



**SCIENTIFIC
LABORATORY
SUPPLIES**

USER MANUAL

SLS Lab Basics 12 Place Microcentrifuge



Code: SLS4600



12301570
Ver.20211215

Before using centrifuge, please carefully read this user manual for its efficient operation and safety.

United Kingdom:
slsinfo@scientific-labs.com

International:
slsexport@scientific-labs.com

Northern Ireland:
NI.sales@scientific-labs.com

Republic of Ireland:
ROI.sales@scientific-labs.com



**SCIENTIFIC
LABORATORY
SUPPLIES**


Contents

Safety Reminder.....	1
1. Specifications.....	3
2. Declaration of Conformity.....	3
3. Required Operational Condition.....	4
4. Installation.....	5
4.1 Location.....	5
4.2 Connection of the power cord and grounding.....	5
5. Structure.....	6
6. Operation panel.....	7
7. Rotor Preparation.....	8
7.1 Prepare the samples.....	8
7.2 Inject the samples into tubes.....	8
7.3 Keep the tubes balanced.....	8
7.4 Inspect the rotor.....	8
7.5 Symmetrically load centrifuge tubes in rotor.....	8
8. Operation.....	9
8.1 Normal Operation.....	9
8.2 RCF Operation.....	12
8.3 Pulse Operation.....	12
9. Maintenance.....	12
10. Troubleshooting.....	13
10.1 Frequent problems list.....	13
10.2 How to open the door.....	14
11. Instructions of rotor and tube.....	15
11.1 The rotor instructions.....	15
11.2 Tubes.....	16
12. Calculating Relative Centrifuge Force (RCF).....	18
13. Warranty.....	18
13.1 Warranty of the centrifuge.....	18
13.2 Warranty of the rotor.....	18
14. After-sales Service.....	18

Safety Reminder

Common safety precautions

Carefully read the following safety precautions for a thorough understanding.

- Follow the instructions and procedures described in this manual to operate this centrifuge safely
- Carefully read all safety messages in this manual and the safety instructions on the instrument
- Safety messages are labelled as indicated below. They are in combination with signal words of “**WARNING**” and “**CAUTION**” with the safety alert symbol  to call your attention to items or operations that could be dangerous to you or other persons using this instrument. The definitions of signal words are as follows:



WARNING: Personal Danger

Warning notes indicate any condition or practice, which if not strictly observed, could result in personal injury or possible death.



CAUTION: Possible damage to instrument

Caution notes indicate any condition or practice, which if not strictly observed or remedied, could result in damage or destruction of the instrument.

NOTE: Notes indicate an area or subject of special merit, emphasising either the product’s capability or common errors in operation or maintenance.

- Do not operate this centrifuge in any manner not described in this User manual. When in doubt or facing any troubles with this centrifuge, **ASK FOR HELP**
- The precautions described in this User manual are carefully developed in an attempt to cover all the possible risks. However, it is also important that you are alert for unexpected incidents. Be carefully operating this centrifuge



WARNING:

- This centrifuge is not explosion-proof. Never use explosive or flammable samples
- Do not install the centrifuge in or near places where inflammable gases are generated or chemicals are stored

- Do not place dangerous material within 30cm around the centrifuge
- It is your responsibility to make sure to prepare necessary safety measures before using samples that are toxic, radioactive or contaminated with pathogenic micro-organisms
- If the instrument, rotor and/or accessories that has been contaminated by solutions with toxic, radioactive or pathogenic materials, clean it according to the decontamination procedure that you are specified
- If you require services at site, please sterilize and decontaminate it in advance, and then notify the SLS Service Centre involved in the details of the particular materials
- Do not handle the power cord or turn on or off the POWER switch with wet hands to avoid electrical shocks
- For safety purposes, do not enter within 30cm around this centrifuge while it is in operation.
- While the rotor is rotating, never forcedly release the door lock
- Unauthorised repairs, disassembly, and other services to the centrifuge except by the SLS Service Centre are strictly prohibited

CAUTION

- This centrifuge must be located on one firm and level table
- Make sure the centrifuge is horizontal before running
- Make sure the angle between the door and cover is greater than 70 degrees when the door is open
- Be careful not put your fingers or hands between the door and cover when the door is closing
- Do not move or relocate this centrifuge while it is running
- If fluid spills in the rotor chamber, please promptly clean and dry with a dry cloth to avoid sample contamination
- Ensure to remove any objects and fragments of the tubes dropped inside the rotor chamber before running this centrifuge
- Cautions be careful of the rotor

(1) Always check for corrosion and damages on the rotor surface before using it. Do not use the rotor if an abnormality is found.

(2) Do not set the centrifuge speed beyond the allowable maximum speed of the rotorkits (rotor or adapters). Make sure to run it below the allowable maximum speed.

(3) Do not exceed the allowable imbalance.

(4) Use the rotor and tubes within their actual capacities.

(5) If the rotor is attached with a lid, ensure it is tightened before operation.

- If any abnormal condition occurs during operation, please stop it immediately and contact the SLS Service Centre. Notify the SLS Service Centre if a warning code is displayed
- Vibrations are likely to damage the centrifuge, contact the SLS Service Centre if abnormality observed

1. Specifications

Maximum speed	15000rpm increment: 100rpm
Maximum RCF	15100 × g, increment: 100 × g
Maximum capacity	2ml × 12
Timer	30 seconds - 99 minutes HOLD continuous operation
Driving Motor	Brushless DC motor
Safety devices	Door interlock, over speed detector, over temperature detector, Error code runtime display
Power requirements	Single phase, 110V-240V, 50 Hz /60Hz, 3A
Dimensions (mm)	(L) 255 × (W) 245 × (H)140
Weight	6Kgs
Additional features	Speed/RCF switch, Pulse operation, LCD display of runtime status, buzzer notification & alert

2. Declaration of Conformity

SLS Lab Basics 12 Place Microcentrifuge:

Construction in accordance with the following safety standards:
EN 61010-1
Construction in accordance with the following EMC standards:
EN 61326-1/ FCC Part 15 Subpart B/ ICES 001
Associated EU guidelines:
EMC-guidelines: 2004/108/EC Instrument guidelines: 2006/95/EC
This ISM device complies with Canadian ICES-001 Cet appareil ISM est conforme à la norme NMB-001 du Canada

The centrifuge:

Construction in accordance with the following safety standards:
EN 61010-1 EN 61010 -2-10
Construction in accordance with the following EMC standards:
EN 61326-1/ FCC Part 15 Subpart B/ IECS 001
Associated EU guidelines:
EMC-guidelines: 2004/108/EC Instrument guidelines: 2006/95/EC
This ISM device complies with Canadian ICES-001 Cet appareil ISM est conforme à la norme NMB-001 du Canada

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:

This centrifuge 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 centrifuge is operated in a commercial environment. The centrifuge generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user manual, may cause harmful interference to radio communications. Operation of centrifuge in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference.

3. Required Operational Condition

3.1 Basic operational Conditions

- (1) Power 110V-240 V, 50Hz /60 Hz, 3A
- (2) Ambient temperature : 2°C - 40°C
- (3) Relative humidity : ≤80%
- (4) No vibration and airflow around
- (5) No electric dust, explosive and corrosive gases around

3.2 Transport and storage condition

- (1) Storage temperature : -40°C - 55°C
- (2) Relative humidity : ≤93%

4. Installation

This section describes the instructions that you should abide when installing the centrifuge to ensure your safety and the optimum performance. Before moving the centrifuge, the rotor must be removed.



WARNING:

- **Improper power supply may damage centrifuge**
- **Make sure the power source conforms to the required power supply before connecting**

4.1 Location

(1) Place the centrifuge on a firm, flat and level table, ensure the four feet of this centrifuge stand on the table firmly. Avoid installing on the slippery surface or surface prone to vibration.

(2) Ideal ambient temperature is $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$, avoid placing the centrifuge in direct sunlight if temperature exceeds 30°C .

(3) Keep clear of the centrifuge at least 10cm on both sides and at least 30cm behind it to guarantee the cooling efficiency.

(4) Keep away from heat or water to avoid sample temperature issues or centrifuge failures.

4.2 Connection of the power cord and grounding



WARNING:

- **To avoid electrical shocks, ensure your hands are dry when touching the power cord**
- **This centrifuge must be grounded properly**

A minimum 10A outlet providing a sufficient ground is required, and this must meet with local safety requirements.

5. Structure



Figure 5.1 Front view of centrifuge



Figure 5.2 Rear view of centrifuge

6. Operation panel

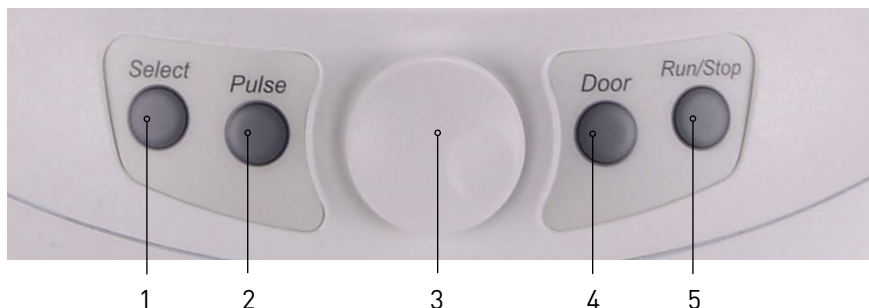


Figure 6.1 Operation Panel

Item	Symbol	Name	Function
1		Select button	Press the button to choose the program which you want to modify
2		Pulse button	The speed can be accelerated and held at the speed when pressing Pulse on
3		Parameter button	Clockwise rotate to increase program values. Rotate anti-clockwise to decrease parameter values. Press the button, shift between speed and RCF display
4		Open/Lock button	Press the button to open the door. The button is not available when the centrifuge is running
5		Run/Stop button	Press the button to start running. The centrifuge will brake to stop running if pressed during centrifugation

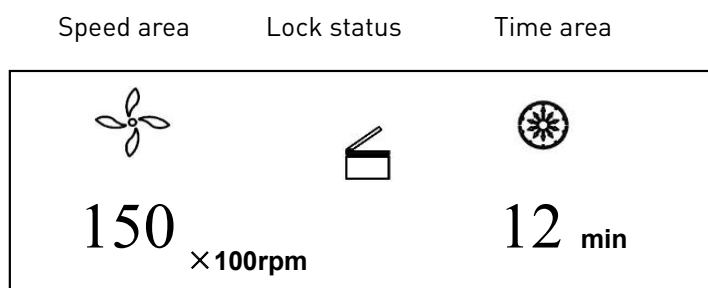


Figure 6.2 The main interface

Main interface is as figure 6.2. The speed is set to be 15000 rpm, running time is 12 minutes. When speed symbol is rotating, indicating the centrifuge is running. Time display symbol displays the ratio of working to time setting. The total time setting is divided into 10 sections.

7. Rotor Preparation

7.1 Prepare the samples

7.2 Inject the samples into tubes



CAUTION:

- Do not overload samples into the centrifuge which will cause leaking
- Do not exceed the actual capacity allowed in the user manual

7.3 Keep the tubes balanced

- Although the centrifuge can accept sample balancing by eye, we recommend that you keep this centrifuge in a well balanced condition to extend its life expectancy
- Never intentionally run the centrifuge under unbalanced condition even though the allowable imbalance is not exceeded

7.4 Inspect the rotor

Check the rotor for corrosion or scratches before using.



CAUTION:

- If any abnormality such as corrosions or scratches are found, stop using the rotor and contact the SLS Service Centre
- Only manufacturers rotors must be used with the unit

7.5 Symmetrically load centrifuge tubes in rotor



CAUTION:

- Make sure the rotor lid is securely fixed on the rotor, and check that the rotor and shaft are tightened. Otherwise, the rotor may be moved off while rotating and cause damage of the centrifuge and rotor

8. Operation

CAUTION:

- Do not push or lean against the centrifuge while it is running
- Do not run the centrifuge when fragments or sample solutions are left in the centrifuge chamber
- Always keep the centrifugal chamber clean
- If the centrifuge makes strange noise during operation, stop it immediately and contact the SLS Service Centre. Notify them of the warning code if displayed

8.1 Normal Operation

Turn on the power switch, centrifuge will display the running interface last time after passing the self-diagnostic checks, see figure 8.1 below:

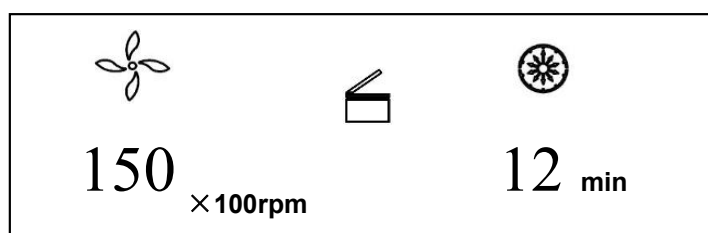


Figure 8.1 The last running interface

- Speed: 15000 rpm Running time: 12 minutes
- The door lock is released

8.1.1 Rotor loading and removal

CAUTION:

- Attach the rotor to the rotor shaft. Ensure the rotor is in position and connected with the shaft, tightening the locking nut to secure the rotor with shaft, to prevent the rotor damaging the centrifuge
- Ensure the rotor lid is firmly tightened to the rotor

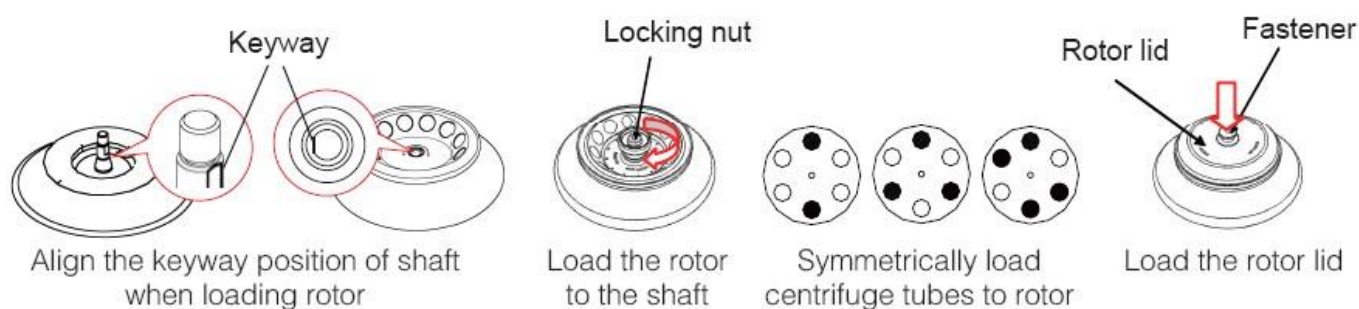




Figure 8.2 The rotor installation

- Load the rotor to the shaft to ensure rotor is in position until it is connected well with the shaft
- Rotate the rotor slightly by your fingers to check, if the rotor vibrates, if so attach the rotor again
- Hold on the rotor with one hand, tighten clockwise the nut with the other hand and make sure to tighten firmly
- Put the rotor lid to the rotor, press the fastener down and make the fastener attach the locking nut tightly
- Close the door and start running
- To release the rotor, firstly pull the fastener up to remove the lid, and then turn the locking nut anti clockwise




CAUTION:

- **Check the rotor is firmly tightened before running**

8.1.2 Set the operation parameters



Press the  button to select required parameters. The parameter can be modified when the parameter is flashing. Clockwise rotate the parameter button  to increase parameter value, counter clockwise rotation of the parameter button will decrease the parameter value. When the Parameter button is rotated faster – the parameter value increases faster. The minimum speed increment is 100 rpm, the minimum time increment is 1 second.

(1) Set the speed

- Press the select button  until the speed rpm is displayed
- When the speed button is selected, the speed symbol will flash the speed value
- The minimum speed value you can set 500rpm, the minimum increment is 100rpm
- Rotate program button  clockwise to increase speed value, rotate the program button anti-clockwise to decrease speed value
- You can speed up set the speed value by rotating program button quickly 

- There is a circulating function to increase decrease the speed values. Rotate the program button clockwise to change settings from small → large → maximum → minimum. Rotate the program button anti-clockwise to change settings from large → small → minimum → maximum

(2) Set the time




- Press  button, time value flashes in the time setting mode
- Rotate the program button  to set running time from 30 seconds to 99 minutes
- When time displays HD this is a continuous running mode

8.1.3 Start the operation

(1) Press running button to start running

- Timer will operate once the speed setting value is reached, the screen displays the remaining run time

(2) View and modify the operation programs

- Pressing button,  returns the display to the program interface and displays settings programs. Press the select button  to the desired program. When flashing, rotate parameter button  to modify values. Release the button after 5 seconds, and the centrifuge will return to normal operation mode and run according to the new value
- If the set time value has been modified the operation time is not affected and will continue

(3) Warning display


- If an error occurs during the operation, the centrifuge will brake to stop automatically, and display the error code on the time/display area. The error code can be checked in the table 10.1, and corrective actions can be applied accordingly

8.1.4 End the operation

(1) The centrifuge will brake when it reaches the setting time or button is pressed.

- When the rotor stops rotating, centrifuge will start beeping to alert the operation has finished

(2) Open the door



- The door can be released automatically when the operation has stopped
- With the door closed, you are able to press the  button to open it
- After ending the operation, the program will store the setting parameters of this operation, and will recall these parameters when restart the program

(3) Open the door and take out the rotor and samples.

8.2 RCF Operation

(1) Turn on the power switch.

(2) Set an RCF (Relative Centrifugal Force) value.

- Press the select button  and choose speed unit $\times g$, the speed symbol will flash into RCF value input status
- If no button is pressed after the speed value has flashed for 5 seconds, the input mode will be shut down
- Rotate program button  to input a RCF value, RCF increment is $100 \times g$

(3) Set operating conditions

- The other operation, please refer to the section 8.1



8.3 Pulse Operation

This function is used to remove the residual samples adhered on the interior of the tubes.

Note: The button works only when the rotor stopped and the door is locked.

(1) Turn on the power switch and load the rotor to the shaft, tighten the rotor lid and make sure it is in secured position, and then close the door.

(2) The centrifuge gets into preparation mode and displays last running values. The values can be reset.

(3) Press  knob and hold, the centrifuge will speed up to the setting speed. While releasing  knob during acceleration, the centrifuge will start to decelerate and stop.

9. Maintenance



CAUTION:

- If you do not follow the recommended instructions for cleaning or disinfecting, this may damage the centrifuge

(1) Centrifuge

- If the centrifuge is exposed to ultraviolet rays for a long time, the color of the doors may change or the label may come off. After using, cover the centrifuge with a piece of cloth to protect it from direct exposure
- If the centrifuge needs cleaning, clean it with a cloth or sponge moistened with a neutral detergent solution

- Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution

(2) Rotor chamber



CAUTION:

- **Do not directly pour water, neutral detergent or disinfectant solution into the rotor chamber. Otherwise fluids may leak into the drive units and cause corrosion or deterioration to the bearings**
- If the rotor chamber needs cleaning, clean with cloth or sponge moistened with a neutral detergent solution. Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution

(3) Drive shaft

- We recommend regular maintenance for drive shaft. You can wipe the drive shaft with soft cloth, and then apply a thin coat of silicon grease

(4) Door

- Clean and sterilize the door using the same method as the step (1) above

(5) Rotor

- To prevent corrosion, remove the rotor from rotor chamber. If not in use for a long term, then detach the rotor lid and turn upside down to dry the tube holes and keep clean
- For sample leaks in the rotor, rinse the rotor with water. Apply a thin coat of silicon grease to the rotor when it is completely dry
- The rotor should be regular maintained, we recommend cleaning it every 3 months to ensure tube and rotor holes keep clean, and then apply a thin coat of silicon grease

This centrifuge has a self diagnostic function. If a problem occurs, an error/warning code will be displayed on the time display screen and the operator can determine the malfunction with the warning code below.

10. Troubleshooting

10.1 Frequent problems list

Symptom	Causes	Solutions
Nothing appears on the screen when the POWER is turned on	Building power circuit breaker trips The fuse was blown out	Remove the trouble and turn on the POWER Replace the fuse
Abnormal vibration	Rotor does not match with spindle Samples are imbalance	Install again the rotor Weighting scales, install symmetrically

		Rotor lid loose	Tighten the rotor lid firmly
Alarm code appeared on the time display screen	E-02 Door fault	The door opened in running	Close the door immediately
		The Run/Stop button is pressed while the door opening	Close the door and then start to operate.
	E-06 Set wrong speed	The setting speed exceed the allowable range	Modify the speed value
	E-10-86	Read the service manual	Contact the SLS Service Centre

Table 10.1 1 Frequent problems and solutions

- Warning code E-1-9 are related to wrong operating. You can continue running the centrifuge after the cause removed

10.2 How to open the door

10.2.1 In the case of power on




CAUTION:

- The door can be opened while the power is on and the rotor stops rotating

(1) Turn on the POWER switch the door lock will release automatically.

(2) The door lock will release automatically once the operation finished.

(3) It is available to release the door by pressing button  once the rotor stops.

10.2.2 In the case of power outage

The door cannot be opened automatically if there is a power outage. It is available to be opened manually.

(1) Ensure if the rotor has stopped rotating.

- Listen carefully to ensure no rotating sound can be heard

(2) Insert a screw driver into the hole to open the door.

- Hole is located on the top right side of the unit
- Insert a screw driver into the hole and push forward to release the door

11. Instructions of rotor and tube

CAUTION:

- Read the instructions thoroughly, correct use rotor
- Do not exceed the allowable maximum speed of rotor, tube and adapters etc. Take care that the allowable maximum speed of some adapters are lower than the rotors maximum speed

11.1 The rotor instructions

11.1.1 Rotor structure

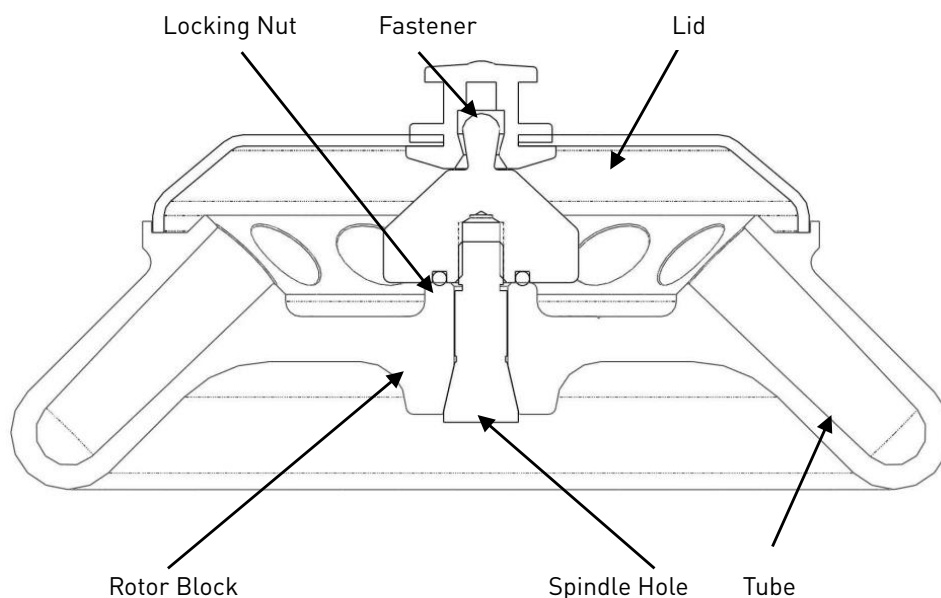


Figure 11.1 The rotor profile

11.1.2 Available rotors and adapters

Table 11.1 Rotors and adapters

Model	Rotor Type	ID Code	Tubes	Adapters	Maximum Speed (RPM)	Maximum RCF (X g)	Allowable Imbalance (*)	
							Imbalance	Volume Imbalance (**)
SLS Lab Basics 12 Place Microcentrifuge	A12-2P	02	1.5/2.0mL Tube		15000	15100	2.0g/tube	5mm/tube
			0.2mL PCR	A05P2	15000	11700		

			Tube					
			0.5mL Microtube	A02P2	15000	12780		

11.1.3 Notice

- The centrifuge rotor can separate samples with density lower than 2.0g/ml. If the separated samples density is over 2.0g/ml, please calculate allowable speed depending on the following formula.

$$\text{Allow Speed (rpm)} = \text{Maximum speed} \times (2.0(\text{g/ml}) / \text{Sample density (g/ml)})^{1/2}$$

11.1.4 Autoclaving

A12-2P rotor is made of plastic, cannot take high-pressure sterilisation and UV irradiation, only ordinary sterilisation can be used.

CAUTION:

- The lid of the rotor is made of plastics and cannot be subjected to high pressure sterilisation, only ordinary sterilisation can be used

11.2 Tubes

11.2.1 Cleaning and sterilising tubes

Table 11.2 Cleaning and sterilising conditions for tubes

Condition			Material	PA	PC	PP
Cleaning	Cleaning Fluids	Acidic (pH5 or lower)		X	X	X
		Acidic (higher than pH5)		0	0	0
		Alkaline (higher than pH9)		0	X	0
		Alkaline (pH9 or lower)		0	0	0
		Neutral (pH7)		0	0	0
		Warm water (up to 70°C)		0	0	0
	Ultrasonic Cleaning	Neutral detergent (pH7)		0	0	0
Sterilisation	Autoclaving	115°C (0.7kg/cm ²) 30 minutes		0	0	0
		121°C (10kg/cm ²) 20 minutes		X	0	0
		126°C (1.4kg/cm ²) 15 minutes		X	X	X
	Boiling	15 to 30 minutes		0	0	0
	Ultraviolet sterilisation	200 - 300nm		X	X	X
	Gas sterilization	Ethylene oxide		0	X	0

		Formaldehyde	0	0	0
--	--	--------------	---	---	---

PA: Polyallomer PC: Polycarbonate PP: Polypropylene

11.2.2 Cleaning PC tubes

PC materials are low in chemical resistance against alkaline solutions. Avoid using neutral detergents with pH higher than 9. Note that pH of some neutral detergents are still higher than 9 even if diluted according to the instruction in the makers catalog. Use detergent with a pH between 7 and 9.

11.2.3 Autoclaving PA, PC and PP tubes

PA begins softening at about 120°C, PC and PP at about 130°C. Autoclave PA tubes at 115.0°C (0.7kg/cm²) for 30 minutes and PC and PP tubes at 121°C (0.1kg/cm²) for 20 minutes. If a certain temperature is exceeded, the tubes may be deformed.

When using a sterilising chamber, please operate as follows:

- (1) Place tubes in vertical position, mouths upward. If tubes are placed sideways, they may deform into an oval shape due to gravity.
- (2) Remove screw nuts and inner covers to prevent from deformation or rupture.
- (3) Wait until the sterilising chamber cools down to the room temperature before the tubes are removed.

11.2.4 Condition and life expectancy of tubes

The life expectancy of plastic tubes depends on the characteristics of samples, speed of the rotor used, and temperature applied and so on. When the plastic tubes are used for centrifuge of ordinary aqueous samples (pH between 5 and 9), their life expectancies are defined as follows.

Operated at the maximum speed:

High quality tubes (PA, PC, PP): 30-50 operations

Ordinary tubes (PA, PC, PP): around 10 operations (Using in low speed can extend the tube life)

Life expectancy of tubes also depends on the pretreatment conditions such as cleaning and sterilisation, lifetime can be cut down.

Notice: Do not use damaged or cracked tubes.

12. Calculation Relative Centrifuge Force (RCF)

Relative Centrifuge Force (RCF) can be determined with the following calculation formula.

$$RCF = 1.118 \times r \times n^2 \times 10^{-5}$$

R- rotating radius, unit: cm; n-rotating speed, unit: rpm

13. Warranty

13.1 Warranty of the centrifuge

This centrifuge is guaranteed for one year from the date of delivery provided that it has been operated and maintained properly.

13.2 Warranty of the rotor

The rotor is guaranteed for 1 year from the date of delivery upon manufacture. Please pay attention, do not use the rotor once it has corrosion or fatigue damage. We do not guarantee this centrifuge and the rotor under the following conditions even if within the guarantee period:

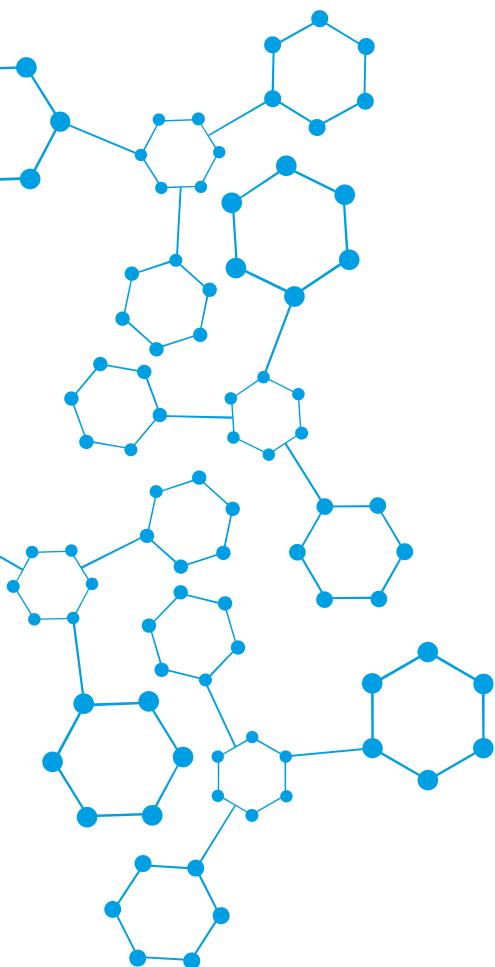
- (1) Failures caused by incorrect installation
- (2) Failures caused by rough or improper handling
- (3) Failures caused by conveyance or relocation after installation
- (4) Failures caused by unauthorized disassembly or modification
- (5) Failures caused by using parts of the other companies, such as rotors and adapters
- (6) Failures caused by natural disasters including fire, earthquakes and so on
- (7) Consumables and parts have a limited guarantee period

14. After-sales Service

In order to ensure to operate centrifuge safely and efficiently, it is necessary for regular maintenance. If your centrifuge has problems, do not attempt to repair it by yourself.

Contact our sales or the SLS Service Centre.

SLS Lab Basics 12 Place Microcentrifuge



To book your service or for further information
please contact us...

Email:

servicecentre@scientific-labs.com

Telephone:

0115 977 5075



Website:

www.scientificlabs.co.uk/servicecentre

United Kingdom:

slsinfo@scientific-labs.com

International:

slsexport@scientific-labs.com

Northern Ireland:

NI.sales@scientific-labs.com

Republic of Ireland:

ROI.sales@scientific-labs.com

