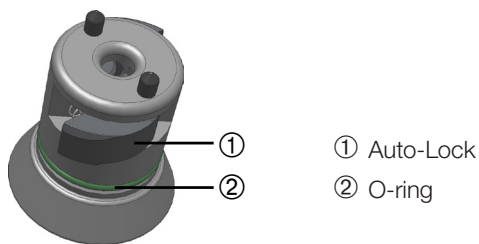


Figure 2-10: Auto-Lock on the drive shaft

## 2. 5. Load the Rotor

### 2. 5. 1. Assembling TX-400 Round Buckets and Adapters

When using an adapter for 15 ml or 50 ml conical tubes make sure that you assemble the bucket and adapter correctly.

The adapters have a rounded key feature that fits into a matching slot in the bucket. If the key is not in the slot, the bucket cap will not close properly and the centrifuge will not start and may cause damage to bucket, adapter and the sample.

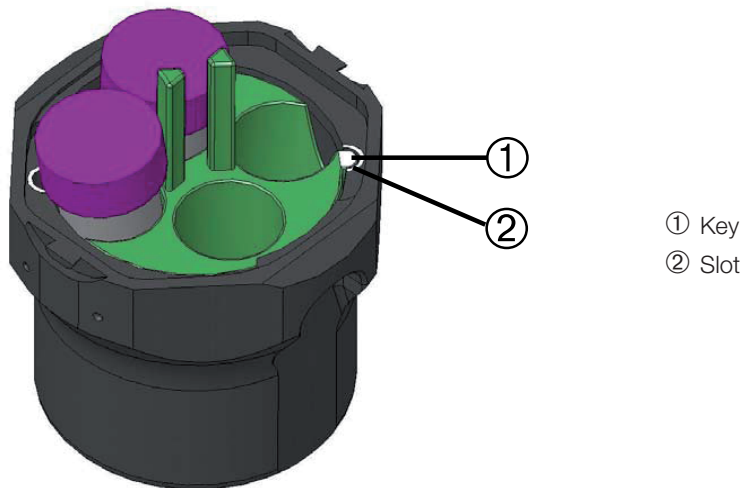


Figure 2-11: Slot and Key on Paired Buckets and Rotors

### 2. 5. 2. Balance Loading

Load the compartments evenly. Balance opposite loads.

When using swinging bucket rotors mind the following in addition:

- Weigh the bucket content (adapter and tube). Make sure you do not exceed the maximum compartment load nor the weight difference limit for adjacent buckets if there is one for the rotor.
- Make sure to install all buckets if using swinging bucket rotors.  
Make sure you install an identical bucket type in opposite positions.
- If in doubt, contact VWR customer service.

#### Correct Loading ✓

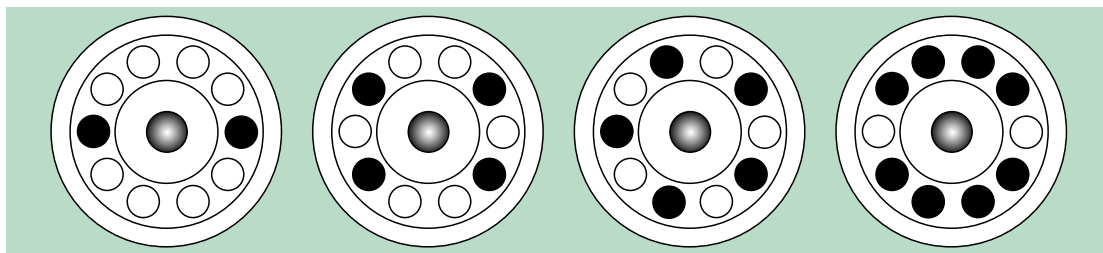


Figure 2-12: Correct loading examples for fixed angle rotors

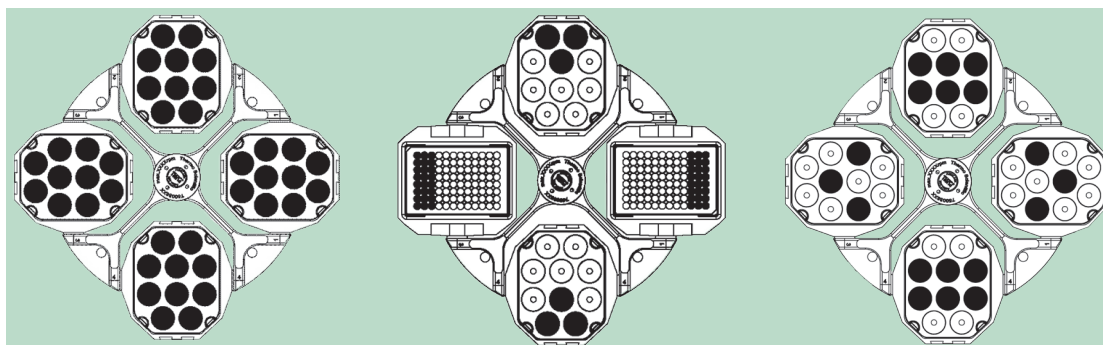


Figure 2-13: Correct loading examples for swinging bucket rotors

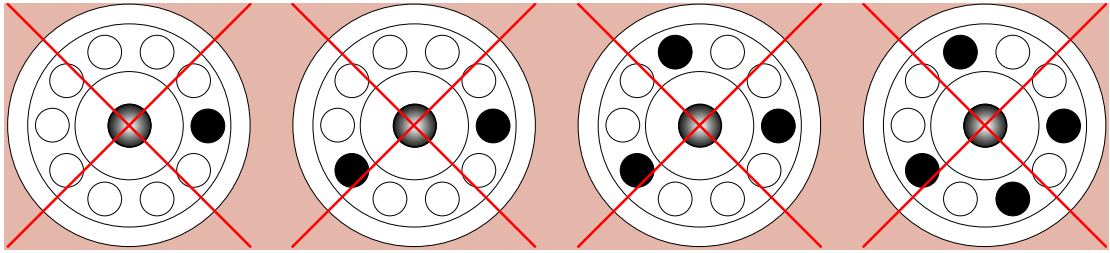
**Incorrect Loading** ✘

Figure 2-14: Incorrect loading examples for fixed angle rotors

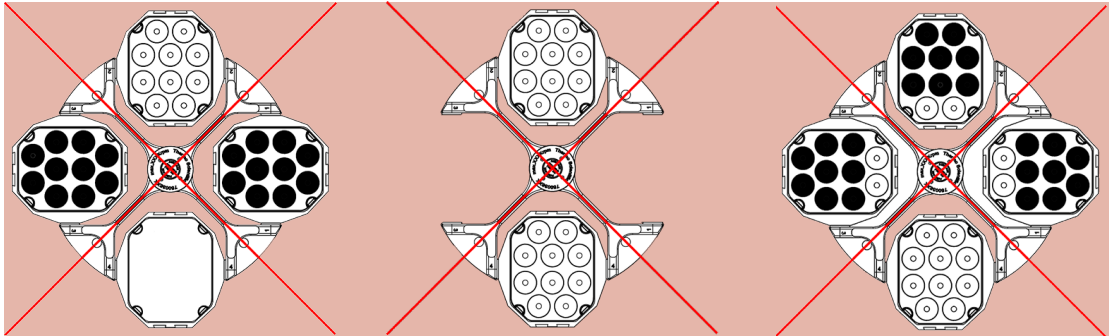


Figure 2-15: Incorrect loading examples for swinging bucket rotors

**Before loading a Rotor**

1. Inspect the rotor and all accessory parts for damage, such as cracks, scratches, or traces of corrosion.
2. Inspect the centrifugation chamber, drive shaft and Auto-Lock device for damage, such as cracks, scratches, or traces of corrosion.
3. Check the suitability of the rotor and other used accessories against the Chemical Compatibility Chart. Refer to “Chemical Compatibility” on page D-1.
4. Make sure that:
  - » tubes or bottles fit in the rotor.
  - » the tubes or bottles do not touch the rotor lid or bucket caps.
  - » buckets or microplate carrier can swing freely by moving them carefully with your hand.

**CAUTION**

Incorrect loading can lead to damage. Always load the rotor symmetrically to avoid imbalance, noisy spinning and possible damage. A full complement of buckets needs to be installed before operating a swinging bucket rotor.

**CAUTION**

When using an aerosol-tight rotor lid or bucket caps, verify that the sample tubes don't interfere with the rotor lid or bucket cap and don't compromise its sealing efficiency.

**CAUTION**

Always use 2 identical bucket types in opposite positions. Make sure that opposite buckets are of the same weight class, if a weight class is labeled on the buckets.

**CAUTION**

Tubes may open and break during centrifugation because they do not fit properly to the cavities. Contamination may occur. Make sure that the length and width of the tubes are fitting into the adapter and cavities. Do not use tubes that are too short or too thick for the adapter and the cavities.



### 2. 5. 3. Maximum Loading

Each rotor is designed to run with its maximum load at maximum speed. The safety system of the centrifuge requires that the rotor is not overloaded.

The rotors are designed to work with substance mixtures with a density of up to 1.2 g/ml. If the admissible maximum load is exceeded, the following steps need to be taken:

- Reduce the fill level.
- Reduce the speed.

Use the following formula or the table given for each rotor in the chapter “Rotor Specifications” on page B-1 to calculate the maximum admissible speed for a given load:

$$n_{\text{adm}} = n_{\text{max}} \sqrt{\frac{w_{\text{max}}}{w_{\text{app}}}}$$

$n_{\text{adm}}$  = admissible maximum application speed

$n_{\text{max}}$  = maximum rated speed

$w_{\text{max}}$  = maximum rated load

$w_{\text{app}}$  = applied load

#### RCF Value Explained

The relative centrifugal force (RCF) is given as a multiple of the force of gravity (g). It is a unitless numerical value which is used to compare the separation or sedimentation capacity of various centrifuges, since it is independent of the type of device. Only the centrifuging radius and the speed are used for calculation:

$$\text{RCF} = 11,18 \times \left( \frac{n}{1000} \right)^2 \times r$$

$r$  = centrifuging radius in cm

$n$  = rotational speed in rpm

The maximum RCF value is related to the maximum radius of the tube opening.

Remember that this value is reduced depending on the tubes, buckets and adapters used.

This can be accounted for in the calculation above if required.

### 2. 5. 4. Use of Tubes and Consumables

Make sure that the tubes and bottles used in the centrifuge are:

- rated to or above the selected RCF to be spun at,
- used at their minimum fill volume and not above their maximum fill volume,
- not used above their design life (age or number of runs),
- undamaged,
- fitting well into the cavities.

Please refer to manufacturers' data sheets for further information.

## 2. 6. Identify Rotor and Buckets

The centrifuge has a rotor detection that identifies an installed rotor. If a swing-out rotor is identified, the centrifuge prompts you to identify the bucket type installed in that rotor.

Rotor detection relies on a list of rotors stored in the memory of the centrifuge. If an unknown rotor is detected, please contact customer service. An update for that rotor list might be available to accommodate new rotor models.

Bucket selection is not possible for swing-out rotors ( e.g.TX-1000 and TX-400 ) for which only one bucket version is available. The bucket code corresponds to the last four digits of the bucket article number.

Proceed as follows to select the bucket type installed in the rotor:

1. Press the + or - button below the “Bucket” field of the LCD display window (see Figure 2–16) to select the correct bucket code for the buckets installed in your rotor.



Figure 2-16: Setting the Correct Bucket Code

2. Press the **Bucket** key repeatedly until the bucket code of the bucket being used is displayed.
3. Release the **+** or **-** button when the desired bucket code appears above the button.

Doing so selects the bucket code for future centrifugation runs (until the next time you choose to change this setting).

## 2. 7. Set Basic Centrifugation Parameters

### NOTICE

For more details on settings refer to “LCD Control Panel” on page 3-1.

### Set Speed / RCF-Value

The centrifuge lets you set speed in rpm or as an RCF value (see “RCF Value Explained” on page 2-8). You may set speed either from within an ongoing centrifugation run (centrifuge running) or for the next centrifugation run (centrifuge at standstill).

### Set Run Time

The centrifuge lets you set a run time after which the centrifugation run stops automatically.

### Acceleration and Deceleration Profiles

The centrifuge offers a total of 9 acceleration profiles (numbered 1 through 9) and total of 10 deceleration profiles or braking curves (numbered 0 through 9) for centrifuging samples with a selected speed profile. An acceleration profile gradually increases the speed of the centrifuge after starting the centrifugation run. A deceleration profile gradually reduces the speed of the centrifuge towards the end of the centrifugation run.

**NOTICE** Avoid if possible speed ranges close to natural resonances of the system. Runs at resonance speeds may have shown vibration and an adverse effect on the quality of separation.

### Set Temperature

A refrigerated centrifuge allows for preselecting a temperature for the sample between -10 °C and +40 °C for the centrifugation run. This feature is not available on ventilated models.

## 2. 8. Pre-Temper the Centrifugation Chamber

Refrigerated centrifuges allow for pre-tempering, that is pre-warming or pre-cooling, the centrifugation chamber and the empty rotor before the centrifugation run starts. If necessary pre-temper your samples using proper equipment. The centrifuge is not intended to be used to pre-temper your samples.

**NOTICE** Ventilated models cannot pre-temper the centrifugation chamber.

## 2. 9. Centrifugation



### WARNING

Damage to health from centrifuging explosive or flammable materials or substances. Do not centrifuge explosive or flammable materials or substances.







### CAUTION

Due to air friction sample integrity may be affected.  
The temperature of the rotor may rise significantly while the centrifuge is spinning.  
Ventilated units lead to a heat up of the rotor above the ambient temperature.  
Refrigerated units can have a deviation from displayed and set temperature to the sample temperature.  
Make sure the centrifuge temperature control capabilities meet your application specification. If necessary make a test run.

Mind the safety zone of minimum 30 cm around the centrifuge. Refer to “Safety Zone” on page 1-2. Persons and hazardous substances must be kept out of this safety zone while centrifuging.

Once the main switch has been turned on, the rotor has been properly installed, the setpoints have been set as explained in the previous section, and the centrifuge lid has been closed, you are ready to start.

### **You have various options to start a centrifugation run with a LCD control panel:**

- **Continuous Mode:** This is a fully manual mode. In Continuous Mode you use the **Start** key  and **Stop** key  to start and stop centrifugation manually, as explained in the section “Continuous Operation” further below.
- **Timed Mode:** This is a semi-automatic mode that relies on a timer. If you have preset a runtime (see “3. 2. 2. Set Run Time” on page 3-3), you press the **Start** key , then wait for the timer to expire and the centrifuge to stop down automatically.
- **Program Mode:** This is a fully automatic mode. You prepare and save an automated program, as explained in the section “Setting Up and Saving a Program” on page 3-6, then run it by pressing the appropriate program selection key .

### NOTICE

For more details on settings refer to “LCD Control Panel” on page 3-1.

## 2. 10. Aerosol-Tight Applications

### 2. 10. 1. Basic Principles

Make sure that the sample containers are well suited for the desired centrifugation process.



### CAUTION

Aerosol-tight rotors and tubes may only be opened in an approved safety work-bench when centrifuging dangerous samples. Mind the maximum permissible load.



### CAUTION

Be sure to check all sealings before starting any aerosol-tight applications.

### 2. 10. 2. Fill Level

Do not fill the tubes beyond a safe level to prevent the sample from reaching the top of the tube during centrifugation. To be on the safe side, fill the tubes only to 2/3 of the rated level.

### 2. 10. 3. Aerosol-Tight Rotor Lids

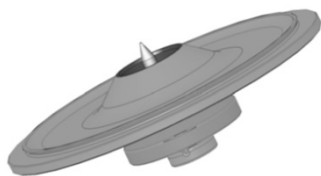


Figure 2-17: Lid of an aerosol-tight rotor with mandrel

#### **Placing O-ring**

The O-ring fulfills its purpose best, when it is neither excessively stretched nor bulged. The O-ring shall be equally placed in the groove of the lid.

Place the O-ring as follows:

1. Place the O-ring above the groove.
2. Push the O-ring on two opposite places into the groove. Make sure the rest of the O-ring is equally distributed.
3. Push the centers of the loose parts into the groove.
4. Push the remaining O-ring into place.

**NOTICE** If the O-ring seems to be too long or too short, take it off the lid and repeat the process.



#### **CAUTION**

When using an aerosol-tight rotor lid, verify that the sample tubes do not interfere with the rotor lid and compromise its sealing efficiency.



#### **CAUTION**

Rotors supplied with a lid for aerosol-tight applications come with a mandrel as an accessory to the Auto-Lock device. Be sure not to place the lid on this mandrel. The lid may be damaged.

### 2. 10. 4. Aerosol-Tight Rotor Buckets

#### **Aerosol-tight Closure with ClickSeal**

1. If necessary, grease the lid joint before closing the lid. Use grease (521-1771) for this.
2. Raise the latch.

The cap can now be easily placed on the bucket.

3. Lower the latch to close the bucket aerosol-tight; be sure the latch clicks into place.

Make sure that both sides of the latch are closing the bucket cap.

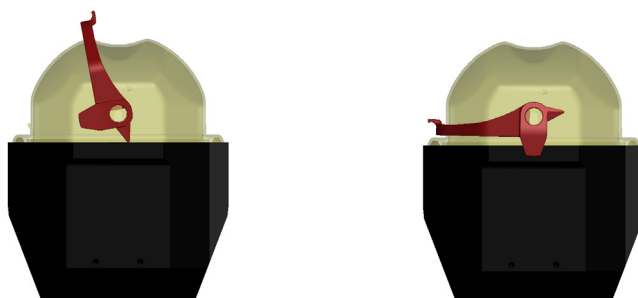


Figure 2-18: Bucket with open lid (left) and closed lid (right)



#### **CAUTION**

If the latch is not flipped down, the caps could be damaged during centrifugation. If the latch has not clicked into place, the bucket is not aerosol-tight. Never lift the bucket at its latch.



#### **CAUTION**

Make sure that the length of tubes used allow proper closing of the bucket cap. Otherwise the bucket will not be aerosol-tight.

## 2. 10. 5. Checking the Aerosol-Tightness

The aerosol-tightness testing of the rotors and buckets depends on the microbiological test process in accordance with the EN 61010-2-020 Appendix AA.

Whether or not a rotor is aerosol-tight depends primarily on proper handling.

Make sure that your rotor is aerosol-tight.

The careful inspection of the seals and seal surfaces for signs of wear and damage such as cracks, scratches and embrittlement is extremely important.

Aerosol-tight applications are not possible if the rotor is run without the lid.

Aerosol-tightness requires the correct operation when filling the sample vessels and closing the rotor lid.

### **Quick Test**

As a quick test, it is possible to test the aerosol-tightness using the following process:

1. Lubricate all seals lightly.

Always use the special grease (521-1771) when lubricating the seals.

2. Fill the bucket with approx. 10 ml of carbonated mineral water.
3. Close the bucket as explained in the handling instructions.
4. Shake the bucket vigorously using your hands.

This releases the carbonic acid gas which is bound in the water, resulting in excess pressure. Do not apply pressure to the lid when doing so.

Leaks can be detected by escaping water or the sound of escaping gas.

Replace the seals if you detect any leaks. Then repeat the test.

Dry the rotor, rotor lid and the cover seal.

**⚠ CAUTION** Prior to each use, the seals in the rotor are to be inspected in order to assure that they are correctly seated and are not worn or damaged. Damaged seals are to be replaced immediately. Replacement seals can be re-ordered as a spare part ("Rotor Specifications" on page B-1). When loading the rotor, ensure that the rotor lid closes securely. Damaged rotor covers are to be replaced immediately.

**CAUTION**

This quick test is not suited for validating the aerosol tightness of a rotor. Check the seals and sealing surfaces of the lid thoroughly.

## 3. LCD Control Panel

This chapter contains details for the centrifuges with the LCD display described in this manual. Pictures shown are examples and may be different in details to your experience—for example, the LCD display for a ventilated unit does not have a key for entering temperature, nor a temperature readout.

**NOTICE** This chapter shows examples for refrigerated models only.

### 3.1. Overview

The LCD display combines a single-line LCD (Liquid Crystal Display) screen with membrane-protected keys for choosing commands or increasing and decreasing parameter values. Figure 3–1 presents the arrangement of the LCD screen areas and keys described in the following.

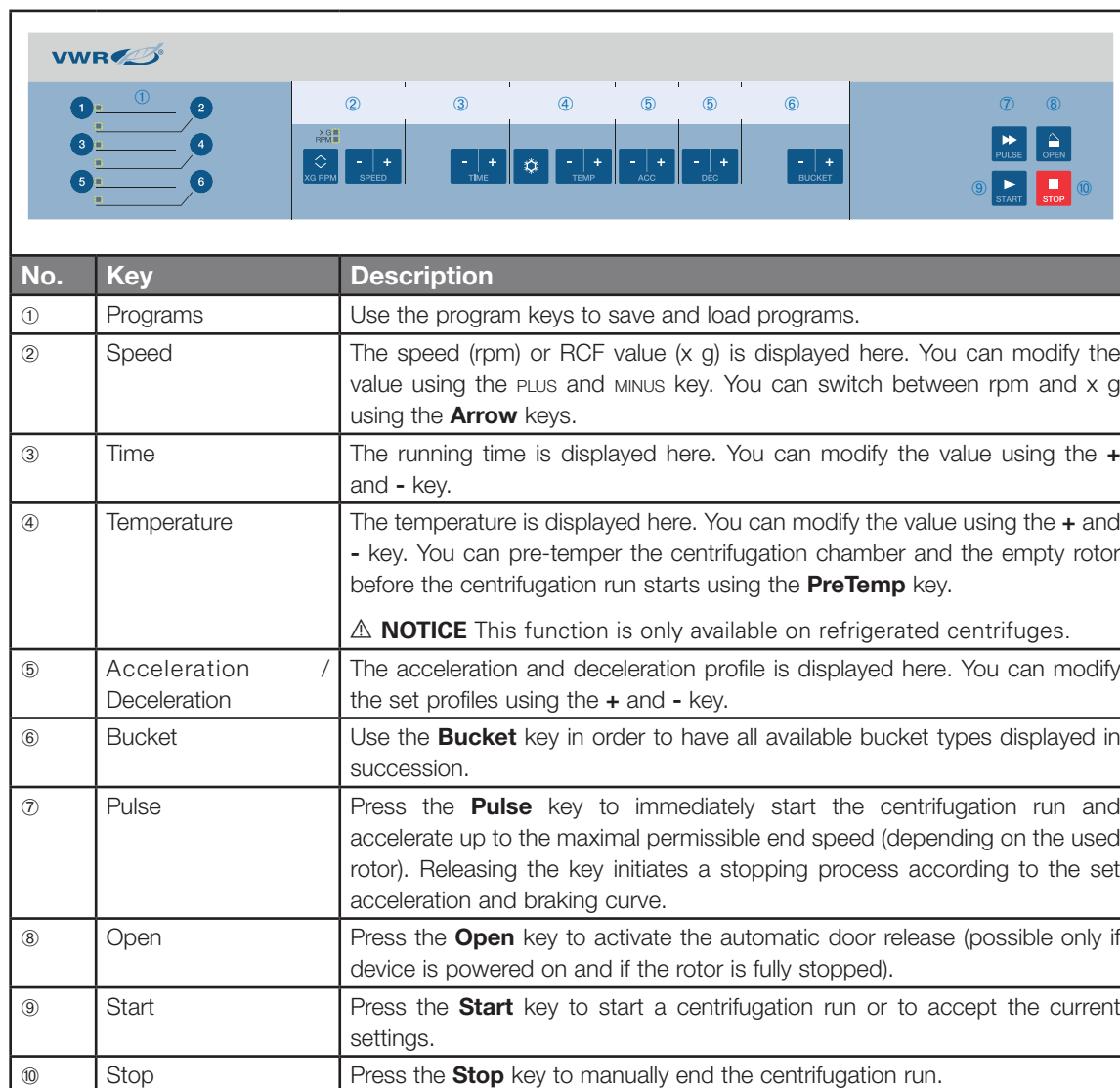


Figure 3–1: Functions on the LCD Control Panel

## 3. 2. Set Basic Centrifugation Parameters

This section explains how to set up the centrifuge with speed / RCF values, acceleration and deceleration profiles, temperature (refrigerated models only), and other operating parameters.

### 3. 2. 1. Set Speed / RCF-Value

The centrifuge lets you set speed in rpm or as an RCF value (see “RCF Value Explained” below). You may set speed either from within an ongoing centrifugation run (centrifuge running) or for the next centrifugation run (centrifuge at standstill).

#### RCF Value Explained

The relative centrifugal force (RCF) is given as a multiple of the force of gravity (g). It is a unitless numerical value which is used to compare the separation or sedimentation capacity of various centrifuges, since it is independent of the type of device. Only the centrifuging radius and the speed are used for calculation:

$$RCF = 11,18 \times \left\langle \frac{n}{1000} \right\rangle^2 \times r$$

r = centrifuging radius in cm

n = rotational speed in rpm

The maximum RCF value is related to the maximum radius of the tube opening.

Remember that this value is reduced depending on the tubes, buckets and adapters used.

This can be accounted for in the calculation above if required.

Proceed as follows to set a speed or RCF value:

1. Press the **Arrow** keys below the xg / rpm LED indicators (left in Figure 3–2) to toggle between RCF (in xg, which means multiples of the force of gravity) and speed (in rpm, which is short for revolutions per minute).

The LED indicator **xg** or **rpm** is lit to indicate the selected mode, and the value in the LCD display switches to an **RCF** or **rpm** reading. The example in Figure 3–2 shows the rpm reading (bottom) and the equivalent RCF reading (top).

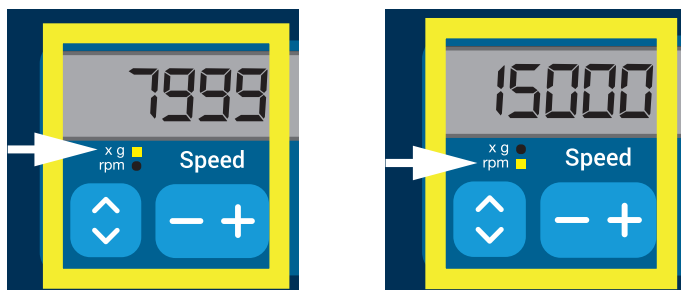


Figure 3–2: Choosing between RCF / rpm and setting the Centrifuge Speed

2. Press the **+** or **-** key below the **Speed** field of the LCD display to set the desired value.

**NOTICE** If you select an extremely low RCF value, it will be automatically corrected if the resulting speed is less than 300 rpm. 300 rpm is the lowest selectable speed.

3. Release the **+** or **-** key when the desired value appears.

Doing so selects the speed setting for future centrifugation runs (until the next time you choose to change this setting).

### 3. 2. 2. Set Run Time

The centrifuge lets you preset a run time after which the centrifugation run stops automatically.

Proceed as follows to set run time:

1. Press the **+** or **-** key below the **Time** field of the LCD display to set the desired duration for the centrifugation run.

The value displayed in the **Time** field (see Figure 3–3 below) changes accordingly.

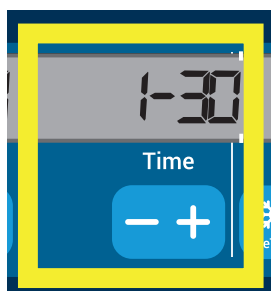


Figure 3–3: Setting the Centrifuge Run Time

2. Release the key when the desired runtime in hours and minutes appears.

Doing so selects the runtime setting for future centrifugation runs (until the next time you choose to change this setting) .

### 3. 2. 3. Set Acceleration and Deceleration Profiles

The centrifuge offers a total of 9 acceleration curves (numbered 1 through 9). An acceleration curve gradually increases the speed of the centrifuge after starting the centrifugation run. An acceleration profile gradually increases the speed of the centrifuge after starting the centrifugation run. A deceleration profile gradually reduces the speed of the centrifuge towards the end of the centrifugation run.

**NOTICE** After the centrifuge is turned on, the last running profile selected is shown.

**NOTICE** Avoid if possible speed ranges close to natural resonances of the system. Runs at resonance speeds may have show vibration and an adverse effect on the quality of separation.

#### Acceleration Profile

Proceed as follows to select an acceleration curve:

1. Press the **+** or **-** key below the **Acceleration** field of the LCD display to cycle through the selection of available acceleration profiles.

Curve number 1 provides the slowest and curve number 9 the fastest acceleration rate.

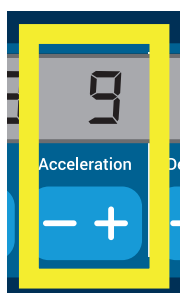


Figure 3–4: Setting the Acceleration Profile

2. Release the **+** or **-** key when the number of the desired acceleration profile appears in the display window. Doing so selects the acceleration profile for future centrifugation runs (until the next time you choose to change this setting) .



## Deceleration Profiles

The centrifuge offers a total of 10 deceleration or braking curves (numbered 0 through 9). A deceleration curve gradually reduces the speed of the centrifuge towards the end of the centrifugation run.

**NOTICE** After the centrifuge is turned on, the last running profile selected is shown.

Proceed as follows to select a braking curve:

1. Press the **+** or **-** key below the **Deceleration** field of the LCD display window to cycle through the selection of available deceleration profiles.

Curve number 0 disables active deceleration altogether. Curve number 1 provides the slowest active and curve number 9 the fastest active deceleration rate.

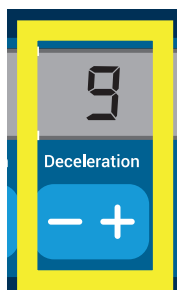


Figure 3-5: Setting the Deceleration Profile

2. Release the **+** or **-** key when the number of the desired deceleration profile appears in the display window. Doing so selects the deceleration profile for future centrifugation runs (until the next time you choose to change this setting).

### 3. 2. 4. Pre-Temper the Centrifugation Chamber

Refrigerated centrifuges allow for pre-tempering, that is pre-warming or pre-cooling, the centrifugation chamber and the empty rotor before the centrifugation run starts. If necessary pre-temper your samples using proper equipment. The centrifuge is not intended to be used to pre-temper your samples. Temperatures displayed by the centrifuge are the estimated sample temperatures.

**NOTICE** This feature is not available on ventilated models.

To set the pre-tempering temperature for the centrifuge, proceed as follows:

1. Insert the rotor with all buckets installed.
2. Press the **PreTemp** key to enable pre-tempering adjustment.

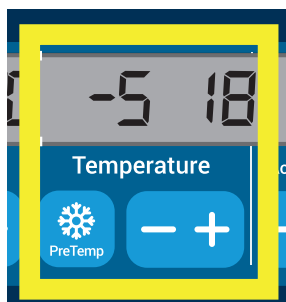


Figure 3-6: Setting the Pre-cooling or Pre-warming Temperature (left)

3. Press the **+** or **-** key and hold it until the desired temperature appears.
4. Release the **+** or **-** key when the desired temperature appears above the **PreTemp** key. The centrifuge starts heating or cooling the rotor chamber to the preset temperature. The current rotor chamber temperature displayed to the right of the selected pre-tempering value starts to change towards the desired value.
5. Wait until the sample chamber temperature indicator is at the same value as the pre-tempering temperature.

### 3. 2. 5. Set Temperature

A refrigerated centrifuge allows for preselecting a rotor chamber temperature between -10 °C and +40 °C for the centrifugation run. Temperatures displayed by the centrifuge are the estimated sample temperatures.

**⚠ CAUTION** Due to air friction sample integrity may be affected.

The temperature of the rotor may rise significantly while the centrifuge is spinning.

Refrigerated units can have a deviation from displayed and set temperature to the sample temperature.

Make sure the centrifuge temperature control capabilities meet your application specification. If necessary make a test run.

**NOTICE** This feature is not available on ventilated models.

Proceed as follows to preselect a temperature for the centrifugation run:

1. Press the **+** or **-** key below the **Temperature** field of the LCD display window (right side of Figure 3–7, showing 18 degrees Celsius) to adjust the desired rotor chamber temperature.

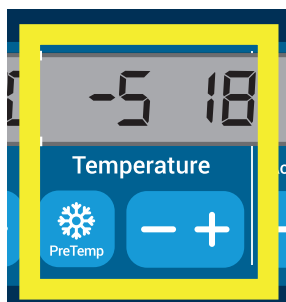


Figure 3–7: Setting the Temperature for the Centrifugation Run (right)

2. Release the **+** or **-** key when the desired temperature appears above the key.  
Doing so selects the temperature for future centrifugation runs (until the next time you choose to change this setting) .

### 3. 2. 6. Select the Bucket Type

Bucket selection is only possible for swing-out rotors. The bucket code corresponds to the last four digits of the article number of the bucket.

Proceed as follows to select the bucket type installed in the rotor:

1. Press the **+** or **-** key below the **Bucket** field of the LCD display window (see Figure 3–8) to select the correct bucket code for the buckets installed in your rotor.



Figure 3–8: Setting the Correct Bucket Code for the Rotor

2. Press the **Bucket** key repeatedly until the bucketcode of the bucket being used is displayed.
3. Release the **+** or **-** key when the desired bucket code appears above the key.  
Doing so selects the bucket code for future centrifugation runs (until the next time you choose to change this setting).

### 3.3. Programs


To reduce the setup effort before a centrifugation run, the centrifuge lets you enter a selection of desired program parameters and store them together as a program that may be retrieved for later use. You can include all or part of the run parameters explained in previous sections of this chapter, including:

- acceleration and braking profile
- speed or RCF value
- running time
- temperature
- bucket type by code

#### Setting Up and Saving a Program

All centrifuge models described in this section let you store up to six programs using dedicated front panel keys. You can retrieve and start the programs later on by pressing the program key assigned during storage.

Proceed as follows to store a program:

1. Set your choice of run parameters in one go, as explained for your centrifuge model in the previous sections of this chapter.
2. Press any of the program selection keys  for 4 seconds.

Your program is stored now.





For instructions on how to start a previously stored program, please refer to the section “Program Mode Operation” on page 3-7.

### 3.4. Centrifugation

Mind the safety zone of minimum 30 cm around the centrifuge. Refer to “Safety Zone” on page 1-1. Persons and hazardous substances must be kept out of this safety zone while centrifuging.

Once the rotor has been properly installed, the main power switch has been turned on and the centrifuge lid has been closed, you are ready to start centrifuging.

You have various options to start a centrifugation run:

- Continuous Mode: This is a fully manual mode. In Continuous Mode you use the **Start** key  and **Stop** key  to start and stop centrifugation manually, as explained in the section “Continuous Operation” further below.
- Timed Mode: This is a semi-automatic mode that relies on a timer. If you have preset a runtime (see “3.2.2. Set Run Time” on page 3-3), you press the **Start** key , then wait for the timer to expire and the centrifuge to stop automatically.
- Program Mode: This is a fully automatic mode. You prepare and save an automated program, as explained in the section “Setting Up and Saving a Program” on page 3-6, then run it by pressing the appropriate program selection key .



#### WARNING

Damage to health from centrifuging explosive or flammable materials or substances. Do not centrifuge explosive or flammable materials or substances.

#### Continuous Mode Operation

Proceed as follows to run the centrifuge in continuous, manual stop mode of operation.

1. Set the desired parameters, as explained in the section “3.2. Set Basic Centrifugation Parameters” on page 3-2.

**NOTICE** Speed (see “3.2.1. Set Speed / RCF-Value” on page 3-2) must be set as a minimum requirement.

2. Press the **Start** key  on the control panel.

The centrifuge starts running up to the pre-set speed. The LCD display changes to reflect the acceleration process until the centrifuge reaches the pre-set speed.

3. Press the **Stop** key  when you have finished centrifuging.

**NOTICE** You cannot open the lid as long as the centrifuge is spinning.

## Timed Mode Operation

Proceed as follows to run the centrifuge in timed mode of operation.

1. Set the desired parameters, as explained in the section “3.2. Set Basic Centrifugation Parameters” on page 3-2.

**NOTICE** Speed (see “3.2.1. Set Speed / RCF-Value” on page 3-2) and runtime (see “3.2.2. Set Run Time” on page 3-3) must be set as a minimum requirement.

2. Press the **Start** key  on the control panel.

The centrifuge starts running and the LCD display changes to indicate the correct speed.

3. When the remaining time has elapsed, the centrifuge will stop automatically.

**NOTICE** You cannot open the lid as long as the centrifuge is spinning.

## Program Mode Operation

Proceed as follows to start a previously stored program.

1. Press any of the program selection keys  to select a program.

**NOTICE** There is no need to set any parameters. All settings are included in the program.

2. Press the **Start** key  to start the centrifugation run with the selected program's settings.

The centrifuge starts running up to the pre-set speed.

The LCD display changes to reflect the acceleration process until the centrifuge reaches the pre-set speed.

3. When the remaining time has elapsed, the centrifuge will stop automatically.

**NOTICE** You cannot open the lid as long as the centrifuge is spinning.

## Handling Error Messages

Error messages may occur when you try to start the centrifuge. Frequent root causes include the following:

- Set speed exceeds admissible speed for rotor
- Imbalanced load
- Unapproved rotor found by rotor detection

A detailed list of error messages and troubleshooting instructions appear in the section “Troubleshooting by Guide” on page 5-2.

## 3. 5. Stop an Ongoing Centrifugation Run

You can stop the centrifuge at any time by pressing the **Stop** key  on the control panel.

Proceed as follows to stop an ongoing centrifugation run:

1. Press the **Stop** key  on the control panel.
2. Wait for the speed drop to zero.

The message END appears in the LCD display.

You can now open the lid and remove the centrifuged material, as explained in “How to Install and Remove a Rotor” on page 2-4.

### 3. 6. System Menu

To enter the system menu hold down any of the keys when powering on the centrifuge.

Use the + and - keys below Speed in order to navigate through the system menu.

Use the + and - keys below Bucket in order to navigate within the system menu points.

Within the system menu you can change the settings of the centrifuge. Following settings are available:

1. Language – following languages are supported: English, German, French, Spanish, Italian, Dutch, Russian.
2. End of run beep – select **YES** if the centrifuge shall make beep after the run. Otherwise select **NO**.
3. Keypad beep – select **YES** if the centrifuge shall make beep when pressing any key. Otherwise select **NO**.
4. LCD powersave – select **YES** if the centrifuge shall enter a powersave mode after the run. Otherwise select **NO**.
5. Auto lid open – select **YES** if the centrifuge shall open after the run. Otherwise select **NO**.
6. Software ID – the current software version is shown here.
7. Cycle count – the current numbers of cycles are shown here.

## 4. Maintenance and Care

### 4.1. Cleaning Intervals

For the sake of personal, environmental, and material protection, you must clean and if necessary disinfect the centrifuge and its accessories on a regular basis.

### 4.2. Basics

- Use warm water with a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agent.
- Use a soft cloth for cleaning.
- Never use caustic cleaning agents such as soap suds, phosphoric acid, bleaching solutions or scrubbing powder.
- Remove rotor and clean centrifugation chamber with a small amount of cleaning agent on a clean cloth.
- Use a soft brush without metal bristles to remove stubborn residue.
- Afterwards rinse with a small amount of distilled water and remove any remains with absorbent towels.
- Use only cleaning and disinfecting agents with a pH of 6-8.



#### CAUTION

Not rated procedures or agents could deteriorate the materials of the centrifuge and lead to malfunction. Refrain from using any other cleaning or decontamination procedure, if you are not entirely sure that the intended procedure is safe for the equipment. Use only cleaning agents that will not damage the equipment. In doubt contact the manufacturer of the cleaning agent. If still in doubt, contact VWR.

#### 4.2.1. Rotor and Accessories Inspection

After thoroughly cleaning the rotors, they must be inspected for damage, wear and corrosion.

The cycle limits of the rotors and buckets are stated on some rotors and buckets and in the technical data section of each rotor ("Rotor Specifications" on page B-1).

**NOTICE** Usage beyond these limits might lead to rotor failure, sample loss and damage to the centrifuge.



#### CAUTION

Do not run any rotor or accessories with sign of damage. Ensure that the rotor, buckets and accessories are within their expected maximum number of cycles. It is recommended that you have rotors and accessories inspected yearly as part of your routine service to ensure safety.

#### Metal Parts

Make sure that the protective coating is complete. It can be removed through wear and chemical attack and can lead to unseen corrosions. In case of corrosion, such as rust or white / metallic pitting, the rotor or accessories must be removed from service immediately. Particular attention should be paid to the bottom of buckets on swinging bucket rotors and tube cavities on fixed angle rotors.

#### Slide Coated Rotors

Rotor crosses are provided with an anti-friction and corrosion resistant finish.

The following procedure is for rotor crosses and rotor trunnion bolts:

- Regular cleaning of contact area between the rotor and buckets (rotor cross trunnions and bucket grooves) is recommended with a mild detergent (every 300-500 cycles).
- The rotor cross is coated with a special advanced lubricating and protective coating, therefore no grease is necessary.
- Contaminating particles (dirt, dust or debris) in the rotor cross and bucket grooves may lead to imbalance and cleaning will be required.
- The lubricating coating may, over extended periods or under heavy loads, become worn. If this occurs a small amount of greasing of the rotor cross trunnions will be required with bolt grease (521-1770).

## **Plastic Parts**

Check for signs of plastic crazing, fading, bruising or cracking. In case of damage the inspected item must be removed from service immediately.

## **O-Rings**

Make sure that O-rings are still smooth, not brittle nor otherwise damaged. Some O-rings are not autoclavable. Replace brittle or damaged O-rings immediately. Refer to “Rotor Specifications” on page B-1 for details on O-rings as spare part.

### **4. 2. 2. Cycles of Rotors and Buckets**

You have to count the cycles of the rotors and buckets using your own method. The centrifuge can not detect the change or replacement of rotors of the same type or of buckets of the same type.

The lifetime of a rotor and buckets depends on the amount of physical load. Do not use rotors and buckets that exceed the maximum number of cycles.

The maximum number of cycles for rotors and buckets is given in the chapter “Rotor Specifications” on page B-1. The maximum number of cycles for buckets is marked on the buckets themselves.

Fiberlite rotors are not limited in cycles, but have a limited lifetime of 15 years.

The centrifuge does not count cycles for a rotor type or a bucket type. You have to count the cycles of the rotors and buckets using your own method.

## **4. 3. Cleaning**

Clean as follows:

1. Clean rotor, buckets and accessories outside of the centrifugation chamber.
2. Separate rotor, buckets, lids, adapters, tubes and O-rings to allow thorough cleaning.
3. Rinse rotor and all accessories with warm water and a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agent. Clean away the grease from the rotor trunnions (pivot point for swinging buckets).
4. Use a soft brush without metal bristles to remove stubborn residue.
5. Rinse rotor and all accessories with distilled water.
6. Place the rotors on a plastic grate with their cavities pointing down, to enable the cavities to fully drain and dry.
7. Dry all of the rotors and accessories after cleaning with a cloth or in a warm air cabinet at a maximum temperature of 50 °C. If drying boxes are used, the temperature must never exceed 50 °C. Higher temperatures could damage the material and shorten the lifetime of the parts.
8. Inspect the rotor and accessories for signs of damages (“Rotor and Accessories Inspection” on page 4-1).
9. After cleaning, treat the entire surface of aluminum parts including the cavities with corrosion protection oil (521-1769).

Treat the bolts of swinging bucket rotors with bolt grease (521-1770) if necessary.



### **CAUTION**

Before using any cleaning methods, users should check with the manufacturer of the cleaning agents that the proposed method will not damage the equipment.



### **CAUTION**

Drive and door lock can be damaged by entering liquids. Do not allow liquids, especially organic solvents, to get on the drive shaft, the drive bearings or the centrifuge door locks. Organic solvents break down the grease in the motor bearing. The drive shaft could lock up.

## Ventilation Grid

To clean the ventilation grid proceed as follows:

1. Pull out the power supply plug.
1. Remove the 2 screws of the ventilation grid ① on the right side of the centrifuge.
2. Remove the ventilation grid ② by pushing it downwards.
3. Use a vacuum cleaner to clean the ventilation grid and if necessary the condenser. Use a soft brush for detailed cleaning if needed.
4. Reinstall the ventilation grid.

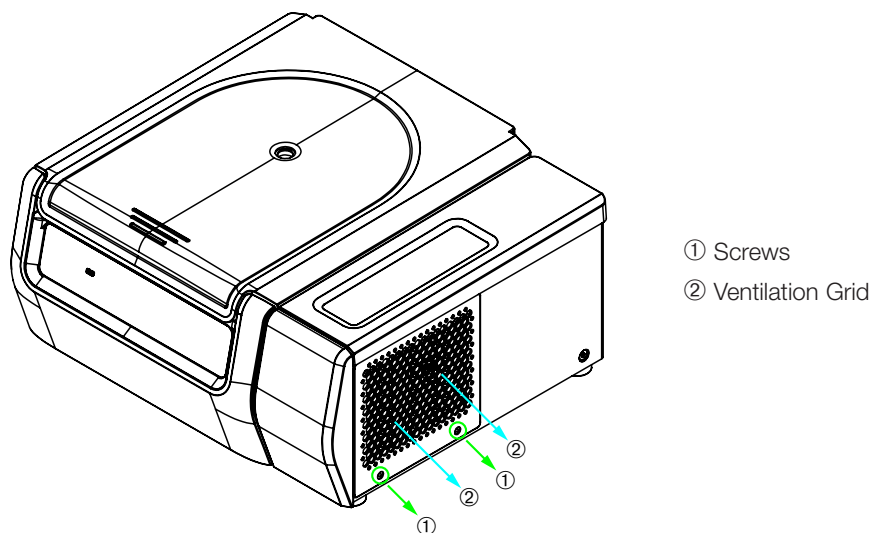


Figure 4-1: Removing the ventilation grid



### CAUTION

Cutting injuries can occur due to sharp metal. Do not touch the condenser with your hands when the ventilation grid is removed.



## 4. 4. Disinfection

**You are responsible that the level of disinfection is achieved according to your requirements.**

### After disinfection:

1. Rinse the centrifuge and all affected accessories with water.
2. Allow to fully drain and dry.
3. After disinfecting, treat the entire surface of aluminum parts including the cavities with corrosion protection oil (521-1769).

Treat the bolts of swinging bucket rotors with bolt grease (521-1770) if necessary.



#### **WARNING**

Do not touch infected parts. Hazardous infection is possible when touching the contaminated rotor and centrifuge parts. Infectious material can get into the centrifuge when a tube breaks or as a result of spills. In case of contamination, make sure that no one is put at risk. Disinfect the affected parts immediately.



#### **CAUTION**

Equipment can be damaged by inappropriate disinfection methods or agents. Make sure that the disinfection agent or the method will not damage the equipment. In doubt contact the manufacturer of the disinfection agent. Observe the safety precautions and handling instructions for the disinfection agents used.

## 4. 5. Decontamination

**You are responsible that the level of decontamination is achieved according to your requirements.**

### After decontamination:

1. Rinse the centrifuge and all affected accessories with water.
2. Allow to fully drain and dry.
3. After decontaminating, treat the entire surface of aluminum parts including the cavities with corrosion protection oil (521-1769).

Treat the bolts of swinging bucket rotors with bolt grease (521-1770) if necessary.



#### **WARNING**

Do not touch contaminated parts. Exposure to radiation is possible when touching the contaminated rotor and centrifuge parts. Contaminated material can get into the centrifuge when a tube breaks or as a result of spills. In case of contamination, make sure that no one is put at risk. Decontaminate the affected parts immediately.



#### **CAUTION**

Equipment can be damaged by inappropriate decontamination methods or agents. Make sure that the decontamination agent or the method will not damage the equipment. In doubt contact the manufacturer of the decontamination agent. Observe the safety precautions and handling instructions for the decontamination agents used.

## 4. 6. Autoclaving

Always disassemble all parts before autoclaving, e.g. lids need to be removed before autoclaving a bucket or rotor.

If not stated otherwise on the parts themselves, all parts can be autoclaved at 121 °C for 20 min. Refer to “Rotor Specifications” on page B-1 for details on rotors.

Make sure that the necessary sterility is achieved according to your requirements.

After autoclaving, treat the entire surface of aluminum parts including the cavities with corrosion protection oil (521-1769).

Treat the bolts of swinging bucket rotors with bolt grease (521-1770) if necessary.



### CAUTION

Never exceed the permitted temperature and duration when autoclaving.

### NOTICE

No chemical additives are permitted in the steam.

## 4. 7. Maintenance

### Lifetime

The centrifuge is specified for a lifetime of 10 years. Decommissioning the centrifuge is suggested when this limit is reached.

The lifetime of rotors, buckets and lids is based on cycles and specified individually for each rotor in the chapter “Rotor Specifications” on page B-1. The lifetime of Fiberlite rotors is limited to 15 years. Other accessories are not limited by a specific lifetime and need only be replaced when damaged or worn.

### Preventive Maintenance

In order to keep this product able to perform the intended applications reliably and safely, ongoing preventive maintenance is necessary in accordance with the following recommended schedule:

- The anti-vibration mounts of the motor suspension and motor cover are suggested to be replaced at three-year intervals.
- The particle deflection seals for ventilated versions of the centrifuge are suggested to be inspected annually and need to be replaced when damaged or exhibiting too much slack, but after 5 years at the latest.
- The gas spring of the centrifuge lid is suggested to be inspected annually and to be replaced when spring action deteriorates.
- The anti-vibration mounts and the motor cover need to be replaced every 3 years.
- For rotors and buckets mind the information in “Rotor and Accessories Inspection” on page 4-1.



### CAUTION

Usage beyond these limits might affect the safety of the overall system.

### NOTICE

In the worst case the centrifuge, the used accessories and the samples can be damaged.

### NOTICE

Maintenance activities must be performed by VWR authorized service technicians only.

## Service

VWR recommends having the centrifuge and accessories serviced once a year by an authorized service technician. The service technician checks the following:

- electrical equipment and connections
- suitability of set-up site
- centrifuge door lock and safety system
- rotor
- fixation of rotor and drive shaft of the centrifuge
- rubber gasket
- protective casing
- anti-vibration mounts

Before service, centrifuge and rotors should be thoroughly cleaned and decontaminated to ensure full and safe inspection can be completed.

VWR offers inspection and service contracts for this work. Any necessary repairs are performed for free during the warranty period and afterwards for a charge. That is only valid if the centrifuge has only been maintained by an authorized service technician.

A validation of the centrifuge is recommended and can be ordered from customer service.

## 4. 8. Shipping

Before shipping the centrifuge:

- The centrifuge must be clean and decontaminated.
- You must confirm the decontamination with a decontamination certificate.



### WARNING

Before shipping the centrifuge and accessories you must clean and, if necessary, disinfect or decontaminate the full system. If you are not sure, consult with VWR customer service.

## 4. 9. Storage

- Before storing the centrifuge and the accessories it must be clean and if necessary disinfected and decontaminated.

Centrifuge, rotors, buckets and accessories have to be fully dry before storage.

- Keep the centrifuge in a clean, dry and dust-free location.
- Do not store the centrifuge in direct sunlight.



### WARNING

When you remove the centrifuge and accessories from use, clean and if necessary disinfect or decontaminate the full system. If you are not sure speak to the VWR customer service.

## 4. 10. Disposal

For the disposal of the centrifuge mind the regulations in your country. Contact the VWR Customer Service for the disposal of the centrifuge. For contact information check the backpage of this manual.

For the countries of the European Union the disposal is regulated by the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EC.

Mind the information on transport and shipping ("Shipping" on page 4-6 and "Transporting" on page 1-2).



### WARNING

When removing the centrifuge and accessories from use for disposal you have to clean and if necessary disinfect or decontaminate the entire system. In doubt contact the VWR customer service.

## 5. Troubleshooting

### 5.1. Mechanical Emergency Door Release

During a power failure, you will not be able to open the centrifuge lid with the regular electric lid release. A mechanical override is provided to allow sample recovery in the case of an emergency. However, this should be used only in emergencies and **after the rotor has come to a complete stop**.

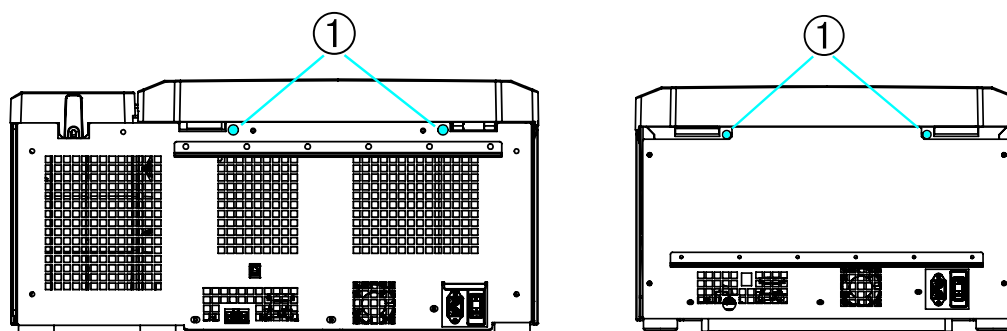
**Always wait until the rotor has come to a stop without braking.** The brake does not work when there is no power. The braking process lasts much longer than usual.

Proceed as follows:

1. **Wait until the rotor has stopped.** This can take longer than 40 minutes.
2. Pull out the power supply plug.
3. On the back side of the housing there are two plastic plugs. You can pry these plugs out of the back plate with a screwdriver. Pull the release cord attached to trigger the mechanical lid release. The lid will open and the samples can be removed.

Refrigerated Benchtop Centrifuge

Ventilated Benchtop Centrifuge



① Plastic plugs attached to the release cords

Figure 5-1: Emergency door release on the back side

**NOTICE** You need to pull both cords in order to unlock both locks.

4. Push the cord(s) back into the centrifuge and mount the plug(s).
5. Reconnect the centrifuge once the power has been restored.
6. Switch on the centrifuge.
7. Press the **OPEN** key to have the door locks operative again.

⚠ **WARNING** If you pull only one cord or you did not press the **OPEN** key to have the door locks operative again, the door might open while the rotor is still spinning.



#### **WARNING**

Serious injuries can occur if you touch a spinning rotor with your hands or tools. A rotor can still be spinning after a power failure occurs. Do not open the centrifuge before the rotor has stopped spinning. Do not touch a spinning rotor. Never use your hands or tools to stop a spinning rotor.

### 5.2. Ice Formation

Warm humid air in combination with a cold centrifugation chamber can lead to formation of ice. To remove the ice from the centrifugation chamber, proceed as follows:

1. Open the centrifuge door.
2. Remove the rotor. See “How to Install and Remove a Rotor” on page 2-4.
3. Let the ice melt.

**NOTICE** Do not use any sharp tools, aggressive liquids or fire to fasten the melting process. If necessary use warm water to speed up the melting process.

4. Remove the water from the centrifugation chamber.
5. Clean the centrifuge chamber. See “Maintenance and Care” on page 4-1.

### 5. 3. Troubleshooting by Guide

**NOTICE** If problems occur other than those listed in this table, the authorized customer service representative must be contacted.

Error Message	Description	Troubleshooting
Numbers not stated here	The centrifuge can not be operated. The run does not start or the centrifuge runs down without being braked.	Restart the centrifuge. If the error message still shows, contact a service technician.
14	Overtemperature detected.	Overheating in chamber. Check the function of the refrigeration unit. Clean the air inlet for the condenser. Restart the centrifuge. If the error message still shows, contact a service technician.
17-23	Rotor detection failed.	Make sure the rotor can be used in the centrifuge. Refer to "Rotor Program" on page A-4. Makes sure the rotor is properly installed. Refer to "How to Install and Remove a Rotor" on page 2-4. Restart the centrifuge. If the error message still shows, contact a service technician.
33	Overpressure in the refrigeration unit.	Clean the air inlet for the condenser. Restart the centrifuge. If the error message still shows, contact a service technician.
40	The centrifuge accelerates too slowly.	Is the rotor properly installed? Check whether you have selected the right bucket. Is it easy to turn the rotor when the lid is open? Does the rotor rub against the device? Restart the centrifuge. If the error message still shows, contact a service technician.
97	Mechanical emergency door release.	Close the centrifuge lid. Do not touch a spinning rotor. Never use your hands or tools to stop a spinning rotor. Restart the centrifuge. If the error message still shows, contact a service technician.
98	Imbalance detected.	Check the loading of the rotor. Check the lubrication of the trunnion bolts of the rotor body if a swinging bucket rotor is used. Restart the centrifuge. If the error message still shows, contact a service technician.

Table 5-1: Error Messages

### 5. 4. Information for the Customer Service

If you need to contact customer service, please provide the order no. and the serial no. of your device. This information can be found on the type plate.

To identify the software version on a centrifuge with a LCD control panel, proceed as follows:

- Hold down any of the keys and then switch on the centrifuge.  
You enter the system menu.
- Press the **START** key.
- Press and hold the **ENTER** key, until the following message is displayed:  
Software ID: xxxxxxx

# A. Technical Specifications

## A. 1. Mega Star Series

Model	Mega Star 1.6	Mega Star 1.6 R
Environmental Conditions	Use in interior spaces only. Altitudes of up to 3000 m above sea level. Max. relative humidity 80% up to 31 °C; decreasing linearly to 50% relative humidity at 40 °C	Use in interior spaces only. Altitudes of up to 3000 m above sea level. Max. relative humidity 80% up to 31 °C; decreasing linearly to 50% relative humidity at 40 °C
Environmental Conditions during Storage and Shipping	Temperature: -10 °C to 55 °C Humidity: 15% to 85%	Temperature: -10 °C to 55 °C Humidity: 15% to 85%
Permissible Ambient Temperature during Operation	+2 °C to +35 °C	+2 °C to +35 °C
Average Heat Dissipation 100–240 V 220-230 V	0.65 kW/h -	- 1.0 kW/h
Overvoltage Category	II	II
Pollution Degree	2	2
IP	20	20
Running Time	9 h, 59 min (increments of 1 minutes)	9 h, 59 min (increments of 1 minutes)
Maximum Speed $n_{max}$	15200 rpm (depending on the rotor)	15200 rpm (depending on the rotor)
Minimum Speed $n_{min}$	300 rpm	300 rpm
Maximum RCF Value at $n_{max}$	25830 x g (depending on the rotor)	25830 x g (depending on the rotor)
Noise Level at Maximum Speed <sup>1, 2</sup>	< 73 dB (A)	< 68 dB (A)
Maximum Kinetic Energy 100-240 V 220-230 V	41 kJ -	- 41 kJ
Temperature Setting Range	-	-10 °C to +40 °C
Dimensions Height (lid open / lid closed) Table top height Width Depth (with mains connection)	845 mm / 364 mm 330 mm 445 mm 620 mm	845 mm / 362 mm 330 mm 625 mm 660 mm
Weight <sup>3</sup> 100 V-240 V 220-230 V	61 kg -	- 94 kg

<sup>1</sup> 1 m in front of the instrument at 1.6 m height.

<sup>2</sup> Measured with Fiberlite F15-8 x 50cy at 14500 rpm, cooling set to -10 °C (only refrigerated).

<sup>3</sup> Without rotor.

Table A-1: Technical Data Mega Star 1.6 Series Centrifuges

Model	Mega Star 4.0	Mega Star 4.0 R
Environmental Conditions	Use in interior spaces only. Altitudes of up to 3000 m above sea level. Max. relative humidity 80% up to 31 °C; decreasing linearly to 50% relative humidity at 40 °C	Use in interior spaces only. Altitudes of up to 3000 m above sea level. Max. relative humidity 80% up to 31 °C; decreasing linearly to 50% relative humidity at 40 °C
Environmental Conditions during Storage and Shipping	Temperature: -10 °C to 55 °C Humidity: 15% to 85%	Temperature: -10 °C to 55 °C Humidity: 15% to 85%
Permissible Ambient Temperature during Operation	+2 °C to +35 °C	+2 °C to +35 °C
Average Heat Dissipation 208–240 V 220–240 V / 230 V	1.2 kW/h -	- 1.6 kW/h
Overvoltage Category	II	II
Pollution Degree	2	2
IP	20	20
Running Time	9 h, 59 min (increments of 1 minutes)	9 h, 59 min (increments of 1 minutes)
Maximum Speed $n_{max}$	15200 rpm (depending on the rotor)	15200 rpm (depending on the rotor)
Minimum Speed $n_{min}$	300 rpm	300 rpm
Maximum RCF Value at $n_{max}$	25 830 x g (depending on the rotor)	25 830 x g (depending on the rotor)
Noise Level at Maximum Speed <sup>1,2</sup>	< 68 dB (A)	< 63 dB (A)
Maximum Kinetic Energy 208–240 V 220–240 V / 230 V	62.5 kJ -	- 62.5 kJ
Temperature Setting Range	-	-10 °C to +40 °C
Dimensions Height (lid open / lid closed) Table top height Width Depth (with mains connection)	851 mm / 364 mm 327 mm 565 mm 690 mm	851 mm / 363 mm 327 mm 745 mm 690 mm
Weight <sup>3</sup> 208–240 V 220–240 V / 230 V	89 kg -	- 125 kg

<sup>1</sup> 1 m in front of the instrument at 1.6 m height.

<sup>2</sup> Measured with Fiberlite F15-8 x 50cy at 14500 rpm, cooling set to -10 °C (only refrigerated).

<sup>3</sup> Without rotor.

Table A-2: Technical Data Mega Star 4.0 Series Centrifuges

## A. 2. Directives, Standards and Guidelines

Centrifuge	Region	Directive	Standard
VWR Mega Star 1.6 Mega Star 1.6 R Mega Star 4.0 Mega Star 4.0 R	<b>Europe</b> <u>Refrigerated</u> 220–240 V, 50 Hz / 230 V, 60 Hz <u>Ventilated</u> 208–240 V, 50 / 60 Hz	<b>2006/42/EC</b> Machinery <b>2014/35/EU</b> Low Voltage (Protective Goals) <b>2014/30/EC</b> Electromagnetic Compatibility (EMC) <b>2011/65/EC</b> RoHS Directive on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment	EN 61010-1 3.1 Edition EN 61010-2-020 3rd Edition EN 61010-2-011 2nd Edition EN 61326-1 Class B EN ISO 14971 ISO 9001

Table A-3: Directives and Standards for Mega Star Series Centrifuges

**NOTE** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## A. 3. Refrigerants

Article No.	Centrifuge	Refrigerant	Quantity	Pressure	GWP	CO2e
521-2660 / 521-2661	Mega Star 1.6 R (220-230 V)	R-134a	0.28 kg	21 bar	1430	0.4 t
521-2664 / 521-2665	Mega Star 4.0 R (220-240 V)	R-134a	0.43 kg	21 bar	1430	0.61 t

Contains fluorinated greenhouse gases in a hermetically sealed system.

Table A-4: Refrigerants Used for Mega Star Series

## A. 4. Mains Supply

The following table contains an overview of the electrical connection data for the Mega Star Series Centrifuges. This data is to be taken into consideration when selecting the mains connection socket.

Art. No.	Centrifuge	Mains Voltage (V)	Fre- quency (Hz)	Rated Current (A)	Power Con- sumption (W)	Building Fuse (AT)	Equipment Fuse (AT)
521-2658 / 521-2659	Mega Star 1.6	208-240	50 / 60	8.5	850	15	16
521-2660 / 521-2661	Mega Star 1.6 R	220-230	50 / 60	6.5	1350	15	16
521-2662 / 521-2663	Mega Star 4.0	208-240	50 / 60	7.5	1600	15	16
521-2664 / 521-2665	Mega Star 4.0 R	220-240	50 / 60	8.5	1850	15	16

Table A-5: Electrical Connection Data for Mega Star Series



## A. 5. Rotor Program

For more details on rotors and accessories refer to “Rotor Specifications” on page B-1.

### A. 5. 1. Rotors for Mega Star Centrifuges

Rotor Name	Article No.	Mega Star 1.6 / Mega Star 1.6 R	Mega Star 4.0 / Mega Star 4.0 R
TX-200 (75003658)	521-1566	✓	✗
TX-400 (75003181)	521-1775	✓	✗
TX-750 (75003180)	521-1352	✗	✓
TX-1000 (75003017)	521-2616	✗	✓
H-FLEX 1 (75003300)	521-2761	✓	✗
M-20 Microplate (75003624)	521-1400	✓	✓
BIOShield 720 (75003183)	521-1564	✓	✗
BIOShield 1000A (75003182)	521-1776	✗	✓
CLINIConic (75003623)	521-1565	✓	✗
8 x 50 ml Sealed (75003694)	521-1567	✓	✗
HIGHConic II (75003620)	521-1358	✓	✓
Microliter 30 x 2 (75003652)	521-1360	✓	✓
Microliter 48 x 2 (75003602)	521-1349	✓	✓
MicroClick 30 x 2 (75005719)	521-1787	✓	✓
MicroClick 18 x 5 (75005765)	521-1855	✗	✓
Fiberlite F15-6 x 100 LEX (75003698)	521-1377	✓	✓
Fiberlite F21-48 x 2 (75003664)	521-1369	✓	✓

Table A-6: Rotor Program for Mega Star Centrifuges

## **B. Rotor Specifications**

This section lists the rotors and their accessories.

For more details on adapters and accessories refer to the separate rotor subchapters in this chapter.



## B. 1. TX-200

### B. 1. 1. Items Supplied

Article No.	Item	Quantity
521-1566	TX-200 Rotor	1
	Rotor safety information	1
521-1770	Bolt grease	1
	GP rotors information card	1

### B. 1. 2. Technical Data

General Technical Data	
Weight (empty)	2.5 kg
Maximum Permissible Load	4 x 275 g
Max. Cycle Number	82000
Radius max. / min.	165 / 64 mm
Angle	90°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	5500 rpm
Maximum RCF-Value at $n_{max}$	5580 x g
K-Factor at $n_{max}$	7921
Acceleration / Braking Time	20 s / 30 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	13 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	5500 rpm
Maximum RCF-Value at $n_{max}$	5580 x g
K-Factor at $n_{max}$	7921
Acceleration / Braking Time	20 s / 30 s
Maximum Speed at 4 °C	5500 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	1 °C



### B. 1. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-1364	TX-200 round buckets (4x)
521-1365	TX-200 round ClickSeal biocontainment lids (4x)
521-3459	Replacement TX-200 O-rings for lids (4x)
521-3460	180 ml bio-bottle - polypropylene (12x)
<b>Adapters</b>	
521-2085	100 ml round bottom open-top tube
521-2086	50 ml DIN round bottom tube
521-2097	50 ml round bottom tube
521-2089	25 ml DIN round/flat bottom tube
521-2090	20 ml round bottom tube
521-2094	5/7 ml round bottom open-top tube
521-2095	3/5 ml RIA or round bottom tube
521-2087	50 ml conical or skirted tube
521-2082	15 ml conical tube
521-2093	15 ml blood collection tube
521-2091	14 ml conical urine tube
521-2092	10 ml blood collection tube
521-2088	30 ml Sterilin Universal tube
521-2096	1.5/2 ml Microtube
521-2083	5/7 ml or 4.5/6 ml blood collection tube

### B. 1. 4. Biocontainment Certificate

Centre of Emergency Preparedness and Response  
Health Protection Agency  
Porton Down  
Salisbury  
Wiltshire SP4 0JG  
United Kingdom



#### Certificate of Containment Testing

#### Containment testing of Thermo Scientific swing out bucket rotor 75003658 and buckets 75003659

Report No. 77- 08 G

Report prepared for: Thermo Fisher  
Issue Date: 1<sup>st</sup> June 2009

#### Test Summary

A Thermo Scientific centrifuge bucket 75003659 with aerosol tight lid (Max speed 5,500 rpm) was supplied by Thermo Fisher and containment tested at 5,500 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

Report Written By

Report Authorised By



## B. 2. TX-400

### B. 2. 1. Items Supplied

Article No.	Item	Quantity
521-1359	TX-400 rotor	1
	Rotor safety information	1
521-1770	Bolt grease	1
	GP rotors information card	1

### B. 2. 2. Technical Data

General Technical Data	
Weight (empty)	4.1 kg
Maximum Permissible Load	4 x 570 g
Max. Cycle Number	50 000
Radius max. / min.	168 / 68 mm
Angle	90°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	4 700 rpm
Maximum RCF-Value at $n_{max}$	4 149 x g
K-Factor at $n_{max}$	10 359
Acceleration / Braking Time	25 s / 35 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	13 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	4 700 rpm
Maximum RCF-Value at $n_{max}$	4 149 x g
K-Factor at $n_{max}$	10 359
Acceleration / Braking Time	25 s / 35 s
Maximum Speed at 4 °C	4 700 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	<4 °C



### B. 2. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-1775	TX-400 rotor cross
521-1361	TX-400 round buckets (4x)
521-1362	TX-400 round ClickSeal biocontainment lids (4x)
521-3420	Replacement TX-400 o-rings for lids (4x)
521-2100	400 ml bio-bottle - polypropylene (12x)
<b>Adapters</b>	
521-1454	250 ml Thermo Scientific Nalgene™ bottle; 200 ml Thermo Scientific Nunc conical bottle (requires Nunc #377585); 225 ml/175 ml BD Falcon conical bottle (requires BD #352090)
521-1429	100 ml round bottom open-top tube
521-1428	50 ml DIN round bottom tube
521-1458	50 ml Nalgene™ Oak Ridge tube
521-1425	30/25 ml DIN round/flat bottom tube
521-1426	15 ml round bottom tube (Sarstedt)
521-1571	3 ml RIA or round bottom tube (without cap)
521-1419	50 ml conical tube
521-1418	15 ml conical tube
521-1456	15 ml blood collection tube (17 x 125 mm)
521-1457	14 ml round or conical urine tube
521-1417	10 ml blood collection (16 x 100 mm)
521-1427	30 ml Sterilin Universal tube
521-1416	5/7 ml blood collection tube (13 x 75-100 mm)
521-1568	1.5/2 ml Microtube
521-1537	4.5/6 ml blood collection tube (Greiner)

### B. 2. 4. Biocontainment Certificate

Centre of Emergency Preparedness and Response  
Health Protection Agency  
Porton Down  
Salisbury  
Wiltshire SP4 0JG  
United Kingdom



#### Certificate of Containment Testing

#### Containment testing of Thermo Scientific swing out bucket rotor 75003629 and buckets 75003655

**Report No. 77-08 E**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 1<sup>st</sup> June 2009

#### Test Summary

A Thermo Scientific centrifuge bucket 75003655 with aerosol tight lid (Max speed 5,000 rpm) was supplied by Thermo Fisher and containment tested at 5,000 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

**Report Written By**

**Report Authorised By**



## B. 3. TX-750

### B. 3. 1. Items Supplied

Article No.	Item	Quantity
521-1352	TX-750 rotor	1
	Rotor safety information	1
521-1770	Bolt grease	1
	GP rotors information card	1

#### Performance data of the compatible ventilated 4 L centrifuges

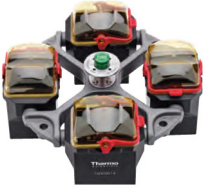
Mega Star 4.0	
<b>Centrifuge Voltage</b>	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	4500 rpm
Maximum RCF-Value at $n_{max}$	4415 x g
K-Factor at $n_{max}$	10672
Acceleration / Braking Time	40 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	13 °C

### B. 3. 2. Technical Data (Round Buckets)

General Technical Data	
Weight (empty)	7.4 kg
Maximum Permissible Load	4 x 800 g
Max. Cycle Number	
Rotor Cross	120000
Bucket	70000
Radius max. / min.	195 mm / 83 mm
Angle	90°
Aerosol-tight	Optional
Max. Autoclaving Temperature	121 °C
Not Autoclavable Parts	O-ring 75003610

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	4500 rpm
Maximum RCF-Value at $n_{max}$	4415 x g
K-Factor at $n_{max}$	10672
Acceleration / Braking Time	40 s / 45 s
Maximum Speed at 4 °C	4500 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	<4 °C



### B. 3. 3. Technical Data (Rectangular Buckets)

General Technical Data	
Weight (empty)	6.8 kg
Maximum Permissible Load	4 x 750 g
Max. Cycle Number	
Rotor Cross	120 000
Bucket	100 000
Radius max. / min.	195 mm / 89 mm
Angle	90°
Aerosol-tight	Optional
Max. Autoclaving Temperature	121 °C
Not Autoclavable Parts	O-ring 521-3461

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
Centrifuge Voltage	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	4 500 rpm
Maximum RCF-Value at $n_{max}$	4 415 x g
K-Factor at $n_{max}$	9 800
Acceleration / Braking Time	40 s / 40 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	13 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
Centrifuge Voltage	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	4 500 rpm
Maximum RCF-Value at $n_{max}$	4 415 x g
K-Factor at $n_{max}$	8 983
Acceleration / Braking Time	40 s / 45 s
Maximum Speed at 4 °C	4 300 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	<4 °C





### B. 3. 4. Technical Data (Microplate Carriers)

General Technical Data	
Weight (empty)	7.3 kg
Maximum Permissible Load	4 x 500 g
Max. Cycle Number	
Rotor Cross	120 000
Bucket	120 000
Radius max. / min.	155 mm / 99 mm
Angle	90°
Aerosol-tight	No
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
Centrifuge Voltage	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	4500 rpm
Maximum RCF-Value at $n_{max}$	3509 x g
K-Factor at $n_{max}$	5601
Acceleration / Braking Time	35 s / 40 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	10 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
Centrifuge Voltage	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	4500 rpm
Maximum RCF-Value at $n_{max}$	3509 x g
K-Factor at $n_{max}$	5601
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	4500 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	<4 °C

### B. 3. 5. Accessories



#### TX-750 (round buckets)

Article No.	Description
<b>Accessories</b>	
521-1352	TX-750 rotor cross
521-1353	TX-750 round buckets (4x) *
521-1354	TX-750 round ClickSeal biocontainment lids (4x)
521-3461	Replacement TX-750 round O-rings for lids (4x)
521-1836	750 ml Bio-Bottle - Polypropylene (1 each)
521-1406	Microplate Carriers and T-75 Flask (includes tray and pads) (2x)
521-1357	Microplate Carriers and T-75 Flask (includes tray and pads) (4x)
<b>Adapters</b>	
521-2084	250 ml Corning conical bottle (unsealed buckets only)
521-1430	250 ml Nalgene bottle
521-1430	225 ml/175 ml BD Falcon conical bottle (requires BD #352090) (open buckets only)
521-1430	200 ml Nunc conical bottle (open buckets only) (requires Nunc #377585)
521-1430	175 ml Nalgene conical bottle (requires Nalgene #DS3126-0175) (open buckets only)
521-1431	100 ml round bottom open-top tube
521-1433	50 ml Nalgene Oak Ridge tube
521-3483	5 ml RIA or round bottom tube (without cap)
521-1439	5/7 ml round bottom tube (without cap) with decanting aid
521-3484	T-75 Nunc Easy Flask
521-3485	T-25 Nunc Easy Flask
521-1432	50 ml conical tube (includes sealing vessel) can be combined with ClickSeal lids
521-1409	50 ml conical tube
4x 521-1883	50 ml conical or skirted tube
521-1434	30 ml Sterilin Universal tube
521-2209	15 ml conical tube
521-1436	15 ml blood collection tube (17 x 125 mm) (inner circle only)
521-1436	10 ml blood collection (16 x 100 mm) or 15 ml Corex/Kimble tube
521-1435	14 ml round or conical urine tube
521-1437	5/7 ml or 4.5/6 ml blood collection tube (13 x 75-100 mm)
521-1440	1.5/2 ml Microtube

#### TX-750 (rectangular buckets)

Article No.	Description
<b>Accessories</b>	
521-1352	TX-750 rotor cross
521-1355	TX-750 rectangular Buckets (4x)
521-1356	TX-750 rectangular ClickSeal biocontainment lids (4x)
521-3462	Replacement TX-750 rectangular O-rings for lids (4x)
<b>Adapters</b>	
521-1441	250 ml flat bottom bottle
521-1442	150 ml round bottom open-top tube
521-1443	100 ml round bottom open-top tube
521-1444	50 ml round bottom tube
521-1569	45 ml flat/round tube
521-1447	25 ml DIN round bottom tube
521-1448	14 ml flanged round bottom tube
521-1452	5/7 ml round bottom tube (13 x 75-100 mm)
521-1421	50 ml conical tube
521-1420	15 ml conical tube
521-1449	14 ml round or conical urine tube
521-1450	10 ml blood collection
521-1451	5/7 ml or 4.5/6 ml blood collection tube
521-1446	30 ml Sterilin Universal tube
521-1453	1.5/2 ml Microtube

#### TX-750 (microplate carriers)

Article No.	Description
<b>Accessories</b>	
521-1352	TX-750 rotor cross
521-1406	Microplate carriers and T-75 flasks (including plate trays and rubber pad) (2x)
521-1357	Microplate carriers and T-75 flasks (including plate trays and rubber pad) (4x)

\* Mind the information on assembling on page 2-6.



### B. 3. 6. Biocontainment Certificate

Centre of Emergency Preparedness and Response  
Health Protection Agency  
Porton Down  
Salisbury  
Wiltshire SP4 0JG  
United Kingdom



#### Certificate of Containment Testing

#### Containment testing of Thermo Scientific Swing out bucket rotor 75003607 and bucket 75003608

**Report No. 59-08 C**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 15<sup>th</sup> January 2009

##### Test Summary

A Thermo Scientific 75003608 centrifuge bucket with aerosol tight lid (Max speed 4,700 rpm) was supplied by Thermo Fisher and containment tested at 4,700 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

**Report Written By**

**Report Authorised By**

Centre of Emergency Preparedness and Response  
Health Protection Agency  
Porton Down  
Salisbury  
Wiltshire SP4 0JG  
United Kingdom



#### Certificate of Containment Testing

#### Containment testing of Thermo Scientific swing out bucket rotor 75003607 and bucket 75003614

**Report No. 59-08 D**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 15<sup>th</sup> January 2009

##### Test Summary

A Thermo Scientific 75003614 centrifuge bucket with aerosol tight lid (Max speed 4,700 rpm) was supplied by Thermo Fisher and containment tested at 4,700 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

**Report Written By**

**Report Authorised By**



## B. 4. TX-1000

### B. 4. 1. Items Supplied

Article No.	Item	Quantity
521-2616	TX-1000 rotor cross	1
521-2615	TX-1000 buckets	4
	Rotor safety information	1
521-1770	Bolt grease	1
	GP rotors information card	1

### B. 4. 2. Technical Data

General Technical Data	
Weight (empty)	9.8 kg
Maximum Permissible Load	4 x 1500 g
Max. Cycle Number	55 000
Radius max. / min.	209 mm / 108 mm
Angle	90°
Aerosol-tight	Optional
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
Centrifuge Voltage	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	3800 rpm
Maximum RCF-Value at $n_{max}$	3374 x g
K-Factor at $n_{max}$	11 567
Acceleration / Braking Time	60 s / 60 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	9 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
Centrifuge Voltage	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	4000 rpm
Maximum RCF-Value at $n_{max}$	3739 x g
K-Factor at $n_{max}$	10 439
Acceleration / Braking Time	65 s / 75 s
Maximum Speed at 4 °C	4000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	2 °C



### B. 4. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-2616	TX-1000 rotor cross
521-2615	TX-1000 buckets (4x)
521-2618	TX-1000 ClickSeal biocontainment lids (4x)
521-3410	Replacement O-rings
521-3411	1000 ml Bio-bottle - polypropylene (4x)
<b>Adapters</b>	
521-3412	1000 ml Bio-bottle (521-3411)
521-3413	750 ml polypropylene Bio-bottle
521-2098	500 ml Nalgene bottle
521-3414	500 ml Corning bottle (requires Corning 431124)
521-3415	250 ml Corning Conical bottle or 200 ml Nunc™ bottle or 175 ml Nalgene conical bottle
521-3416	250 ml Nalgene bottle / 225 ml BD Falcon™ (requires BD #352090) / 200 ml Nunc conical bottle (requires Nunc #377585) / 175 ml Nalgene conical bottle (requires Nalgene #DS3126-0175)
521-3417	50 ml Nalgene Oak Ridge tube
521-3418	Small bag/cell culture bags 4 x 2 bags (< 350 ml)
521-1414	50 ml conical tube
521-3419	50 ml double biocontainment vessel for 50 ml conical tube (can be combined with ClickSeal lids)
521-2154	15 ml conical tube
521-1412	10 ml blood collection tube (16 x 100 mm) or Corex™/Kimble™ tubes
521-2617	9/10 ml blood collection tube (Sarstedt™)
521-1411	5/7 ml blood collection tube (13 x 75-100 mm)
521-1536	4.5/6 ml blood collection tube (Greiner™)
521-2099	Microplate carriers

### B. 4. 4. Biocontainment Certificate

Health Protection Agency  
Microbiology Services  
Porton Down  
Salisbury  
Wiltshire  
SP4 0JG



## Certificate of Containment Testing

### Containment Testing of Thermo Scientific TX-1000 Rotor in a Thermo Scientific Centrifuge

Report No. 170-12 G1

Report Prepared For: Thermo Fisher Scientific  
Issue Date: 10<sup>th</sup> October 2012 re-issued 21<sup>st</sup> August 2013

#### Test Summary

Thermo Scientific TX-1000 Rotor is identical to the rotor tested according to report 170-12 G. We consider that this rotor will match the performance of that previously containment tested in a Thermo Scientific centrifuge at 5,500 rpm, using Annex AA of IEC 61010-2-020:2006 (2<sup>nd</sup> Ed.). The sealed rotor was shown to contain all contents.

#### Report Written By

*Anna Moy*

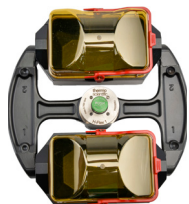
Name: Ms Anna Moy  
Title: Biosafety Scientist

#### Report Authorised By

*S. Parks*

Name: Mr Simon Parks  
Title: Senior Biosafety Scientist

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## B. 5. H-FLEX 1

### B. 5. 1. Items Supplied

Article No.	Item	Quantity
521-2761	H-FLEX 1 rotor	1
	Rotor safety information	1
521-1770	Bolt grease	1
	GP rotors information card	1

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	4 700 rpm
Maximum RCF-Value at $n_{max}$	4 297 x g
K-Factor at $n_{max}$	19 394
Acceleration / Braking Time	35 s / 35 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2$ K	9 °C

### B. 5. 2. Technical Data

General Technical Data	
Weight (empty)	6.0 kg
Maximum Permissible Load	2 x 1115 g
Max. Cycle Number	55000
Radius max. / min.	174 mm / 32 mm
Angle	90°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C
Not Autoclavable Parts	O-ring 20058488

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	4 700 rpm
Maximum RCF-Value at $n_{max}$	4 297 x g
K-Factor at $n_{max}$	19 394
Acceleration / Braking Time	40 s / 40 s
Maximum Speed at 4 °C	4 700 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2$ K	-3 °C



### B. 5. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-2762	H-Flex 1 Rotor bucket, set of 2
521-2763	Bucket cap H-Flex 1, set of 2
<b>Adapters</b>	
521-2770	Adapter for TX-400 (see on page B-5)
521-2766	50 ml conical tube
521-2765	15 ml conical tube
521-2768	10/12 ml blood collection tube
521-2769	5/7 ml blood collection tube
521-2767	Microplate carriers

### B. 5. 4. Biocontainment Certificate



Public Health England  
National Infection Service  
Porton Down  
Salisbury  
Wiltshire  
SP4 0JG

#### Certificate of Containment Testing

#### Containment Testing of Thermo Scientific Swinging Buckets (75003301) and Sealing Caps (75003302) in a H-Flex 1 (75003300) rotor in a Thermo Scientific Centrifuge

Report No. 18-015

**Report Prepared For:** Thermo Fisher Scientific  
**Issue Date:** 04 September 2018

#### Test Summary

Thermo Scientific Swinging Buckets (75003301) and Sealing Caps (75003302) in a H-Flex 1 rotor (75003300) were containment tested in a Thermo Scientific centrifuge at 4,700 rpm, using Annex AA of IEC 61010-2-020:2016 (3rd Ed.). The sealed buckets were shown to contain all contents.

Report Written By

*Anna Moy*

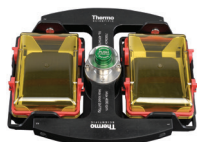
**Name:** Ms Anna Moy  
**Title:** Biosafety Scientist

Report Authorised By

*Sara Speight*

**Name:** Mrs Sara Speight  
**Title:** Senior Biosafety Scientist

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## B. 6. M-20 Microplate

### B. 6. 1. Items Supplied

Article No.	Item	Quantity
521-1400	M-20 Microplate	1
521-1771	Rubber seal grease	1
521-1770	Bolt grease	1
	GP rotors information card	1

### B. 6. 2. Technical Data

General Technical Data	
Weight (empty)	4.23 kg
Maximum Permissible Load	2 x 770 g
Max. Cycle Number	50 000
Radius max. / min.	127 mm / 79 mm
Angle	90°
Aerosol-tight	Optional
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
<b>Centrifuge Voltage</b>	<b>100-240 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	4 000 rpm
Maximum RCF-Value at $n_{max}$	2 272 x g
K-Factor at $n_{max}$	7 507
Acceleration / Braking Time	20 s / 30 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	7 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
<b>Centrifuge Voltage</b>	<b>220-230 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	4 000 rpm
Maximum RCF-Value at $n_{max}$	2 272 x g
K-Factor at $n_{max}$	7 507
Acceleration / Braking Time	20 s / 30 s
Maximum Speed at 4 °C	4 000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	-7 °C

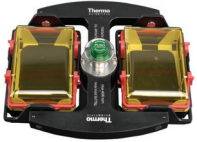
#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
<b>Centrifuge Voltage</b>	<b>208-240 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	4 000 rpm
Maximum RCF-Value at $n_{max}$	2 272 x g
K-Factor at $n_{max}$	7 507
Acceleration / Braking Time	20 s / 30 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	9 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	<b>220-240 V, 50 Hz 230 V, 60 Hz</b>
Maximum Speed $n_{max}$	4 000 rpm
Maximum RCF-Value at $n_{max}$	2 272 x g
K-Factor at $n_{max}$	7 507
Acceleration / Braking Time	20 s / 30 s
Maximum Speed at 4 °C	4 000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	-7 °C





### B. 6. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-3463	Replacement sealing lids (2x)
521-3464	Replacement O-rings (4x)
<b>Adapters</b>	
Included	Microplate carriers
521-1538	Aerosol-tight capsule
521-1400	M-20 rotor cross

### B. 6. 4. Biocontainment Certificate

Centre of Emergency Preparedness and Response  
Health Protection Agency  
Porton Down  
Salisbury  
Wiltshire SP4 0JG  
United Kingdom



#### Certificate of Containment Testing

#### Containment testing of Thermo Scientific swing out bucket rotor 75003624 and buckets 75003625

**Report No. 77- 08 C**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 1<sup>st</sup> June 2009

#### Test Summary

A Thermo Scientific centrifuge bucket 75003625 with aerosol tight lid (Max speed 4,000 rpm) was supplied by Thermo Fisher and containment tested at 4,000 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

**Report Written By**

**Report Authorised By**



## B. 7. BIOShield 720

## B. 7. 2. Technical Data

### B. 7. 1. Items Supplied

Article No.	Item	Quantity
521-1564	BIOShield 720 rotor	1
521-1771	Rubber seal grease	1
521-1770	Bolt grease	1
	GP rotors information card	1
	Rotor safety information	1

General Technical Data	
Weight (empty)	5.7 kg
Maximum Permissible Load	4 x 470 g
Max. Cycle Number	66 000
Radius max. / min.	162 mm / 67 mm
Angle	90°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C
Not Autoclavable Parts	Gasket 50117078

### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	5 300 rpm
Maximum RCF-Value at $n_{max}$	5 088 x g
K-Factor at $n_{max}$	7 952
Acceleration / Braking Time	50 s / 65 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	14 °C

### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	5 300 rpm
Maximum RCF-Value at $n_{max}$	5 088 x g
K-Factor at $n_{max}$	7 952
Acceleration / Braking Time	55 s / 65 s
Maximum Speed at 4 °C	5 300 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	< 4 °C



**B. 7. 3. Accessories**

Article No.	Description
<b>Accessories</b>	
521-3465	180 ml Bio-Bottle - Polypropylene (12x)
521-3466	Sealing kit
<b>Adapters</b>	
521-3467	150 ml round bottom open-top tube
521-3468	100 ml round bottom open-top tube
521-3469	50 ml DIN round bottom tube
521-3470	25 ml DIN round bottom tube
521-3471	15 ml Sarstedt tube
521-3472	5/7 ml round bottom open-top tube
521-3473	50 ml conical tube
521-3493	30 ml Sterilin universal tube
521-3474	15 ml conical tube
521-3475	10 ml blood collection tube (16 x 100 mm)
521-3476	5/7 ml blood collection tube (13 x 75-100 mm)
521-3477	1.5/2 ml conical microtube

**B. 7. 4. Biocontainment Certificate**

Centre of Emergency Preparedness and Response  
 Health Protection Agency  
 Porton Down  
 Salisbury  
 Wiltshire SP4 0JG  
 United Kingdom



Certificate of Containment Testing

**Containment Testing of  
 contained Bioshield 720 Thermo  
 Scientific rotor 75003621**

**Report No. 77- 08 F**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 1<sup>st</sup> June 2009

**Test Summary**

A Thermo Scientific 75003621 contained Bioshield 720 rotor (Max speed 6,300 rpm) was supplied by Thermo Fisher and containment tested at 6,300 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

**Report Written By**

**Report Authorised By**



## B. 8. BIOShield 1000A

### B. 8. 1. Items Supplied

Article No.	Item	Quantity
521-1776	BIOShield 1000A	1
521-1770	Bolt grease	1
521-1771	Rubber seal grease	1
	GP rotors information card	1
	Rotor safety information	1

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
<b>Centrifuge Voltage</b>	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	5300 rpm
Maximum RCF-Value at $n_{max}$	5590 x g
K-Factor at $n_{max}$	6981
Acceleration / Braking Time	65 s / 85 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	10 °C

### B. 8. 2. Technical Data

General Technical Data	
Weight (empty)	8.5 kg
Maximum Permissible Load	4 x 600 g
Max. Cycle Number	30 000
Radius max. / min.	178 mm / 82 mm
Angle	90°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C
Not Autoclavable Parts	Gasket 20290682

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	5300 rpm
Maximum RCF-Value at $n_{max}$	5590 x g
K-Factor at $n_{max}$	6981
Acceleration / Braking Time	70 s / 85 s
Maximum Speed at 4 °C	5300 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	-1 °C



**B. 8. 3. Accessories**

Article No.	Description
<b>Adapters</b>	
521-1441	250 ml flat bottom bottle
521-1442	150 ml round bottom open-top tube
521-1443	100 ml round bottom open-top tube
521-1444	50 ml round bottom tube
521-1569	45 ml flat/round tube
521-1447	25 ml DIN round bottom tube
521-1448	14 ml flanged round bottom tube
521-1452	5/7 ml round bottom tube (13 x 75-100 mm)
521-1446	30 ml Sterilin Universal tube
521-1449	14 ml round or conical urine tube
521-1450	10 ml blood collection (16 x 100 mm) or 15 ml DIN tube
521-1451	5/7 ml or 4.5/6 ml blood collection tube
521-3478	50 ml conical tube
521-3479	15 ml conical tube
521-1453	1.5/2 ml Microtube

**B. 8. 4. Biocontainment Certificate**



Public Health England  
National Infection Service  
Porton Down  
Salisbury  
Wiltshire  
SP4 0JG

**Certificate of Containment Testing**

**Containment Testing of  
Thermo Scientific BIOShield™  
1000A (75003182) Rotor in a  
Thermo Scientific Centrifuge**

**Report No. 18-051**

**Report Prepared For:** Thermo Fisher Scientific  
**Issue Date:** 04 April 2019

**Test Summary**

Thermo Scientific BIOShield™ 1000A (75003182) rotor was containment tested in a Thermo Scientific centrifuge at 6,000 rpm, using Annex AA of IEC 61010-2-020:2016 (3rd Ed.). The sealed rotor was shown to contain all contents.

**Report Written By**

**Name:** Ms Anna Moy  
**Title:** Biosafety Scientist

**Report Authorised By**

**Name:** Mrs Sara Speight  
**Title:** Senior Biosafety Scientist

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## B. 9. CLINIConic

### B. 9. 1. Items Supplied

Article No.	Item	Quantity
521-1565	CLINIConic rotor	1
	GP rotors information card	1
	Rotor safety information	1
	Small benchtop rotors CD	1

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	5650 rpm
Maximum RCF-Value at $n_{max}$	4997 x g
K-Factor at $n_{max}$	3955
Acceleration / Braking Time	20 s / 35 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	13 °C

### B. 9. 2. Technical Data

General Technical Data	
Weight (empty)	4.7 kg
Maximum Permissible Load	30 x 30 g
Max. Cycle Number	50000
Radius max. / min.	140 mm / 85 mm
Angle	37°
Aerosol-tight	No
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	5650 rpm
Maximum RCF-Value at $n_{max}$	4997 x g
K-Factor at $n_{max}$	3955
Acceleration / Braking Time	20 s / 35 s
Maximum Speed at 4 °C	5650 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	-3 °C



### B. 9. 3. Accessories

Article No.	Description
<b>Adapters</b>	
521-1860	10 ml round bottom tube
521-3165	7 ml blood collection tubes (13 x 100 mm)
521-3164	5 ml blood collection tubes (13 x 75 mm)



## B. 10. 8 x 50 mL Sealed

## B. 10. 2. Technical Data

### B. 10. 1. Items Supplied

Article No.	Item	Quantity
521-1567	8 x 50 Individually sealed fixed angle rotor	1
	GP rotors information card	1
	Rotor safety information	1

General Technical Data	
Weight (empty)	3.3 kg
Maximum Permissible Load	8 x 189 g
Max. Cycle Number	50 000
Radius max. / min.	143 mm / 69 mm
Angle	45°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C

### Performance data of the compatible ventilated 1 L centrifuges

### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	6 700 rpm
Maximum RCF-Value at $n_{max}$	7 177 x g
K-Factor at $n_{max}$	4 107
Acceleration / Braking Time	25 s / 35 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	15 °C

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	6 700 rpm
Maximum RCF-Value at $n_{max}$	7 177 x g
K-Factor at $n_{max}$	4 107
Acceleration / Braking Time	25 s / 35 s
Maximum Speed at 4 °C	6 700 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	1 °C





### B. 10. 3. Accessories

Article No.	Description
<b>Adapters</b>	
521-1817	15 ml conical tube
521-3480	10 ml blood collection tube (16 x 100 mm)
521-3481	7 ml blood collection tube (13 x 100 mm)
521-3482	3.5 ml blood collection tube

### B. 10. 4. Biocontainment Certificate

Centre of Emergency Preparedness and Response  
Health Protection Agency  
Porton Down  
Salisbury  
Wiltshire SP4 0JG  
United Kingdom



#### Certificate of Containment Testing

#### Containment testing of Thermo Scientific Vessel 75003787

**Report No. 77- 08 B**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 1<sup>st</sup> June 2009

#### Test Summary

A Thermo Scientific vessel 75003787 with aerosol tight lid (Max rcf 7177 x g) was supplied by Thermo Fisher and containment tested at max rcf 7177 x g using the method described in Annex AA of EN 61010-2-020. The vessel was shown to contain a spill when tested in triplicate.

**Report Written By**

**Report Authorised By**



## B. 11. HIGHConic II

### B. 11. 1. Items Supplied

Article No.	Item	Quantity
521-1358	HIGHConic II	1
521-0601	HIGHConic II adapter 1x50 ml	6
	GP rotors information card	1
	Rotor safety information	1

### B. 11. 2. Technical Data

General Technical Data	
Weight (empty)	3.6 kg
Maximum Permissible Load	6 x 140 g
Max. Cycle Number	50 000
Radius max. / min.	126 mm / 61 mm
Angle	45°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	10350 rpm
Maximum RCF-Value at $n_{max}$	15090 x g
K-Factor at $n_{max}$	1713
Acceleration / Braking Time	40 s / 55 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	19 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	10350 rpm
Maximum RCF-Value at $n_{max}$	15090 x g
K-Factor at $n_{max}$	1713
Acceleration / Braking Time	40 s / 60 s
Maximum Speed at 4 °C	10350 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	-1 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
Centrifuge Voltage	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	10350 rpm
Maximum RCF-Value at $n_{max}$	15090 x g
K-Factor at $n_{max}$	1713
Acceleration / Braking Time	40 s / 55 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	15 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
Centrifuge Voltage	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	10350 rpm
Maximum RCF-Value at $n_{max}$	15090 x g
K-Factor at $n_{max}$	1713
Acceleration / Braking Time	40 s / 60 s
Maximum Speed at 4 °C	8500 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	-3 °C



### B. 11. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-3486	Replacement O-ring Kit
<b>Adapters</b>	
521-0761	50 ml Nalgene Oak Ridge tube
521-3487	30 ml Nalgene Oak Ridge tube / 38 ml round tube
521-3488	16 ml Nalgene Oak Ridge tube
521-1005	10 ml Nalgene Oak Ridge tube / 12 ml round tube
521-3489	6.5 ml round bottom tube
521-0601	50 ml conical tube
521-1006	15 ml conical tube
521-3490	1.5/2 ml Microtube

### B. 11. 4. Biocontainment Certificate



Public Health  
England

Public Health England  
Microbiology Services  
Porton Down  
Salisbury  
Wiltshire  
SP4 0JG

#### Certificate of Containment Testing

#### Containment Testing of Thermo Scientific Rotor 75003620 HIGHConic II – 6x100ml in a Thermo Scientific Centrifuge

Report No. 36/13

**Report Prepared For:** Thermo Fisher Scientific  
**Issue Date:** 4<sup>th</sup> November 2013

#### Test Summary

A Thermo Scientific 75003620 HIGHConic II – 6x100ml rotor was containment tested in a Thermo Scientific centrifuge at 12,000 rpm, using Annex AA of IEC 61010-2-020:2006 (2<sup>nd</sup> Ed.). The sealed rotor was shown to contain all contents.

Report Written By

Name: Miss Anna Moy  
Title: Biosafety Scientist

Report Authorised By

Name: Mrs Sara Speight  
Title: Senior Biosafety Scientist

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## B. 12. Microliter 30 x 2

### B. 12. 1. Items Supplied

Article No.	Item	Quantity
521-1360	Microliter 30 x 2	1
	GP rotors information card	1
	Rotor safety information	1
	O-Ring kit	1

### B. 12. 2. Technical Data

General Technical Data	
Weight (empty)	2.1 kg
Maximum Permissible Load	30 x 4 g
Max. Cycle Number	50 000
Radius max. / min.	100 mm / 64 mm
Angle	45°
Aerosol-tight	Optional
Max. Autoclaving Temperature	138 °C

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
<b>Centrifuge Voltage</b>	<b>100-240 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 830 x g
K-Factor at $n_{max}$	489
Acceleration / Braking Time	30 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	23 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
<b>Centrifuge Voltage</b>	<b>220-230 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 830 x g
K-Factor at $n_{max}$	489
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	15 200 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	5 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
<b>Centrifuge Voltage</b>	<b>208-240 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 830 x g
K-Factor at $n_{max}$	489
Acceleration / Braking Time	30 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	21 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	<b>220-240 V, 50 Hz 230 V, 60 Hz</b>
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 830 x g
K-Factor at $n_{max}$	489
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	15 200 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	2 °C



**B. 12. 3. Accessories**

Article No.	Description
<b>Accessories</b>	
521-3491	Replacement O-ring kit
<b>Adapters</b>	
521-1816	0.25 ml Microtube
521-1815	0.5 ml Microtube
521-1800	0.2 ml PCR tube

**B. 12. 4. Biocontainment Certificate**

Centre of Emergency Preparedness and Response  
 Health Protection Agency  
 Porton Down  
 Salisbury  
 Wiltshire SP4 0JG  
 United Kingdom



**Certificate of Containment Testing**

**Containment Testing of  
 Thermo Scientific rotor 75003652**

**Report No. 77- 08 H**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 1<sup>st</sup> June 2009

**Test Summary**

A Thermo Scientific contained rotor 75003652 (Max speed 15,200 rpm) was supplied by Thermo Fisher and containment tested at 15,200 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

**Report Written By**

**Report Authorised By**



## B. 13. Microliter 48 x 2

### B. 13. 1. Items Supplied

Article No.	Item	Quantity
521-1349	Microliter 48 x 2 rotor	1
521-1771	Rubber seal grease	1
	GP rotors information card	1
	Rotor safety information	1
	O-Ring kit	1

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
<b>Centrifuge Voltage</b>	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	15200 rpm
Maximum RCF-Value at $n_{max}$	25314 x g
K-Factor at $n_{max}$	556
Acceleration / Braking Time	30 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	22 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
<b>Centrifuge Voltage</b>	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	15200 rpm
Maximum RCF-Value at $n_{max}$	25314 x g
K-Factor at $n_{max}$	556
Acceleration / Braking Time	35 s / 50 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	21 °C

### B. 13. 2. Technical Data

General Technical Data	
Weight (empty)	2.5 kg
Maximum Permissible Load	48 x 4 g
Max. Cycle Number	50 000
Radius max. / min.	98 mm / 59 mm
Angle	45°
Aerosol-tight	Yes
Max. Autoclaving Temperature	138 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
<b>Centrifuge Voltage</b>	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	15200 rpm
Maximum RCF-Value at $n_{max}$	25314 x g
K-Factor at $n_{max}$	556
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	15200 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	3 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	15200 rpm
Maximum RCF-Value at $n_{max}$	25314 x g
K-Factor at $n_{max}$	556
Acceleration / Braking Time	35 s / 50 s
Maximum Speed at 4 °C	15200 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	0 °C




**B. 13. 3. Accessories**

Article No.	Description
<b>Accessories</b>	
521-3491	Replacement O-ring kit
<b>Adapters</b>	
521-1816	0.25 ml Microtube
521-1815	0.5 ml Microtube
521-1800	0.2 ml PCR tube

**B. 13. 4. Biocontainment Certificate**

Centre of Emergency Preparedness and Response  
 Health Protection Agency  
 Porton Down  
 Salisbury  
 Wiltshire SP4 0JG  
 United Kingdom



**Certificate of Containment Testing**


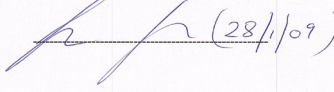
**Containment Testing of Thermo Scientific Rotor 75003602**

**Report No. 59-08 E**

**Report prepared for:** Thermo Fisher  
**Issue Date:** 15<sup>th</sup> January 2009

**Test Summary**

A Thermo Scientific 75003602 contained rotor (Max speed 15,200 rpm) was supplied by Thermo Fisher and containment tested at 15,200 rpm using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill when tested in triplicate.

**Report Written By**       **Report Authorised By**  (28/1/09)



## B. 14. MicroClick 30 x 2

### B. 14. 1. Items Supplied

Article No.	Item	Quantity
521-1787	MicroClick 30 x 2 rotor	1
	ClickSeal lid	1
521-1771	Rubber seal grease	1
521-1862	O-ring set	1
	GP rotors information card	1
	Rotor safety information	1
	Small benchtop rotors CD	1

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
Centrifuge Voltage	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	14 000 rpm
Maximum RCF-Value at $n_{max}$	21 694 x g
K-Factor at $n_{max}$	563
Acceleration / Braking Time	30 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	19 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
Centrifuge Voltage	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	14 000 rpm
Maximum RCF-Value at $n_{max}$	21 694 x g
K-Factor at $n_{max}$	563
Acceleration / Braking Time	30 s / 40 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	18 °C

## B. 14. 2. Technical Data

General Technical Data	
Weight (empty)	1.44 kg
Maximum Permissible Load	30 x 4 g
Max. Cycle Number	50 000
Radius max. / min.	99 mm / 64 mm
Angle	45°
Aerosol-tight	Yes
Max. Autoclaving Temperature	138 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
Centrifuge Voltage	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	14 000 rpm
Maximum RCF-Value at $n_{max}$	21 694 x g
K-Factor at $n_{max}$	563
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	15 200 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	0 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
Centrifuge Voltage	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	14 000 rpm
Maximum RCF-Value at $n_{max}$	21 694 x g
K-Factor at $n_{max}$	563
Acceleration / Braking Time	25 s / 40 s
Maximum Speed at 4 °C	14 000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	-3 °C





## B. 14. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-1862	Replacement O-ring kit
<b>Adapters</b>	
521-1816	0.25 ml Microtube
521-1815	0.5 ml Microtube
521-1800	0.2 ml PCR tube

## B. 14. 4. Biocontainment Certificate

Health Protection Agency  
Microbiology Services  
Porton Down  
Salisbury  
Wiltshire  
SP4 0JG



## Certificate of Containment Testing

**Containment Testing  
of Rotor 75005719 MicroClick 30x2  
in a  
Thermo Scientific Centrifuge**

**Report No. 194-12 B**

**Report Prepared For:** Thermo Fisher Scientific  
**Issue Date:** 30<sup>th</sup> October 2012

**Test Summary**

A 75005719 MicroClick 30x2 rotor was containment tested in a Thermo Scientific centrifuge at 15,000 rpm, using Annex AA of IEC 61010-2-20:2006 (2<sup>nd</sup> Ed.). The sealed rotor was shown to contain all contents.

<b>Report Written By</b>  <b>Name: Ms Anna Moy</b> <b>Title: Biosafety Scientist</b>	<b>Report Authorised By</b>  <b>Name: Mrs Sara Speight</b> <b>Title: Senior Biosafety Scientist</b>
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Thermo Scientific is a trademark of Thermo Fisher Scientific and is registered with the USPTO.



## B. 15. MicroClick 18 x 5

### B. 15. 1. Items Supplied

Article No.	Item	Quantity
521-1855	MicroClick 18 x 5	1
	ClickSeal lid	1
521-1771	Rubber seal grease	1
	GP rotors information card	1
521-1862	O-ring set	1
	Rotor safety information	1

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
<b>Centrifuge Voltage</b>	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	15 000 rpm
Maximum RCF-Value at $n_{max}$	24 652 x g
K-Factor at $n_{max}$	378
Acceleration / Braking Time	45 s / 30 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	22 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
<b>Centrifuge Voltage</b>	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	14 000 rpm
Maximum RCF-Value at $n_{max}$	21 475 x g
K-Factor at $n_{max}$	434
Acceleration / Braking Time	30 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	17 °C

## B. 15. 2. Technical Data

General Technical Data	
Weight (empty)	1.7 kg
Maximum Permissible Load	18 x 9 g
Max. Cycle Number	50 000
Radius max. / min.	98 mm / 70 mm
Angle	45°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
<b>Centrifuge Voltage</b>	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	15 000 rpm
Maximum RCF-Value at $n_{max}$	24 652 x g
K-Factor at $n_{max}$	378
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	15 000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	5 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	15 000 rpm
Maximum RCF-Value at $n_{max}$	24 652 x g
K-Factor at $n_{max}$	378
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	15 000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	2 °C



### B. 15. 3. Accessories

Article No.	Description
<b>Accessories</b>	
521-1862	Replacement O-ring Kit
<b>Adapters</b>	
521-1854	1.2/2 ml Microtube
521-1854	1.5/2 ml Microtube

### B. 15. 4. Biocontainment Certificate



Public Health England  
Microbiology Services  
Porton Down  
Salisbury  
Wiltshire  
SP4 0JG

#### Certificate of Containment Testing

#### Containment Testing of Thermo Scientific Rotor MicroClick 18x5 (75005765) in a Thermo Scientific Centrifuge

Report No. 102/13

**Report Prepared For:** Thermo Fisher Scientific  
**Issue Date:** 13<sup>th</sup> February 2014

#### Test Summary

A Thermo Scientific MicroClick 18x5 rotor (75005765) was containment tested in a Thermo Scientific centrifuge at 15,000 rpm, using Annex AA of IEC 61010-2-020:2006 (2<sup>nd</sup> Ed.). The sealed rotor was shown to contain all contents.

Report Written By

Report Authorised By

*Anna Moy*

*Sara Speight*

Name: Miss Anna Moy  
Title: Biosafety Scientist

Name: Mrs Sara Speight  
Title: Senior Biosafety Scientist

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## B. 16. Fiberlite F15-6 x 100 LEX

## B. 16. 2. Technical Data

### B. 16. 1. Items Supplied

Article No.	Item	Quantity
521-1377	Fiberlite F15-6 x 100 LEX	1
	GP rotors information card	1

General Technical Data	
Weight (empty)	3.63 kg
Maximum Permissible Load	6 x 126 g
Radius max. / min.	98 mm / 25 mm
Angle	25°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C

### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
<b>Centrifuge Voltage</b>	<b>100-240 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	13 000 rpm
Maximum RCF-Value at $n_{max}$	18 516 x g
K-Factor at $n_{max}$	2 045
Acceleration / Braking Time	50 s / 60 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	19 °C

### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
<b>Centrifuge Voltage</b>	<b>220-230 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	13 000 rpm
Maximum RCF-Value at $n_{max}$	18 516 x g
K-Factor at $n_{max}$	2 045
Acceleration / Braking Time	50 s / 65 s
Maximum Speed at 4 °C	13 000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	< 4 °C

### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
<b>Centrifuge Voltage</b>	<b>208-240 V, 50/60 Hz</b>
Maximum Speed $n_{max}$	13 000 rpm
Maximum RCF-Value at $n_{max}$	18 516 x g
K-Factor at $n_{max}$	2 045
Acceleration / Braking Time	45 s / 60 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	16 °C

### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	<b>220-240 V, 50 Hz 230 V, 60 Hz</b>
Maximum Speed $n_{max}$	13 000 rpm
Maximum RCF-Value at $n_{max}$	18 516 x g
K-Factor at $n_{max}$	2 045
Acceleration / Braking Time	50 s / 65 s
Maximum Speed at 4 °C	13 000 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	< 4 °C



**B. 16. 3. Accessories**

Article No.	Description
<b>Accessories</b>	
521-3492	Replacement O-ring Kit
<b>Adapters</b>	
521-0761	50 ml Nalgene Oak Ridge tube
521-1037	16 ml Nalgene Oak Ridge tube
521-1005	10 ml Nalgene Oak Ridge tube / 12 ml round tube
521-3489	6.5 ml round bottom tube
521-3487	30 ml Nalgene™ Oak Ridge tube / 38 ml round tube
521-0601	50 ml conical tube
521-1006	15 ml conical tube
521-3490	1.5/2 ml Microtube

**B. 16. 4. Biocontainment Certificate**

Centre of Emergency Preparedness and Response  
 Health Protection Agency  
 Porton Down  
 Salisbury  
 Wiltshire SP4 0JG  
 United Kingdom



**Certificate of Containment Testing**

**Containment Testing of Fiberlite F15-6x100y Rotor in the Thermo Fisher Scientific Centrifuge**

**Report No. 59-09 B**

**Report prepared for:** Thermo Fisher Scientific  
**Issue Date:** 22<sup>nd</sup> April 2010

**Test Summary**

A Piramoon Technologies Inc. Fiberlite F15-6x100y (max speed 15,000rpm) rotor was containment tested in the Thermo Fisher Scientific centrifuge at 15,000rpm, using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill within the rotor.

**Report Written By**

**Report Authorised By**



## B. 17. Fiberlite F21-48 x 2

### B. 17. 1. Items Supplied

Article No.	Item	Quantity
521-1369	Fiberlite F21-48 x 2	1
	GP rotors information card	1

#### Performance data of the compatible ventilated 1 L centrifuges

Mega Star 1.6	
<b>Centrifuge Voltage</b>	100-240 V, 50/60 Hz
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 055 x g
K-Factor at $n_{max}$	455
Acceleration / Braking Time	30 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	21 °C

#### Performance data of the compatible ventilated 4 L centrifuges

Mega Star 4.0	
<b>Centrifuge Voltage</b>	208-240 V, 50/60 Hz
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 055 x g
K-Factor at $n_{max}$	455
Acceleration / Braking Time	35 s / 45 s
Temperature increase in the sample after 1 h of continuous run, tolerance $\pm 2K$	22 °C

## B. 17. 2. Technical Data

General Technical Data	
Weight (empty)	2.6 kg
Maximum Permissible Load	48 x 4 g
Radius max. / min.	97 mm / 64 mm
Angle	45°
Aerosol-tight	Yes
Max. Autoclaving Temperature	121 °C

#### Performance data of the compatible refrigerated 1 L centrifuges

Mega Star 1.6 R	
<b>Centrifuge Voltage</b>	220-230 V, 50/60 Hz
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 055 x g
K-Factor at $n_{max}$	455
Acceleration / Braking Time	30 s / 45 s
Maximum Speed at 4 °C	15 200 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	4 °C

#### Performance data of the compatible refrigerated 4 L centrifuges

Mega Star 4.0 R	
<b>Centrifuge Voltage</b>	220-240 V, 50 Hz 230 V, 60 Hz
Maximum Speed $n_{max}$	15 200 rpm
Maximum RCF-Value at $n_{max}$	25 055 x g
K-Factor at $n_{max}$	455
Acceleration / Braking Time	35 s / 45 s
Maximum Speed at 4 °C	15 200 rpm
Sample Temperature at max. Speed (ambient temp. at 23 °C, run time 2 h), tolerance $\pm 2 K$	3 °C



### B. 17. 3. Accessories

Article No.	Description
<b>Accessories</b>	
On request	Replacement O-ring Kit
521-1073	0.2 ml PCR tube

### B. 17. 4. Biocontainment Certificate

Centre of Emergency Preparedness and Response  
Health Protection Agency  
Porton Down  
Salisbury  
Wiltshire SP4 0JG  
United Kingdom



#### Certificate of Containment Testing

#### Containment Testing of Fiberlite F21-48X1.5 Rotor in the Thermo Scientific GP3 Centrifuge

**Report No. 59-09 A**

**Report prepared for:** Thermo Fisher Scientific  
**Issue Date:** 9<sup>th</sup> December 2009

#### Test Summary

A Piramoon technologies Inc. Fiberlite F21-48X1.5 (max speed 15,200rpm) rotor was containment tested in the Thermo Scientific GP3 centrifuge at 15,200rpm, using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill within the rotor.

**Report Written By**

*Anna Mey*

**Report Authorised By**

*[Signature]*

## C. Technical Service

### Web Resources

Visit the VWR website at [www.vwr.com](http://www.vwr.com) for:

- Complete technical service contact information;
- Access to the VWR Online Catalogue, and information about accessories and related products;
- Additional product information and special offers

**Contact us** for information or technical assistance contact your local VWR representative or visit [www.vwr.com](http://www.vwr.com)

### Warranty

**VWR** warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

### Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorisation, unless any refusal is due to a defect of the product.



## Equipment disposal



This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

Instead it's your responsibility to correctly dispose of your equipment at life cycle-end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and / or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you

# D. Chemical Compatibility

Chemical Compatibility	
MATERIAL	CHEMICAL
Viton™	S U U U U U / S S
Tygon™	S / U U U S / S U S M M
Titanium	S S S S S S / U S S S S
Stainless Steel	S / M S S / U U S M S S
Silicone Rubber	S U M S S / M U S S S S
Rulon A™, Teflon™	S S S S S S S S S S S S S S
Polyvynil Chloride	U M U U S M S S S S S S
Polysulfone	S / U U S / S S S S S S
Polypropylene	S M S M S S S S S S S S
Polyethylene	S M S S S S S S S S S S
Polythermide	S U U / S S / U / S S S S
Polyester, Glass Thermoset	/ U U U S M S U U M M
Polycarbonate	S U U U M S S M S U U U
Polyallomer	S M S M S S S S S S S S
PET <sup>1</sup> , Polyclear™, Clear Crimp™	U / U U S / S S S S / U
Nylon	S / S S S / S M U S S S S S
Noryl™	S / U U S S / S S S S S S S
Neoprene	U U U S S / S S S S S S S
Glass	S / S S S / S S S S S S S
EPDM rubber	/ M S / / S S / S S S S S
Delrin™	S / M S S S U U S S M M
Composite Carbon Fiber/Epoxy	M / U M S S / S S S S U
Polyurethane Rotor Paint	S / S U S S S S S S S S S
Cellulose Acetate Butyrate	/ U U / S S / U S S U U U
Buna N	U U U U S / S U U S S S S
Anodic Coating for Aluminum	S / S S U / U S S S S U U
Aluminium	S S M S U / U S M S U U U
2-MERCAPTOETHANOL	S U U U U / S S
ACETALDEHYDE	S / M S S / S S S S S S
ACETONE	M U U / S S / S S S S S S
ACETONITRILE	S U U / S S / S S S S S S
ALCONOX™	U / S S / S S S S S S S
ALLYL ALCOHOL	/ U S S S S S S S S S S
ALUMINIUM CHLORIDE	U S M U / S S S S S S S
FORMIC ACID (100%)	/ S S U / S S S S S S S
AMMONIUM ACETATE	S S U U S S S S S S S S
AMMONIUM CARBONATE	M S U S U S S S S S S S
AMMONIUM HYDROXIDE (10%)	U S U S S S S S S S S S
AMMONIUM HYDROXIDE (28%)	U U S S S S S S S S S S
S	Satisfactory
M	Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use
U	Unsatisfactory, not recommended
/	Performance unknown; suggest testing, using sample to avoid loss of valuable material

Chemical Compatibility													
CHEMICAL	MATERIAL												
		Viton™	U	S	U	M	S	S	S	S	S	S	S
Tygon™	/	S	S	/	M	S	S	/	U	S	/	S	S
Titanium	S	S	S	S	S	S	S	S	S	S	S	S	S
Stainless Steel	S	M	U	/	S	S	S	S	S	S	S	S	S
Silicone Rubber	S	S	S	U	/	S	S	M	M	S	U	M	S
Rulon A™, Teflon™	S	S	S	/	S	S	S	S	S	S	S	S	S
Polyvynil Chloride	M	S	S	/	U	S	S	S	S	S	U	M	S
Polysulfone	/	S	S	/	U	S	S	S	S	S	U	/	S
Polypropylene	S	S	S	M	M	S	S	S	S	S	U	U	S
Polyethylene	S	S	S	S	S	S	S	S	S	M	U	U	S
Polythermide	S	/	/	S	/	S	S	S	/	U	U	U	/
Polyester, Glass Thermoset	U	M	S	S	U	M	U	M	U	M	U	U	S
Polycarbonate	U	S	S	S	U	M	U	S	U	U	U	S	S
Polyallomer	S	S	S	M	U	S	S	U	U	U	S	S	S
PET <sup>1</sup> , Polyclear™, Clear Crimp™	U	/	S	/	U	/	U	S	U	U	S	S	S
Nylon	S	S	S	S	U	S	S	S	S	S	S	S	S
Noryl™	/	S	S	/	U	S	S	U	/	S	S	S	S
Neoprene	S	S	S	M	U	M	M	S	U	M	S	S	S
Glass	/	S	S	/	S	S	M	S	S	/	S	S	S
EPDM rubber	S	S	S	S	M	/	/	S	U	M	S	/	/
Delrin™	M	S	U	S	S	/	U	S	M	M	U	S	S
Composite Carbon Fiber/Epoxy	U	S	S	/	U	S	/	S	U	/	S	S	S
Polyurethane Rotor Paint	S	S	S	/	S	S	/	S	S	/	S	S	S
Cellulose Acetate Butyrate	U	/	/	U	U	S	U	/	U	U	M	/	/
Buna N	U	S	S	M	U	M	M	S	U	U	S	S	S
Anodic Coating for Aluminum	U	/	M	/	S	/	/	U	S	/	S	S	S
Aluminium	U	/	U	S	S	/	U	M	S	S	U	S	M
AMMONIUM HYDROXIDE (CONC.)	U	U	U	S	S	U	U	M	S	S	U	S	M
AMMONIUM PHOSPHATE	U	U	U	S	S	U	U	M	S	S	U	S	M
AMMONIUM SULFATE	U	U	U	S	S	U	U	M	S	S	U	S	M
AMYL ALCOHOL	S	/	U	U	U	S	U	M	S	/	S	S	S
ANILINE	S	S	U	U	U	S	U	M	S	/	S	S	S
SODIUM HYDROXIDE (<1%)	U	/	M	S	S	/	U	M	S	/	S	S	S
SODIUM HYDROXIDE (10%)	U	/	M	U	U	/	U	M	S	/	S	S	S
BARIUM SALTS	M	U	S	/	S	/	U	M	S	/	S	S	S
BENZENE	S	S	U	U	U	S	U	M	S	/	S	S	S
BENZYL ALCOHOL	S	/	U	U	U	/	U	M	S	/	S	S	S
BORIC ACID	U	S	S	M	U	S	U	M	S	/	S	S	S
CESIUM ACETATE	M	/	S	/	S	/	U	M	S	/	S	S	S
CESIUM BROMIDE	M	S	S	/	S	/	U	M	S	/	S	S	S
CESIUM CHLORIDE	M	S	S	U	S	/	U	M	S	/	S	S	S
CESIUM FORMATE	M	S	S	/	S	/	U	M	S	/	S	S	S
S	Satisfactory												
M	Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use												
U	Unsatisfactory, not recommended												
/	Performance unknown; suggest testing, using sample to avoid loss of valuable material												



Chemical Compatibility															
MATERIAL	CHEMICAL	Acetic Acid (Glacial)	Acetic Acid (5%)	Acetic Acid (60%)	Ethyl Acetate	Ethyl Alcohol (50%)	Ethyl Alcohol (95%)	Ethylene Dichloride	Ethylene Glycol	Ethylene Oxide Vapor	Ficoll-Hypaque™	Hydrofluoric Acid (10%)	Hydrofluoric Acid (50%)	Hydrochloric Acid (conc.)	Formaldehyde (40%)
Viton™		U	M	U	U	U	U	S	S	S	S	/	M	/	U
Tygon™		/	S	M	U	M	M	/	M	S	S	/	/	/	M
Titanium		S	S	S	S	S	S	S	S	S	S	S	U	U	S
Stainless Steel		U	M	U	M	M	U	/	M	S	M	U	U	U	M
Silicone Rubber		U	S	M	M	S	S	U	S	U	S	U	U	U	S
Rulon A™, Teflon™		S	S	S	S	S	S	S	S	S	S	S	S	S	S
Polyvynil Chloride		U	M	M	U	S	S	U	S	S	S	M	M	U	S
Polysulfone		M	S	S	U	S	M	/	S	S	S	S	M	/	M
Polypropylene		U	S	M	S	S	S	U	S	S	S	S	S	S	S
Polyethylene		S	S	S	S	S	S	U	S	S	S	S	S	/	S
Polythermide		M	S	M	/	S	S	U	S	/	S	S	U	U	U
Polyester, Glass Thermoset		U	S	S	U	S	/	U	S	/	/	U	U	U	S
Polycarbonate		U	S	U	U	U	U	U	U	M	S	M	U	U	S
Polyallomer		U	S	M	M	S	S	U	S	S	S	S	S	M	S
PET <sup>1</sup> , Polyclear™, Clear Crimp™		U	M	U	U	U	U	U	/	/	/	/	U	U	M
Nylon		U	S	U	S	S	S	S	S	S	S	S	U	U	S
Noryl™		S	S	S	U	S	S	U	S	/	S	U	U	M	S
Neoprene		U	S	M	S	S	S	U	S	U	S	U	U	U	S
Glass		S	S	S	S	S	S	/	S	S	S	/	/	/	S
EPDM rubber		M	S	/	M	S	S	M	S	/	/	/	/	M	M
Delrin™		U	M	U	M	M	M	S	S	/	S	U	U	U	S
Composite Carbon Fiber/Epoxy		S	S	S	S	S	S	/	S	U	S	/	/	U	S
Polyurethane Rotor Paint		S	S	S	S	S	S	/	S	/	S	/	/	/	S
Cellulose Acetate Butyrate		U	S	U	U	S	U	U	S	/	/	M	U	U	S
Buna N		U	M	U	U	S	S	U	S	U	S	U	U	U	M
Anodic Coating for Aluminum		S	S	S	M	S	S	/	S	/	S	U	U	U	M
Aluminium		S	S	S	M	S	S	/	S	/	M	U	U	U	M
		S Satisfactory													
		M Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use													
		U Unsatisfactory, not recommended													
		/ Performance unknown; suggest testing, using sample to avoid loss of valuable material													

Chemical Compatibility											
CHEMICAL	MATERIAL										
		GLUTARALDEHYDE	S	M	U	S	S	/	M	M	S
GLYCEROL											
GUANIDINE HYDROCHLORIDE											
HAEMO-SOL™											
HEXANE	S	S	/	M	M	M	S	S	S	U	S
ISOBUTYL ALCOHOL	/										
ISOPROPYL ALCOHOL	M										
IODOACETIC ACID	S	M	/	S	S	S	S	S	S	S	S
POTASSIUM BROMIDE	U	S	/	S	S	S	S	S	S	S	S
POTASSIUM CARBONATE	M										
POTASSIUM CHLORIDE	U	S	/	S	S	S	S	S	S	S	S
POTASSIUM HYDROXIDE (5%)	U	S	S	S	S	S	S	S	S	S	S
POTASSIUM HYDROXIDE (CONC.)	U	U	/	M	M	M	S	S	S	S	S
POTASSIUM PERMANGANATE	S	S	/	S	S	S	S	S	S	S	S
<b>S</b>		Satisfactory									
<b>M</b>		Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use									
<b>U</b>		Unsatisfactory, not recommended									
<b>/</b>		Performance unknown; suggest testing, using sample to avoid loss of valuable material									
Viton™		/	S	S	S	S	S	S	S	S	S
Tygon™		/	S	S	S	S	/	M	M	S	S
Titanium		S	S	S	S	S	S	M	S	S	S
Stainless Steel		S	S	U	S	S	/	M	S	S	M
Silicone Rubber		S	S	S	S	U	S	S	M	S	S
Rulon A™, Teflon™		/	S	S	S	S	S	S	S	S	S
Polyvynil Chloride		/	S	S	S	M	S	S	S	S	M
Polysulfone		S	S	S	S	S	/	S	S	S	S
Polypropylene		S	S	S	S	S	S	S	S	S	M
Polyethylene		S	S	S	S	U	S	S	S	S	S
Polythermide		/	/	/	/	S	S	S	S	S	U
Polyester, Glass Thermoset		/	S	/	/	S	M	M	/	S	U
Polycarbonate		S	S	S	S	U	S	U	S	U	U
Polyallomer		S	S	S	S	M	S	S	S	S	M
PET <sup>1</sup> , Polyclear™, Clear Crimp™		S	S	S	S	U	U	U	M	S	S
Nylon		S	S	S	S	S	S	S	S	S	U
Noryl™		S	S	S	S	U	/	S	S	S	S
Neoprene		S	S	S	S	S	U	U	M	S	S
Glass		S	S	S	S	S	/	S	S	S	M
EPDM rubber		/	S	/	/	/	S	S	/	/	/
Delrin™		S	S	S	S	S	S	S	S	M	M
Composite Carbon Fiber/Epoxy		/	S	S	/	S	/	S	S	S	S
Polyurethane Rotor Paint		/	S	S	/	S	/	S	S	S	/
Cellulose Acetate Butyrate		S	/	/	/	/	U	U	/	S	/
Buna N		S	S	S	S	S	M	M	M	S	S
Anodic Coating for Aluminum		S	S	U	S	S	/	M	S	U	S
Aluminium		S	M	U	S	S	/	M	S	U	S







Chemical Compatibility																												
MATERIAL	CHEMICAL	Viton™	Tygon™	Titanium	Stainless Steel	Silicone Rubber	Rulon A™, Teflon™	Polyvynil Chloride	Polysulfone	Polypropylene	Polyethylene	Polythermide	Polyester, Glass Thermoset	Polycarbonate	Polyallomer	PET <sup>1</sup> , Polyclear™, Clear Crimp™	Nylon	Noryl™	Neoprene	Glass	EPDM rubber	Delrin™	Composite Carbon Fiber/Epoxy	Polyurethane Rotor Paint	Cellulose Acetate Butyrate	Buna N	Anodic Coating for Aluminum	Aluminium
	OILS (OTHER)	S	M	S	S	/	S	S	S	S	U	S	S	S	S	U	S	S	S	S	M	S	/	/	/	S	S	S
	OLEIC ACID	S	M	S	U	M	S	S	S	S	S	S	S	S	S	M	S	S	U	S	U	U	S	S	S	U	S	S
	OXALIC ACID	U	S	M	U	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	U	S
	PERCHLORIC ACID (10%)	U	/	S	/	U	S	M	/	M	M	S	M	U	M	/	U	/	M	U	S	/	U	U	/	/	U	U
	PERCHLORIC ACID (70%)	U	U	S	U	U	S	U	U	S	M	U	M	U	M	U	U	U	M	U	S	/	M	U	/	/	U	U
	PHENOL (5%)	U	U	M	U	U	S	U	U	S	M	S	U	U	M	U	U	U	M	U	S	/	U	U	/	/	U	U
	PHENOL (50%)	U	U	M	U	U	S	U	U	S	M	S	U	U	M	U	U	U	M	U	S	/	U	U	/	/	U	U
	PHOSPHORIC ACID (10%)	U	U	M	U	U	S	U	U	S	M	S	U	U	M	U	U	U	M	U	S	/	U	U	/	/	U	U
	PHOSPHORIC ACID (CONC.)	U	U	M	U	U	S	U	U	S	M	S	U	U	M	U	U	U	M	U	S	/	U	U	/	/	U	U
	PHYSIOLOGIC MEDIA (SERUM, URINE)	M	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	/	/	/	/	/	S	S
	PICRIC ACID	S	M	S	S	U	S	U	S	S	S	S	U	S	S	S	U	U	M	S	S	S	M	S	/	/	S	S
	PYRIDINE (50%)	U	U	U	U	U	U	U	M	S	U	/	U	U	M	U	U	U	M	S	S	/	U	U	S	U	S	S
	RUBIDIUM BROMIDE	M	S	S	M	S	S	S	S	S	S	/	/	S	S	S	S	S	S	S	S	/	S	S	/	/	S	S
	RUBIDIUM CHLORIDE	M	S	S	M	S	S	S	S	S	S	/	/	S	S	S	S	S	S	S	S	/	S	S	/	/	S	S
	SUCROSE	M	S	S	M	S	S	S	S	S	S	/	/	S	S	S	S	S	S	S	S	/	S	S	/	/	S	S
	S	Satisfactory																										
	M	Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use																										
	U	Unsatisfactory, not recommended																										
	/	Performance unknown; suggest testing, using sample to avoid loss of valuable material																										



Chemical Compatibility														
CHEMICAL	MATERIAL													
		TRICHLOROETHANE	S	/	U	/	/	/	/	/	/	/	/	/
TRICHLOROETHYLENE	/	/	U	/	/	/	/	/	/	/	/	/	/	S
TRISODIUM PHOSPHATE	/	/	/	/	/	/	/	/	/	/	/	/	/	S
TRIS BUFFER (NEUTRAL PH)	U	S	S	S	S	S	S	S	S	S	S	S	S	S
TRITON X/100™	S	S	/	S	S	S	S	S	S	S	S	S	S	S
UREA	S	/	U	S	S	S	S	S	S	S	S	S	S	S
HYDROGEN PEROXIDE (10%)	U	U	M	S	S	S	S	S	S	S	S	S	S	S
HYDROGEN PEROXIDE (3%)	S	M	S	S	S	S	S	S	S	S	S	S	S	S
XYLENE	S	S	U	S	S	S	S	S	S	S	S	S	S	S
ZINC CHLORIDE	U	U	S	S	S	S	S	S	S	S	S	S	S	S
ZINC SULFATE	U	S	S	/	S	S	S	S	S	S	S	S	S	S
CITRIC ACID (10%)	M	S	S	M	S	S	S	S	S	S	S	S	S	S
<b>S</b>	Satisfactory													
<b>M</b>	Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use													
<b>U</b>	Unsatisfactory, not recommended													
<b>/</b>	Performance unknown; suggest testing, using sample to avoid loss of valuable material													
Viton™	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Tygon™	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Titanium	S	U	S	S	S	S	S	S	S	S	S	S	S	S
Stainless Steel	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Silicone Rubber	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Rulon A™, Teflon™	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Polyvynil Chloride	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Polysulfone	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Polypropylene	U	U	S	S	S	S	S	S	S	S	S	S	S	S
Polyethylene	U	U	S	S	S	S	S	S	S	S	S	S	S	S
Polythermide	U	U	S	S	S	S	S	S	S	S	S	S	S	S
Polyester, Glass Thermoset	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Polycarbonate	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Polyallomer	U	U	S	S	S	S	S	S	S	S	S	S	S	S
PET <sup>1</sup> , Polyclear™, Clear Crimp™	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Nylon	S	S	/	S	S	S	S	S	S	S	S	S	S	S
Noryl™	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Neoprene	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Glass	/	/	/	/	/	/	/	/	/	/	/	/	/	/
EPDM rubber	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Delrin™	M	/	M	S	S	S	S	S	S	S	S	S	S	S
Composite Carbon Fiber/Epoxy	/	/	/	S	S	S	S	S	S	S	S	S	S	S
Polyurethane Rotor Paint	/	/	/	S	S	S	S	S	S	S	S	S	S	S
Cellulose Acetate Butyrate	/	U	S	S	/	S	S	S	S	S	S	S	S	S
Buna N	U	U	/	S	S	S	S	S	S	S	S	S	S	S
Anodic Coating for Aluminum	/	/	/	S	S	S	S	S	S	S	S	S	S	S
Aluminium	S	/	U	S	S	S	S	S	S	S	S	S	S	S

<sup>1</sup> Polyethyleneterephthalate

**NOTICE** Chemical resistance data is included only as a guide to product use. Because no organized chemical compatibility data exists for materials under the stress of centrifugation, when in doubt we recommend pretesting sample lots.

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