Thermo Fisher Scientific

FIBER*Lite*™ F21-48x2

Instruction Manual

50120023-2 September 2009

IMPORTANT!

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- **web site addresses**
- **contact information**
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Table of Contents

Preface

Before starting to use the rotor, read through these instruction manual carefully and follow the instructions.

The information contained in these instruction manual is the property of Thermo Fisher Scientific; it is forbidden to copy or pass on this information without explicit approval.

Failure to follow the instructions and safety information in this instruction manual will result in the expiration of the seller's warranty.

Scope of Supply

Article Number		Quantity	Check
75003664	FIBER*Lite* ™ F21-48x2	1	☐
76003500	Rubber seal grease	1	☐
70009824	Anti-corrosion oil	1	☐
50120023	Instruction Manual	1	☐

If any parts are missing, please contact the nearest Thermo Fisher Scientific representative.

Precautions

In order to ensure safe operation of the FIBER*Lite* ™ F21-48x2, the following general safety regulations must be followed:

- Do not remove the magnet at the rotor bottom
- Do not use rotors which show any signs of corrosion and/or cracks.
- Use only with rotors that have been loaded properly.
- Never overload the rotor.

- Use only accessories which have been approved by Thermo Fisher Scientific. Exceptions to this rule are commercially available glass or plastic centrifuge tubes, provided they have been approved for the speed or the RCF value of the rotor.
- Please observe the safety instructions.

Please pay particular attention to the following aspects:

- Rotor installation: Check that the rotor is locked properly into place before operating the centrifuge.
- Always balance the samples.

Maximum sample density at maximum speed: $1{,}2\frac{g}{ml}$

This symbol refers to general hazards.
ATTENTION means that material damage could occur.
WARNING means that injuries or material damage or contamination could occur.

This symbol refers to biological hazards.
Observe the information contained in the instruction manual to keep yourself and your environment safe.

Rotor Specifications

Contents

Heraeus

Table 1-1.230V 50Hz/60Hz ventilated

Centrifuge	Heraeus Multifuge X3	Heraeus Multifuge X3F	Heraeus Multifuge X1
Catalog #	75004500	75004530	75004210
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	40 / 40	40 / 40	45 / 45
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20	20	21
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Heraeus Megafuge 40
Catalog #	75004503
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	40 / 40
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-2. 230V 50Hz/60Hz refrigerated

Centrifuge	Heraeus Multifuge X3R	Heraeus Multifuge X3FR	Heraeus Multifuge X1R
Catalog #	75004515	75004536	75004250
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	35 / 40	35 / 40	45 / 45
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Heraeus Megafuge 40R
Catalog #	75004518
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	35 / 40
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-3. 120V 60Hz ventilated

Centrifuge	Heraeus Multifuge X3	Heraeus Multifuge X3F	Heraeus Multifuge X1
Catalog #	75004501	75004531	75004211
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	40 / 40	40 / 40	45 / 45
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20	20	22
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Heraeus Megafuge 40
Catalog #	75004504
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	40 / 40
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-4. 120V 60Hz refrigerated

Centrifuge	Heraeus Multifuge X3R	Heraeus Multifuge X3FR	Heraeus Multifuge X1R
Catalog #	75004516	75004537	75004251
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	35 /40	35 /40	45 / 45
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Heraeus Megafuge 40R
Catalog #	75004519
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	35 /40
aerosol-tight	no
max temperature for autoclaving °C	121

Sorvall

Table 1-5. 230V 50Hz/60Hz ventilated

Centrifuge	Sorvall Legend XT	Sorvall Legend XF	Sorvall Legend X1
Catalog #	75004505	75004532	75004220
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	40 / 40	40 / 40	45 / 45
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20	20	21
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Sorvall ST 40
Catalog #	75004509
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	40 / 40
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-6. 230V 50Hz/60Hz refrigerated

Centrifuge	Sorvall Legend XTR	Sorvall Legend XFR	Sorvall Legend X1R
Catalog #	75004520	75004538	75004260
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	34 / 40	34 / 40	45 / 45
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Sorvall ST 40R
Catalog #	75004524
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	34 / 40
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-7. 120V 60Hz ventilated

Centrifuge	Sorvall Legend XT	Sorvall Legend XF	Sorvall Legend X1
Catalog #	75004506	75004533	75004221
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	40 /40	40 /40	45 / 45
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20	20	22
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Sorvall ST 40
Catalog #	75004510
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	40 /40
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-8. 120V 60Hz refrigerated

Centrifuge	Sorvall Legend XTR	Sorvall Legend XFR	Sorvall Legend X1R
Catalog #	75004521	75004539	75004261
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	35 / 30	35 / 30	45 / 45
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Sorvall ST 40R	Sorvall ST 16R
Catalog #	75004525	75004281
Weight empty [kg] of rotor	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200
maximum RCF value at n_{max}	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45
Accel. / braking time [s]	35 / 30	55 / 50
aerosol-tight	no	no
max temperature for autoclaving °C	121	121

Table 1-9. 100V 50Hz/60Hz ventilated

Centrifuge	Sorvall Legend XT	Sorvall Legend XF	Sorvall Legend X1
Catalog #	75004507	75004534	75004223
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	40 / 40	40 / 40	45 / 45
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20	20	22
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Sorvall ST 40
Catalog #	75004511
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	40 / 40
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-10.100V 50Hz/60Hz refrigerated

Centrifuge	Sorvall Legend XTR	Sorvall Legend XFR	Sorvall Legend X1R
Catalog #	75004522	75004540	75004263
Weight empty [kg] of rotor	1.75	1.75	1.75
Maximum permissible load [g]	48x3.2	48x3.2	48x3.2
maximum speed n_{max} [rpm]	15200	15200	15200
maximum RCF value at n_{max}	25055	25055	25055
max. / min. radius [cm]	9.7 / 6.4	9.7 / 6.4	9.7 / 6.4
Pitch angle [°]	45	45	45
Accel. / braking time [s]	35 / 40	35 / 40	45 / 45
aerosol-tight	no	no	no
max temperature for autoclaving °C	121	121	121

Centrifuge	Sorvall ST 40R
Catalog #	75004526
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	35 / 40
aerosol-tight	no
max temperature for autoclaving °C	121

Thermo Scientific

Table 1-11.230V 50Hz/60Hz ventilated

Centrifuge	Thermo Scientific SL 40
Catalog #	75004512
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	40 / 40
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-12.230V 50Hz/60Hz refrigerated

Centrifuge	Thermo Scientific SL 40R
Catalog #	75004527
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	35 / 40
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-13.120V 60Hz ventilated

Centrifuge	Thermo Scientific SL 40
Catalog #	75004513
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	40 / 40
sample heating at n_{max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes	20
aerosol-tight	no
max temperature for autoclaving °C	121

Table 1-14.120V 60Hz refrigerated

Centrifuge	Thermo Scientific SL 40R
Catalog #	75004528
Weight empty [kg] of rotor	1.75
Maximum permissible load [g]	48x3.2
maximum speed n_{max} [rpm]	15200
maximum RCF value at n_{max}	25055
max. / min. radius [cm]	9.7 / 6.4
Pitch angle [°]	45
Accel. / braking time [s]	35 / 40
aerosol-tight	no
max temperature for autoclaving °C	121

Accessories

Contents

F21-48x2 Fixed Angle Carbon Fiber Rotor

Rotor Specifications	
Capacity (ml)	48 x 2
Tube Dimensions (mm)	11 x 50
Angle °	45
Maximum Speed (rpm)	15.200
K Factor	455
Net Weight (kg)	2,6

RCF/Radius	RCF (x g)	Radius (cm)
Maximum	25.055	9,7
Minimum	16.516	6,4

F21-48x2 Carbon Fiber Rotor Package

Cat. No.	Description
75003664	F21-48x1.5/2ml Carbon Fiber Rotor

Accessories

Cat. No.	Description
099-489021	Replacement Lid Assembly
021-489021	O-ring Refresher Kit

Tube Ordering Information

Cat. No.	Tube Vol. (ml)	Vol. Fill (ml)	Description	Qty.	Max. Speed (rpm)	Dims ØxL (mm)	Sealing Assembly Required: Cat. No.	Qty /Pkg	Description	Adapters Required: Cat. No.	Qty /Pkg	No. of Places	Accessories Required:	
-	2	-	Microtube	-	-	11x45	-	-	-	-	-	-	-	-
-	1,5	-	Microtube	-	-	11x45	-	-	-	-	-	-	-	-
-	1,5	-	Millipore Ultra-MC	-	-	11 x 50	-	-	-	-	-	-	-	-
-	0,6	-	Microtube	-	-	7x32	-	-	-	76003758	12	1	-	-
-	0,4	-	Microtube	-	-	7x29	-	-	-	76003759	12	1	-	-
-	0,2	-	PCR Reaction Tube	-	-	6x24	-	-	-	76003750	12	1	-	-

AutoLock™

Contents

Rotor Installation

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

This rotor is equipped with an AutoLock™-system.

This system is used to automatically lock the rotor to the centrifuge spindle. The rotor does not have to be bolted onto the centrifuge spindle.

Proceed as follows:

1. Open the lid of the centrifuge and if necessary remove any dust, foreign objects or residue from the chamber.
   AutoLock™ and o-ring must be clean and undamaged.

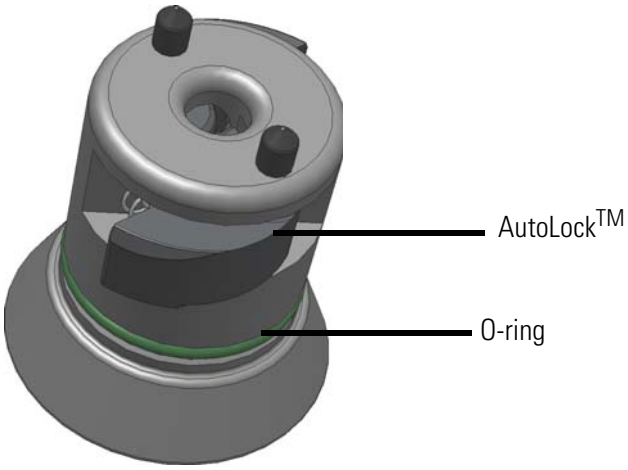


Figure 1. AutoLock™

2. Hold the rotor over the centrifuge spindle and let it slide slowly down the centrifuge spindle. The rotor clicks automatically into place.

CAUTION Do not force the rotor onto the centrifuge spindle.
If the rotor is very light, then it may be necessary to press it onto the centrifuge spindle with a small amount of pressure.

3. Check if the rotor is properly installed by lifting slightly on the handle. If the rotor can be pulled up, then it must be reclamped to the centrifuge spindle.

WARNING If the rotor cannot be properly locked in place after several attempts, then the AutoLock™ 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 hub area clear of objects.

CAUTION Check that the rotor is properly locked on the centrifuge spindle before each use by pulling it a its handle.

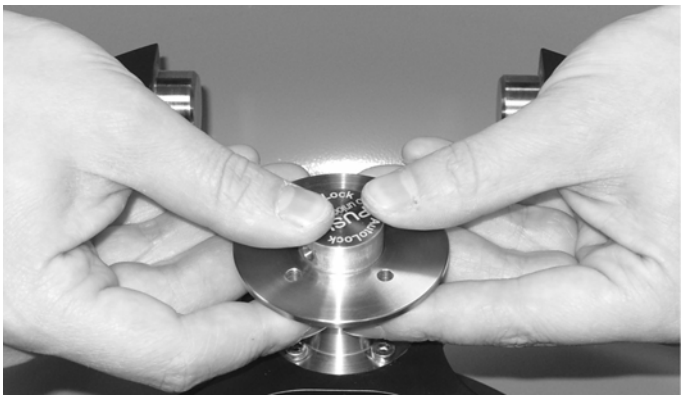
Be sure to check all seals before starting any aerosol-tight applications.

4. Close the centrifuge door.

Removing the Rotor

To remove the rotor, proceed as follows:

1. Open the centrifuge door.
2. Grab the rotor handle with both hands and press against the green AutoLock™ button. At the same time, pull the rotor directly upwards with both hands and remove it from the centrifuge spindle. Make sure not to jam the rotor while doing this.



Rotor Loading

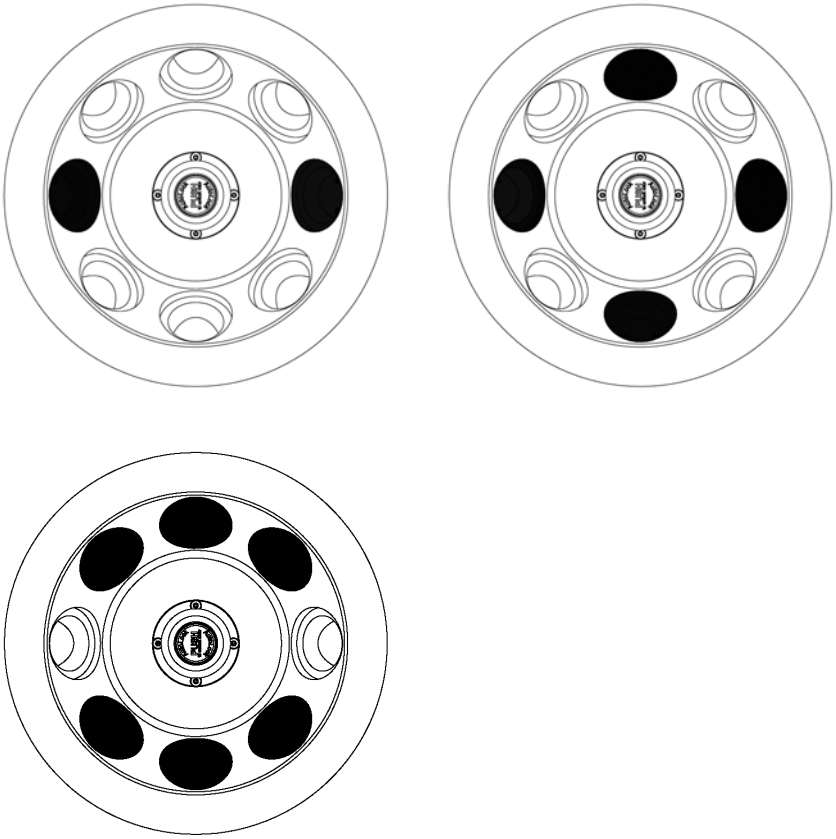
Contents

Before Run

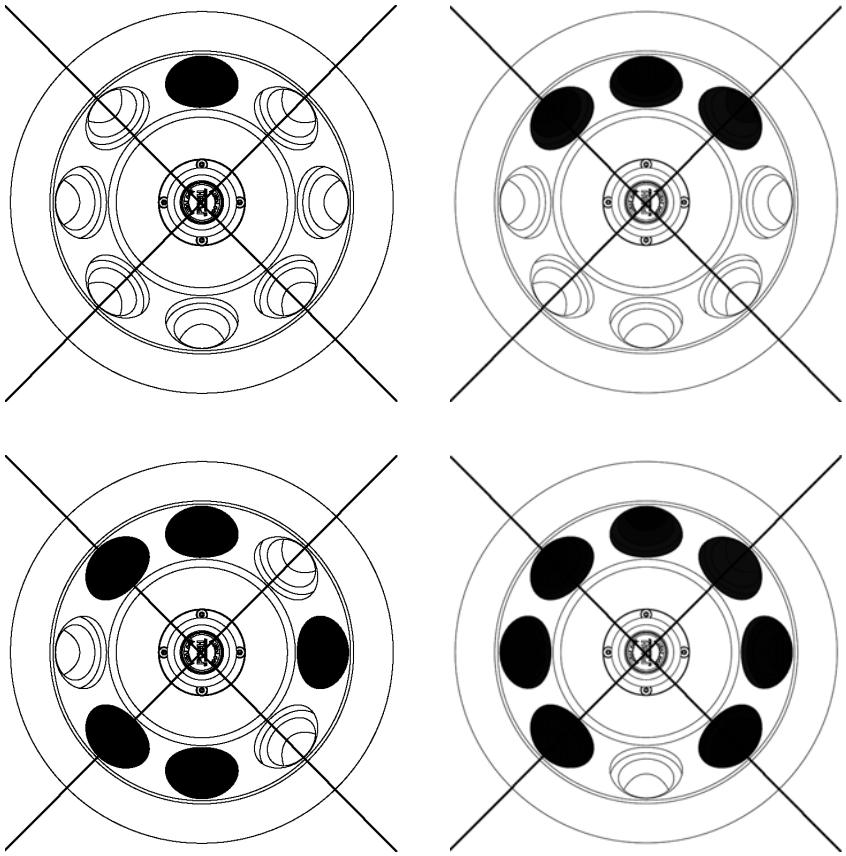
1. Please read and observe the safety instructions contained in these operating instructions and in the instructions for use.
2. Check the rotor and all accessory parts for damages such as cracks, scratches or traces of corrosion.
3. Check the rotor chamber, the centrifuge spindle and the AutoLock™.
4. Check the rotor's suitability using the chemical compatibility chart on page B-1.
5. Make sure the tubes or bottles do not touch the lid.

Proper Loading

To ensure safe operation of the centrifuge, the rotor must be evenly loaded at all times.



Improper Loading



Maximum Loading

The rotor can run at high speeds. The rotor design has sufficient reserve stability even when spinning at top speed.

The safety system of the centrifuge requires that you symetrically balance the tubes in the rotor. This refers to each cavity.

There are two options available for centrifuging samples whose weight, including adaptor, exceeds the maximum permissible load:

- Reduce the fill level.
- Reduce the speed.
  Use this formular:

$$n_{adm} = n_{max}\sqrt{\frac{\text{Maximum permissible load}}{\text{Effective load}}}$$

n_{adm} = admissible speed
n_{max} = maximum speed

Aerosol-tight Applications

Contents

Basic Principles

CAUTION When centrifuging hazardous samples, do not open aerosol-tight rotors or buckets unless placed in a safety cabinet.
Always bear in mind the maximum permitted fill levels.

Be sure to check all seals before starting any aeorsol-tight applications.

- Check that the sample containers are well suited for the desired centrifugation process.

Fill Level

The tubes are only to be filled to a level which ensures that the sample is unable to reach the top of the tube during centrifugation. Therefore fill the tube only 2/3 of the rated level.

Checking the Aerosol-Tightness

The aerosol tightness testing of the rotors and buckets depend 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.

Check as needed to make sure 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 lids are open.

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 of fixed-angle rotors using the following process:

1. Lubricate all seals lightly.
   Always use the special grease 7600 3500 when lubricating the seals.
2. Fill the cavities with approx. 10 ml of carbonated mineral water.
3. Close the rotor as explained in the handling instructions.
4. Shake the rotor 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.

5. 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.
When loading the rotor, ensure that the rotor lid closes securely.
Damaged or clouded rotor covers are to be replaced immediately.

Maintenance and Care

Contents

Cleaning intervalls

For the sake of personal, environmental, and material protection, it is your duty to clean and if necessary disinfect the centrifuge on a regular basis.

Maintenance	Recommended interval
Clean rotor chamber	daily or when polluted
Clean rotor	daily or when polluted
Accessories	daily or when polluted
Cabinet	Once per month
Ventilation holes	Every six months

CAUTION Refrain from using any other cleaning or decontamination procedure than those recommended here, if you are not entirely sure that the intended procedure is safe for the equipment.
Use only approved cleansers.
If in doubt, contact Thermo Fisher Scientific.

Cleaning

When cleaning centrifug

- Use warm water with a neutral solvent.
- Never use caustic cleaning agents such as soap suds, phosphoric acid, bleaching solutions or scrubbing powder.
- Rinse the cavities out thoroughly.
- Use a soft brush without metal bristles to remove stubborn residue.
- Afterwards rinse with distilled water.
- Place the rotors on a plastic grate with their cavities pointing down.
- If drying boxes are used, the temperature must never exceed 50 °C, since higher temperatures could damage the material and shorten the lifetime of the parts.
- Use only disinfectants with a pH of 6-8.
- Dry aluminum parts off with a soft cloth.
- After cleaning, treat the entire surface of aluminum parts with corrosion protection oil (7000 9824). Also treat the cavities with oil.
- Store the aluminum parts at room temperature or in a cold-storage room with the cavities pointing down.

CAUTION Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

Clean centrifuge and accessories as follows:

1. Open the centrifuge.
2. Turn off the centrifuge.
3. Pull out the power supply plug.
4. Grasp the rotor with both hands and lift it vertically off the centrifuge spindle.
5. Remove the centrifuge tubes and adaptors.
6. Use a neutral cleaning agent with a pH value between 6 and 8 for cleaning.
7. Dry all of the rotors and accessorie after cleaning with a cloth or in a warm air cabinet at a maximum temperature of 50°C.
8. Clean the housing of the centrifuge as needed.

- After cleaning, treat the entire surface of aluminum parts with corrosion protection oil (7000 9824). Also treat the cavities with oil.
- Tread the boldof the swing out rotor with bold grease (75003786).

CAUTION When cleaning, do not allow liquids, especially organic solvents, to get on the drive shaft, the bearings, the AutoLock™ or the locks.
Organic solvents break down the grease in the motor bearing. The drive shaft could freeze up.

After some applications their might be ice in the rotor chamber. Let the ice melt and drain it off. Clean the rotor chamber as described above.

Disinfection

Disinfect the centrifuge immediately whenever infectious material has spilled during centrifugation.

WARNING Infectious material can get into the centrifuge when a tube breaks or as a result of spills. Keep in mind the risk of infection when touching the rotor and take all necessary precautions.
In case of contamination, make sure that others are not put at risk.
Decontaminate the affected parts immediately.
Take other precautions if need be.

Use a sprayer whenever possible so that all surfaces are covered evenly.

The rotor chamber and the rotor should be treated preferably with a neutral disinfectant. A disinfectant spray would be most suitable for this purpose so that the rotor and accessory surfaces are covered evenly.

CAUTION Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.
Observe the safety precautions and handling instructions for the cleaning agents used.

Contact the Service Department of Thermo Fisher Scientific for questions regarding the use of other disinfectants.

Disinfect the rotor and accessories as follows:

1. Open the centrifuge.
2. Turn off the centrifuge.
3. Pull out the power supply plug.
4. Grasp the rotor with both hands and lift it vertically off the centrifuge spindle.
5. Remove the centrifuge tubes and adaptors and dispose of them or disinfect them.
6. Treat the rotor and accessories according to the instructions for the disinfectant (spray or soak in solution). Adhere strictly to the given application times.
7. Be sure the disinfectant can drain off the rotor.
8. Rinse the rotor and rotor lid thoroughly with water and then rub down.
9. Dispose of the disinfectant according to the applicable guidelines.
10. Dry all of the rotors and accessorie after cleaning with a cloth or in a warm air cabinet at a maximum temperature of 50°C.

- After cleaning, treat the entire surface of aluminum parts with corrosion protection oil (7000 9824). Also treat the cavities with oil.
- Tread the boldof the swing out rotor with bold grease (75003786).

Decontamination

Decantaminate the centrifuge immediately whenever radioactive material has spilled during centrifugation.

WARNING Radioactive material can get into the centrifuge when a tube breaks or as a result of spills. Keep in mind the risk of infection when touching the rotor and take all necessary precautions.
In case of contamination, make sure that others are not put at risk.
Decontaminate the affected parts immediately.
Take other precautions if need be.

CAUTION Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

For general radioactive decontamination use a solution of equal parts of 70% ethanol, 10% SDS and water.

Disinfect the rotor and accessories as follows:

1. Open the centrifuge.
2. Turn off the centrifuge.

3. Pull out the power supply plug.
4. Grasp the rotor with both hands and lift it vertically off the centrifuge spindle.
5. Remove the centrifuge tubes and adaptors and dispose of them or disinfect them.
6. Rinse the rotor first with ethanol and then with de-ionized water.

- Adhere strictly to the given application times.

7. Be sure the decontamination solution can drain off the rotor.
8. Rinse the rotor and accessories thoroughly with water.
9. Dispose of the decontamination solution according to the applicable guidelines.
10. Dry all of the rotors and accessorie after cleaning with a cloth or in a warm air cabinet at a maximum temperature of 50°C.

- After cleaning, treat the entire surface of aluminum parts with corrosion protection oil (7000 9824). Also treat the cavities with oil.
- Tread the boldof the swing out rotor with bold grease (75003786).

Autoclaving

1. Before autoclaving clean rotor and accessories and described above.
2. Place the rotor on a flat surface.

- Rotors and adapter can beautoclaved at 121 °C.
- The maximum permissible autoclave cycle is 20 minutes at 121 °C.

Clean the rotor before autoclaving and rinse it with distilled water. Remove all accessories (tubes, adapters) from the rotor. Place the rotor on a flat surface.

Note No chemical additives are permitted in the steam.

CAUTION Never exceed the permitted temperature and duration when autoclaving. If the rotor shows signs of corrosion or wear, it must be replaced.

Service of Thermo Fisher Scientific

Thermo Fisher Scientific recommends having the centrifuge and accessories serviced once a year by an authorized service technician. The service technicians check the following:

- the electrical equipment
- the suitability of the set-up site
- the lid lock and the safety system
- the rotor

- the fixation of the rotor and the drive shaft

Thermo Fisher Scientific offers inspection and service contracts for this work.

RCF-Values

Speed (rpm)	R_{min}	R_{max}	RCF R_{min}	RCF R_{max}
300	6.3	9.7	6	10
400	6.3	9.7	11	17
500	6.3	9.7	18	27
600	6.3	9.7	25	39
700	6.3	9.7	35	53
800	6.3	9.7	45	69
900	6.3	9.7	57	88
1000	6.3	9.7	70	108
1100	6.3	9.7	85	131
1200	6.3	9.7	101	156
1300	6.3	9.7	119	183
1400	6.3	9.7	138	213
1500	6.3	9.7	158	244
1600	6.3	9.7	180	278
1700	6.3	9.7	204	313
1800	6.3	9.7	228	351
1900	6.3	9.7	254	391
2000	6.3	9.7	282	434
2100	6.3	9.7	311	478
2200	6.3	9.7	341	525
2300	6.3	9.7	373	574
2400	6.3	9.7	406	625
2500	6.3	9.7	440	678
2600	6.3	9.7	476	733
2700	6.3	9.7	513	791
2800	6.3	9.7	552	850
2900	6.3	9.7	592	912
3000	6.3	9.7	634	976

Speed (rpm)	R_{min}	R_{max}	RCF R_{min}	RCF R_{max}
3100	6.3	9.7	677	1042
3200	6.3	9.7	721	1110
3300	6.3	9.7	767	1181
3400	6.3	9.7	814	1254
3500	6.3	9.7	863	1328
3600	6.3	9.7	913	1405
3700	6.3	9.7	964	1485
3800	6.3	9.7	1017	1566
3900	6.3	9.7	1071	1649
4000	6.3	9.7	1127	1735
4100	6.3	9.7	1184	1823
4200	6.3	9.7	1242	1913
4300	6.3	9.7	1302	2005
4400	6.3	9.7	1364	2100
4500	6.3	9.7	1426	2196
4600	6.3	9.7	1490	2295
4700	6.3	9.7	1556	2396
4800	6.3	9.7	1623	2499
4900	6.3	9.7	1691	2604
5000	6.3	9.7	1761	2711
5100	6.3	9.7	1832	2821
5200	6.3	9.7	1905	2932
5300	6.3	9.7	1978	3046
5400	6.3	9.7	2054	3162
5500	6.3	9.7	2131	3280
5600	6.3	9.7	2209	3401
5700	6.3	9.7	2288	3523
5800	6.3	9.7	2369	3648
5900	6.3	9.7	2452	3775
6000	6.3	9.7	2536	3904
6100	6.3	9.7	2621	4035
6200	6.3	9.7	2707	4169
6300	6.3	9.7	2796	4304
6400	6.3	9.7	2885	4442
6500	6.3	9.7	2976	4582
6600	6.3	9.7	3068	4724
6700	6.3	9.7	3162	4868

Speed (rpm)	R_{min}	R_{max}	RCF R_{min}	RCF R_{max}
6800	6.3	9.7	3257	5015
6900	6.3	9.7	3353	5163
7000	6.3	9.7	3451	5314
7100	6.3	9.7	3551	5467
7200	6.3	9.7	3651	5622
7300	6.3	9.7	3753	5779
7400	6.3	9.7	3857	5939
7500	6.3	9.7	3962	6100
7600	6.3	9.7	4068	6264
7700	6.3	9.7	4176	6430
7800	6.3	9.7	4285	6598
7900	6.3	9.7	4396	6768
8000	6.3	9.7	4508	6941
8100	6.3	9.7	4621	7115
8200	6.3	9.7	4736	7292
8300	6.3	9.7	4852	7471
8400	6.3	9.7	4970	7652
8500	6.3	9.7	5089	7835
8600	6.3	9.7	5209	8021
8700	6.3	9.7	5331	8208
8800	6.3	9.7	5454	8398
8900	6.3	9.7	5579	8590
9000	6.3	9.7	5705	8784
9100	6.3	9.7	5833	8980
9200	6.3	9.7	5962	9179
9300	6.3	9.7	6092	9379
9400	6.3	9.7	6224	9582
9500	6.3	9.7	6357	9787
9600	6.3	9.7	6491	9994
9700	6.3	9.7	6627	10204
9800	6.3	9.7	6764	10415
9900	6.3	9.7	6903	10629
10000	6.3	9.7	7043	10845
10100	6.3	9.7	7185	11063
10200	6.3	9.7	7328	11283
10300	6.3	9.7	7472	11505
10400	6.3	9.7	7618	11730

Speed (rpm)	R_{min}	R_{max}	RCF R_{min}	RCF R_{max}
10500	6.3	9.7	7765	11956
10600	6.3	9.7	7914	12185
10700	6.3	9.7	8064	12416
10800	6.3	9.7	8215	12649
10900	6.3	9.7	8368	12884
11000	6.3	9.7	8523	13122
11100	6.3	9.7	8678	13362
11200	6.3	9.7	8835	13603
11300	6.3	9.7	8994	13847
11400	6.3	9.7	9154	14094
11500	6.3	9.7	9315	14342
11600	6.3	9.7	9478	14592
11700	6.3	9.7	9642	14845
11800	6.3	9.7	9807	15100
11900	6.3	9.7	9974	15357
12000	6.3	9.7	10142	15616
12100	6.3	9.7	10312	15878
12200	6.3	9.7	10483	16141
12300	6.3	9.7	10656	16407
12400	6.3	9.7	10830	16675
12500	6.3	9.7	11005	16945
12600	6.3	9.7	11182	17217
12700	6.3	9.7	11360	17491
12800	6.3	9.7	11540	17768
12900	6.3	9.7	11721	18046
13000	6.3	9.7	11903	18327
13100	6.3	9.7	12087	18610
13200	6.3	9.7	12272	18896
13300	6.3	9.7	12459	19183
13400	6.3	9.7	12647	19473
13500	6.3	9.7	12837	19764
13600	6.3	9.7	13027	20058
13700	6.3	9.7	13220	20354
13800	6.3	9.7	13413	20652
13900	6.3	9.7	13609	20953
14000	6.3	9.7	13805	21255
14100	6.3	9.7	14003	21560

Speed (rpm)	R_{min}	R_{max}	RCF R_{min}	RCF R_{max}
14200	6.3	9.7	14202	21867
14300	6.3	9.7	14403	22176
14400	6.3	9.7	14605	22487
14500	6.3	9.7	14809	22801
14600	6.3	9.7	15014	23116
14700	6.3	9.7	15220	23434
14800	6.3	9.7	15428	23754
14900	6.3	9.7	15637	24076
15000	6.3	9.7	15848	24400
15100	6.3	9.7	16060	24727
15200	6.3	9.7	16273	25055

Chemical Compatibility Chart

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
2-mercaptoethanol		S	S	U	-	S	M	S	-	S	U	S	S	U	S	S	-	S	S	S	S	U	S	S	S	S	S	S
Acetaldehyde		S	-	U	U	-	-	-	M	-	U	-	-	-	M	U	U	U	M	M	-	M	S	U	-	S	-	U
Acetone		M	S	U	U	S	U	M	S	S	U	U	S	U	S	U	U	U	S	S	U	U	S	M	M	S	U	U
Acetonitrile		S	S	U	-	S	M	S	-	S	S	U	S	U	M	U	U	-	S	M	U	U	S	S	S	S	U	U
Alconox®		U	U	S	-	S	S	S	-	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S	S	U
Allyl Alcohol		-	-	-	U	-	-	S	-	-	-	-	S	-	S	S	M	S	S	S	-	M	S	-	-	S	-	-
Aluminum Chloride		U	U	S	S	S	S	U	S	S	S	S	M	S	S	S	S	-	S	S	S	S	S	M	U	U	S	S
Formic Acid (100%)		-	S	M	U	-	-	U	-	-	-	-	U	-	S	M	U	U	S	S	-	U	S	-	U	S	-	U
Ammonium Acetate		S	S	U	-	S	S	S	-	S	S	S	S	S	S	S	U	-	S	S	S	S	S	S	S	S	S	S
Ammonium Carbonate		M	S	U	S	S	S	S	S	S	S	S	S	S	S	U	U	-	S	S	S	S	S	S	M	S	S	S
Ammonium Hydroxide (10%)		U	U	S	U	S	S	M	S	S	S	S	S	-	S	U	M	S	S	S	S	S	S	S	S	S	M	S
Ammonium Hydroxide (28%)		U	U	S	U	S	U	M	S	S	S	S	S	U	S	U	M	S	S	S	S	S	S	S	S	S	M	S
Ammonium Hydroxide (conc.)		U	U	U	U	S	U	M	S	-	S	-	S	U	S	U	U	S	S	S	-	M	S	S	S	S	-	U
Ammonium Phosphate		U	-	S	-	S	S	S	S	S	S	S	S	-	S	S	M	-	S	S	S	S	S	S	M	S	S	S
Ammonium Sulfate		U	M	S	-	S	S	U	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	U	S	S	U
Amyl Alcohol		S	-	M	U	-	-	S	S	-	M	-	S	-	M	S	S	S	S	M	-	-	-	U	-	S	-	M
Aniline		S	S	U	U	S	U	S	M	S	U	U	U	U	U	U	U	-	S	M	U	U	S	S	S	S	U	S
Sodium Hydroxide (<1%)		U	-	M	S	S	S	-	-	S	M	S	S	-	S	M	M	S	S	S	S	S	S	M	S	S	-	U
Sodium Hydroxide (10%)		U	-	M	U	-	-	U	-	M	M	S	S	U	S	U	U	S	S	S	S	S	S	M	S	S	-	U
Barium Salts		M	U	S	-	S	S	S	S	S	S	S	S	S	S	S	M	-	S	S	S	S	S	S	M	S	S	S
Benzene		S	S	U	U	S	U	M	U	S	U	U	S	U	U	U	M	U	M	U	U	U	S	U	U	S	U	S

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
Benzyl Alcohol		S	-	U	U	-	-	M	M	-	M	-	S	U	U	U	U	U	U	U	-	M	S	M	-	S	-	S
Boric Acid		U	S	S	M	S	S	U	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S
Cesium Acetate		M	-	S	-	S	S	S	-	S	S	S	S	-	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Bromide		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Chloride		M	S	S	U	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Formate		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Iodide		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Sulfate		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Chloroform		U	U	U	U	S	S	M	U	S	U	U	M	U	M	U	U	U	M	M	U	U	S	U	U	U	M	S
Chromic Acid (10%)		U	-	U	U	S	U	U	-	S	S	S	U	S	S	M	U	M	S	S	U	M	S	M	U	S	S	S
Chromic Acid (50%)		U	-	U	U	-	U	U	-	-	-	S	U	U	S	M	U	M	S	S	U	M	S	-	U	M	-	S
Cresol Mixture		S	S	U	-	-	-	S	-	S	U	U	U	U	U	U	-	-	U	U	-	U	S	S	S	S	U	S
Cyclohexane		S	S	S	-	S	S	S	U	S	U	S	S	U	U	U	M	S	M	U	M	M	S	U	M	M	U	S
Deoxycholate		S	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	S	S	S	S
Distilled Water		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Dextran		M	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Diethyl Ether		S	S	U	U	S	S	S	U	S	U	U	S	U	U	U	U	U	U	U	U	U	S	S	S	S	M	U
Diethyl Ketone		S	-	U	U	-	-	M	-	S	U	-	S	-	M	U	U	U	M	M	-	U	S	-	-	S	U	U
Diethylpyrocarbonate		S	S	U	-	S	S	S	-	S	S	U	S	U	S	U	-	-	S	S	S	M	S	S	S	S	S	S
Dimethylsulfoxide		S	S	U	U	S	S	S	-	S	U	S	S	U	S	U	U	-	S	S	U	U	S	S	S	S	U	U
Dioxane		M	S	U	U	S	S	M	M	S	U	U	S	U	M	U	U	-	M	M	M	U	S	S	S	S	U	U
Ferric Chloride		U	U	S	-	-	-	M	S	-	M	-	S	-	S	-	-	-	S	S	-	-	-	M	U	S	-	S
Acetic Acid (Glacial)		S	S	U	U	S	S	U	M	S	U	S	U	U	U	U	U	M	S	U	M	U	S	U	U	S	-	U
Acetic Acid (5%)		S	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S	S	S	S	S	M	S	S	M	S	S	M
Acetic Acid (60%)		S	S	U	U	S	S	U	-	S	M	S	U	U	M	U	S	M	S	M	S	M	S	M	U	S	M	U
Ethyl Acetate		M	M	U	U	S	S	M	M	S	S	U	S	U	M	U	U	-	S	S	U	U	S	M	M	S	U	U
Ethyl Alcohol (50%)		S	S	S	S	S	S	M	S	S	S	S	S	U	S	U	S	S	S	S	S	S	S	S	M	S	M	U
Ethyl Alcohol (95%)		S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	-	S	S	S	M	S	S	S	U	S	M	U
Ethylene Dichloride		S	-	U	U	-	-	S	M	-	U	U	S	U	U	U	U	U	U	U	-	U	S	U	-	S	-	S
Ethylene Glycol		S	S	S	S	S	S	S	S	S	S	S	S	-	S	U	S	S	S	S	S	S	S	S	M	S	M	S

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
Ethylene Oxide Vapor		S	-	U	-	-	U	-	-	S	U	-	S	-	S	M	-	-	S	S	S	U	S	U	S	S	S	U
Ficoll-Hypaque®		M	S	S	-	S	S	S	-	S	S	S	S	-	S	S	-	S	S	S	S	S	S	S	M	S	S	S
Hydrofluoric Acid (10%)		U	U	U	M	-	-	U	-	-	U	U	S	-	S	M	U	S	S	S	S	M	S	U	U	U	-	-
Hydrofluoric Acid (50%)		U	U	U	U	-	-	U	-	-	U	U	U	U	S	U	U	U	S	S	M	M	S	U	U	U	-	M
Hydrochloric Acid (conc.)		U	U	U	U	-	U	U	M	-	U	M	U	U	M	U	U	U	-	S	-	U	S	U	U	U	-	-
Formaldehyde (40%)		M	M	M	S	S	S	S	M	S	S	S	S	M	S	S	S	U	S	S	M	S	S	S	M	S	M	U
Glutaraldehyde		S	S	S	S	-	-	S	-	S	S	S	S	S	S	S	-	-	S	S	S	-	-	S	S	S	-	-
Glycerol		M	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S
Guanidine Hydrochloride		U	U	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	U	S	S	S
Haemo-Sol®		S	S	S	-	-	-	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	S	S	S	S
Hexane		S	S	S	-	S	S	S	-	S	S	U	S	U	M	U	S	S	U	S	S	M	S	U	S	S	U	S
Isobutyl Alcohol		-	-	M	U	-	-	S	S	-	U	-	S	U	S	S	M	S	S	S	-	S	S	S	-	S	-	S
Isopropyl Alcohol		M	M	M	U	S	S	S	S	S	U	S	S	U	S	U	M	S	S	S	S	S	S	S	M	M	M	S
Iodoacetic Acid		S	S	M	-	S	S	S	-	S	M	S	S	M	S	S	-	M	S	S	S	S	S	M	S	S	M	M
Potassium Bromide		U	S	S	-	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	M	S	S	S
Potassium Carbonate		M	U	S	S	S	S	S	-	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S
Potassium Chloride		U	S	S	-	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	S	U	S	S	S
Potassium Hydroxide (5%)		U	U	S	S	S	S	M	-	S	S	S	S	-	S	U	S	S	S	S	S	S	S	M	U	M	S	U
Potassium Hydroxide (conc.)		U	U	M	U	-	-	M	-	M	S	S	-	U	M	U	U	U	S	M	-	M	U	-	U	U	-	U
Potassium Permanganate		S	S	S	-	S	S	S	-	S	S	S	U	S	S	S	M	-	S	M	S	U	S	S	M	S	U	S
Calcium Chloride		M	U	S	S	S	S	S	S	S	S	S	S	S	S	M	S	-	S	S	S	S	S	S	M	S	S	S
Calcium Hypochlorite		M	-	U	-	S	M	M	S	-	M	-	S	-	S	M	S	-	S	S	S	M	S	M	U	S	-	S
Kerosene		S	S	S	-	S	S	S	U	S	M	U	S	U	M	M	S	-	M	M	M	S	S	U	S	S	U	S
Sodium Chloride (10%)		S	-	S	S	S	S	S	S	-	-	-	S	S	S	S	S	-	S	S	S	S	-	S	S	M	-	S
Sodium Chloride (sat'd)		U	-	S	U	S	S	S	-	-	-	-	S	S	S	S	S	-	S	S	-	S	-	S	S	M	-	S
Carbon Tetrachloride		U	U	M	S	S	U	M	U	S	U	U	S	U	M	U	S	S	M	M	S	M	M	M	M	U	S	S
Aqua Regia		U	-	U	U	-	-	U	-	-	-	-	-	U	U	U	U	U	U	U	-	-	-	-	-	S	-	M
Solution 555 (20%)		S	S	S	-	-	-	S	-	S	S	S	S	S	S	S	-	-	S	S	S	-	S	S	S	S	S	S
Magnesium Chloride		M	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Mercaptoacetic Acid		U	S	U	-	S	M	S	-	S	M	S	U	U	U	U	-	S	U	U	S	M	S	U	S	S	S	S

CHEMICAL / MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
Methyl Alcohol	S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	M	S	S	S	S	S	S	S	M	S	M	U
Methylene Chloride	U	U	U	U	M	S	S	U	S	U	U	S	U	U	U	U	U	M	U	U	U	S	S	M	U	S	U
Methyl Ethyl Ketone	S	S	U	U	S	S	M	S	S	U	U	S	U	S	U	U	U	S	S	U	U	S	S	S	S	U	U
Metrizamide®	M	S	S	-	S	S	S	-	S	S	S	S	-	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Lactic Acid (100%)	-	-	S	-	-	-	-	-	-	M	S	U	-	S	S	S	M	S	S	-	M	S	M	S	S	-	S
Lactic Acid (20%)	-	-	S	S	-	-	-	-	-	M	S	M	-	S	S	S	S	S	S	S	M	S	M	S	S	-	S
N-Butyl Alcohol	S	-	S	U	-	-	S	-	-	S	M	-	U	S	M	S	S	S	S	M	M	S	M	-	S	-	S
N-Butyl Phthalate	S	S	U	-	S	S	S	-	S	U	U	S	U	U	U	M	-	U	U	S	U	S	M	M	S	U	S
N, N-Dimethylformamide	S	S	S	U	S	M	S	-	S	S	U	S	U	S	U	U	-	S	S	U	U	S	M	S	S	S	U
Sodium Borate	M	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	-	S	S	S	S	S	S	M	S	S	S
Sodium Bromide	U	S	S	-	S	S	S	-	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	M	S	S	S
Sodium Carbonate (2%)	M	U	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S
Sodium Dodecyl Sulfate	S	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S
Sodium Hypochlorite (5%)	U	U	M	S	S	M	U	S	S	M	S	S	S	M	S	S	S	S	M	S	S	S	M	U	S	M	S
Sodium Iodide	M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Sodium Nitrate	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	U	S	S	S	S
Sodium Sulfate	U	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Sodium Sulfide	S	-	S	S	-	-	-	S	-	-	-	S	S	S	U	U	-	-	S	-	-	-	S	S	M	-	S
Sodium Sulfite	S	S	S	-	S	S	S	S	M	S	S	S	S	S	S	M	-	S	S	S	S	S	S	S	S	S	S
Nickel Salts	U	S	S	S	S	S	-	S	S	S	-	-	S	S	S	S	-	S	S	S	S	S	S	M	S	S	S
Oils (Petroleum)	S	S	S	-	-	-	S	U	S	S	S	S	U	U	M	S	M	U	U	S	S	S	U	S	S	S	S
Oils (Other)	S	-	S	-	-	-	S	M	S	S	S	S	U	S	S	S	S	U	S	S	S	S	-	S	S	M	S
Oleic Acid	S	-	U	S	S	S	U	U	S	U	S	S	M	S	S	S	S	S	S	S	S	S	M	U	S	M	M
Oxalic Acid	U	U	M	S	S	S	U	S	S	S	S	S	U	S	U	S	S	S	S	S	S	S	S	U	M	S	S
Perchloric Acid (10%)	U	-	U	-	S	U	U	-	S	M	M	-	-	M	U	M	S	M	M	-	M	S	U	-	S	-	S
Perchloric Acid (70%)	U	U	U	-	-	U	U	-	S	U	M	U	U	M	U	U	U	M	M	U	M	S	U	U	S	U	S
Phenol (5%)	U	S	U	-	S	M	M	-	S	U	M	U	U	S	U	M	S	M	S	U	U	S	U	M	M	M	S
Phenol (50%)	U	S	U	-	S	U	M	-	S	U	M	U	U	U	U	U	S	U	M	U	U	S	U	U	U	M	S
Phosphoric Acid (10%)	U	U	M	S	S	S	U	S	S	S	S	U	-	S	S	S	S	S	S	S	S	S	U	M	U	S	S
Phosphoric Acid (conc.)	U	U	M	M	-	-	U	S	-	M	S	U	U	M	M	S	S	S	M	S	M	S	U	M	U	-	S

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
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	S	S
Picric Acid		S	S	U	-	S	M	S	S	S	M	S	U	S	S	S	U	S	S	S	S	U	S	U	M	S	M	S
Pyridine (50%)		U	S	U	U	S	U	U	-	U	S	S	U	U	M	U	U	-	U	S	M	U	S	S	U	U	U	U
Rubidium Bromide		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Rubidium Chloride		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Sucrose		M	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sucrose, Alkaline		M	S	S	-	S	S	S	-	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	M	S	S	S
Sulfosalicylic Acid		U	U	S	S	S	S	S	-	S	S	S	U	S	S	S	-	S	S	S	-	S	S	S	U	S	S	S
Nitric Acid (10%)		U	S	U	S	S	U	U	-	S	U	S	U	-	S	S	S	S	S	S	S	S	S	M	S	S	S	S
Nitric Acid (50%)		U	S	U	M	S	U	U	-	S	U	S	U	U	M	M	U	M	M	M	S	S	S	U	S	S	M	S
Nitric Acid (95%)		U	-	U	U	-	U	U	-	-	U	U	U	U	M	U	U	U	U	M	U	U	S	U	S	S	-	S
Hydrochloric Acid (10%)		U	U	M	S	S	S	U	-	S	S	S	U	U	S	U	S	S	S	S	S	S	S	S	U	M	S	S
Hydrochloric Acid (50%)		U	U	U	U	S	U	U	-	S	M	S	U	U	M	U	U	S	S	S	S	M	S	M	U	U	M	M
Sulfuric Acid (10%)		M	U	U	S	S	U	U	-	S	S	M	U	S	S	S	S	S	S	S	S	S	S	U	U	U	S	S
Sulfuric Acid (50%)		M	U	U	U	S	U	U	-	S	S	M	U	U	S	U	U	M	S	S	S	S	S	U	U	U	M	S
Sulfuric Acid (conc.)		M	U	U	U	-	U	U	M	-	-	M	U	U	S	U	U	U	M	S	U	M	S	U	U	U	-	S
Stearic Acid		S	-	S	-	-	-	S	M	S	S	S	S	-	S	S	S	S	S	S	S	S	S	M	M	S	S	S
Tetrahydrofuran		S	S	U	U	S	U	U	M	S	U	U	S	U	U	U	-	M	U	U	U	U	S	U	S	S	U	U
Toluene		S	S	U	U	S	S	M	U	S	U	U	S	U	U	U	S	U	M	U	U	U	S	U	S	U	U	M
Trichloroacetic Acid		U	U	U	-	S	S	U	M	S	U	S	U	U	S	M	-	M	S	S	U	U	S	U	U	U	M	U
Trichloroethane		S	-	U	-	-	-	M	U	-	U	-	S	U	U	U	U	U	U	U	U	U	S	U	-	S	-	S
Trichloroethylene		-	-	U	U	-	-	-	U	-	U	-	S	U	U	U	U	U	U	U	U	U	S	U	-	U	-	S
Trisodium Phosphate		-	-	-	S	-	-	M	-	-	-	-	-	-	S	-	-	S	S	S	-	-	S	-	-	S	-	S
Tris Buffer (neutral pH)		U	S	S	S	S	S	S	-	S	S	S	S	S	S	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	S	S	S	S	S	S	S	S	S	S	S	S
Urea		S	-	U	S	S	S	S	-	-	-	-	S	S	S	M	S	S	S	S	-	S	S	S	M	S	-	S
Hydrogen Peroxide (10%)		U	U	M	S	S	U	U	-	S	S	S	U	S	S	S	M	U	S	S	S	S	S	S	M	S	U	S
Hydrogen Peroxide (3%)		S	M	S	S	S	-	S	-	S	S	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S
Xylene		S	S	U	S	S	S	M	U	S	U	U	U	U	U	U	M	U	M	U	U	U	S	U	M	S	U	S
Zinc Chloride		U	U	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
Zinc Sulfate		U	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Citric Acid (10%)		M	S	S	M	S	S	M	S	S	S	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S

*Polyethyleneterephthalate

Key

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

Warranty and recommended Service Life

Rotor Type	Warranty Years	Recommended Retirement After Years
FIBER*Lite* ™ F21-48x2	15	-

Rotor Type	Warranty	Recommended Retirement After Years
O-ringe, tubes, bottles	30 Days	1

Thermo Fisher Scientific warrants that the Products will operate substantially in conformity with Thermo Fisher Scientific's published specifications, when subjected to normal, proper and intended usage by properly trained personnel, for a period of 5 YEARS after shipment to the Customer (the "Warranty Period"). Thermo Fisher Scientific agrees during the Warranty Period, provided it is promptly notified in writing upon the discovery of any material defect and further provided that all costs of returning the defective Goods to Thermo Fisher Scientific are pre-paid by the Customer, to repair or replace, at Thermo Fisher Scientific's option, defective Goods so as to cause the same to operate in substantial conformance with the said specifications. Replacement parts may be new or refurbished, at the election of Thermo Fisher Scientific. All replaced parts shall become the property of Thermo Fisher Scientific. Thermo Fisher Scientific's sole liability with respect to equipment, materials, parts or software furnished to Thermo Fisher Scientific by its third party suppliers shall be limited to the assignment by Thermo Fisher Scientific to the Customer of any such third party supplier's warranty, to the extent the same is assignable. In no event shall Thermo Fisher Scientific have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of: (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by or on behalf of the Customer, (iv) use of the Goods in a manner for which they were not designed, (v) causes external to the Goods such as, but not limited to, power failure or electrical power surges or (vi) use of the Goods in combination with equipment or software not supplied by Thermo Fisher Scientific. If Thermo Fisher Scientific determines that Goods for which the Customer has requested warranty services are not covered by the warranty hereunder, the Customer shall pay or reimburse Thermo Fisher Scientific for all costs of investigating and responding to such request at Thermo Fisher Scientific's then prevailing time and material rates. If Thermo Fisher Scientific provides repair services or replacement parts that are not covered by the warranty provided in this Clause, the Customer shall pay Thermo Fisher Scientific therefor at Thermo Fisher Scientific's then prevailing time and materials rates. Any installation, maintenance, repair, service, relocation or alteration to or of, or other tampering with, the Goods, performed by any person or entity other than Thermo Fisher Scientific without Thermo Fisher Scientific's prior written approval, or any use of replacement parts not supplied by Thermo Fisher Scientific, shall immediately void and cancel all warranties with respect to the affected Goods.

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