



**Thermo Fisher Scientific**

# **TX-400**

## **Instruction Manual**

50121018-3

October 2009

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## 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**

A handwritten signature in blue ink, appearing to read "M. Roberts", written over a horizontal dashed line.

**Report Authorised By**

A handwritten signature in blue ink, appearing to read "S. P. H.", written over a horizontal dashed line.

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## 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
75003629	TX-400	1	<input type="checkbox"/>
76003500	Rubber seal grease	1	<input type="checkbox"/>
7500 786	Bolt grease	1	<input type="checkbox"/>
50121018	Instruction Manual	1	<input type="checkbox"/>

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

## Precautions

In order to ensure safe operation of the TX-400, 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 which have been loaded properly.
- Never overload the rotor.

## Preface

- 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:  $1.2 \frac{g}{cm^3}$



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” on page 1-2
- “Sorvall” on page 1-4
- “Thermo Scientific” on page 1-7



# Heraeus

**Table 1-1.** Heraeus 230V 50Hz/60Hz

Centrifuge	Heraeus Multifuge X1	Heraeus Megafuge 16
Catalog #	75004210	75004230
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	35 / 40	35 / 40
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 60 minutes	8	8
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\* tested by HPA, Porton-down, UK

Centrifuge	Heraeus Multifuge X1R	Heraeus Megafuge16R
Catalog #	75004250	75004270
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	35 / 40	35 / 40
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\* tested by HPA, Porton-down, UK

**Table 1-2.** Heraeus 120V 60Hz

<b>Centrifuge</b>	<b>Heraeus Multifuge X1</b>	<b>Heraeus Megafuge 16</b>
Catalog #	75004211	75004231
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	45 / 45	45 / 45
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 60 minutes	8	8
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\*tested by HPA, Porton-down, UK

<b>Centrifuge</b>	<b>Heraeus Multifuge X1R</b>	<b>Heraeus Megafuge 16R</b>
Catalog #	75004251	75004271
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	45 / 45	45 / 45
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\*tested by HPA, Porton-down, UK

## 1 Rotor Specifications

Sorvall

# Sorvall

**Table 1-3.** Sorvall 230V 50Hz/60Hz

Centrifuge	Sorvall Legend X1	Sorvall ST 16
Catalog #	75004220	75004240
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{\max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{\max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	35 / 40	35 / 40
Sample heating at $n_{\max}$ [° C] referred to ambient temperature of 23 °C, running time 60 minutes	8	8
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\* tested by HPA, Porton-down, UK

Centrifuge	Sorvall Legend X1R	Sorvall ST 16R
Catalog #	75004260	75004380
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{\max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{\max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	35 / 40	35 / 40
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\* tested by HPA, Porton-down, UK

**Table 1-4.** Sorvall 120V 60Hz

<b>Centrifuge</b>	<b>Sorvall Legend X1</b>	<b>Sorvall ST 16</b>
Catalog #	75004221	75004241
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	45 / 45	45 / 45
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 60 minutes	8	8
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\*Tested by HPA, Porton-down, UK

<b>Centrifuge</b>	<b>Sorvall Legend X1R</b>	<b>Sorvall ST 16R</b>
Catalog #	75004261	75004381
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	45 / 45	45 / 45
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\*Tested by HPA, Porton-down, UK

## 1 Rotor Specifications

Sorvall

**Table 1-5.** Sorvall 100V 50/60Hz

Centrifuge	Sorvall Legend X1	Sorvall ST 16
Catalog #	75004223	75004243
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{\max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{\max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	50 / 45	50 / 45
Sample heating at $n_{\max}$ [° C] referred to ambient temperature of 23 °C, running time 60 minutes	8	8
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\* tested by HPA, Porton-down, UK

Centrifuge	Sorvall Legend X1R	Sorvall ST 16R
Catalog #	75004263	75004383
Weight of empty rotor [kg]	4.1	4.1
Max. cycle number	50,000	50,000
Maximum permissible load [g]	4x570	4x570
Maximum speed $n_{\max}$ [rpm]	5,000	5,000
Maximum RCF value at $n_{\max}$	4,696	4,696
Max. / min. radius [cm]	16.8 / 6.8	16.8 / 6.8
Pitch angle [°]	90	90
Accel. / braking time [s]	50 / 45	50 / 45
Aerosol-tight *	yes	yes
Permissible temperature range autoclavable °C	121	121

\* tested by HPA, Porton-down, UK

# Thermo Scientific

**Table 1-6.** Thermo Scientific 230V 50Hz/60Hz

Centrifuge	Thermo Scientific SL 16
Catalog #	75004000
Weight of empty rotor [kg]	4.1
Max. cycle number	50,000
Maximum permissible load [g]	4x570
Maximum speed $n_{max}$ [rpm]	5,000
Maximum RCF value at $n_{max}$	4,696
Max. / min. radius [cm]	16.8 / 6.8
Pitch angle [°]	90
Accel. / braking time [s]	35 / 40
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 60 minutes	8
Aerosol-tight *	yes
Permissible temperature range autoclavable °C	121

\*tested by HPA, Porton-down, UK

Centrifuge	Thermo Scientific SL 16R
Catalog #	75004030
Weight of empty rotor [kg]	4.1
Max. cycle number	50,000
Maximum permissible load [g]	4x570
Maximum speed $n_{max}$ [rpm]	5,000
Maximum RCF value at $n_{max}$	4,696
Max. / min. radius [cm]	16.8 / 6.8
Pitch angle [°]	90
Accel. / braking time [s]	35 / 40
Aerosol-tight *	yes
Permissible temperature range autoclavable °C	121

\*tested by HPA, Porton-down, UK

## 1 Rotor Specifications

Thermo Scientific

**Table 1-7.** Thermo Scientific 120V 60Hz

Centrifuge	Thermo Scientific SL 16
Catalog #	75004001
Weight of empty rotor [kg]	4.1
Max. cycle number	50,000
Maximum permissible load [g]	4x570
Maximum speed $n_{\max}$ [rpm]	5,000
Maximum RCF value at $n_{\max}$	4,696
Max. / min. radius [cm]	16.8 / 6.8
Pitch angle [°]	90
Accel. / braking time [s]	45 / 45
Sample heating at $n_{\max}$ [° C] referred to ambient temperature of 23 °C, running time 60 minutes	8
Aerosol-tight *	yes
Permissible temperature range autoclavable °C	121

\* tested by HPA, Porton-down, UK

Centrifuge	Thermo Scientific SL 16R
Catalog #	75004031
Weight of empty rotor [kg]	4.1
Max. cycle number	50,000
Maximum permissible load [g]	4x570
Maximum speed $n_{\max}$ [rpm]	5,000
Maximum RCF value at $n_{\max}$	4,696
Max. / min. radius [cm]	16.8 / 6.8
Pitch angle [°]	90
Accel. / braking time [s]	45 / 45
Aerosol-tight *	yes
Permissible temperature range autoclavable °C	121

\* tested by HPA, Porton-down, UK

# Accessories

## Contents

- „Rotor data“ on page 2-2
- „Accessories“ on page 2-2



## TX-400 Swinging Bucket Aluminum Rotor with Round Buckets



Rotor Specifications		
Capacity (ml)	4 x 400	
Tube Dimensions (mm)	80x124	
Angle°	90	
Maximum Speed (rpm)	5.000	
K Factor	9153	
Net Weight (kg)	4,1	
RCF/Radius	RCF (x g)	Radius (cm)
Maximum	4.696	16,8
Minimum	1.898	6,8



TX-400 Rotor Packages	
Cat. No.	Description
75003629	TX-400 Swing-Out Rotor without buckets
75003655	Round Buckets (set of 4)
75003656	Sealing Caps for Round Buckets (set of 4)
75003657	Replacement O-rings for 75003656 Sealing Caps (set of 4)

Tube Ordering Information														
Cat. No.	Tube Vol. (ml)	Vol. Fill (ml)	Description	Qty.	Max. Speed (rpm)	Dims ØxL (mm)	Sealing Assembly Required:			Adapters Required:			Accessories Required:	
							Cat. No.	Qty /Pkg	Description	Cat. No.	Qty /Pkg	No. of Places		
75007585	400	400	PP Screw Cap Bottle	12	5.000	80x124	Included	12	PP Sealing	-	-	-	-	-
3141-0250	250	250	PP Oak Ridge Bottle	4	5.000	62.5x139	Included	4	PP Sealing	75003788	4	1	-	-
3140-0250	250	250	PC OakRidge Bottle	4	5.000	62.5x139	Included	4	PP Sealing	75003788	4	1	-	-
-	225	225	BD Conical	-	-	62.5x139	-	-	-	75003788+BD Cushion #352090	4	1	-	-
376813	200	200	Nunc Conical	4	-	62.5x139	Included	4	PP Sealing	75003788+3775 85	4	1	-	-
3143-0175	175	175	PP Nalgene Conical	4	-	62.5x139	Included	4	PP Sealing	75003788+DS31 26-0175	4	1	-	-
3144-0175	175	175	PC Nalgene Conical	4	-	62.5x139	Included	4	PP Sealing	75003788+DS31 26-0175	4	1	-	-
76009007	100	75	Glass Bottle	10	5.000	45x123	-	-	-	75003708	4	1	-	-
76009084	100	75	PP Bottle	1	5.000	45x98	-	-	-	75003708	4	1	-	-
76009095	100	75	PC Bottle	1	5.000	45 x98	-	-	-	75003708	4	1	-	-
334959	50	50	Nunc Conical	25	5.000	29.5x120	Included	25	PP Sealing	75003638	4	4	-	-
-	50	-	Universal Tube	-	-	34,5 x 105	-	-	-	75003707	4	3	-	-
3114-0050	50	50	Teflon Oak Ridge Tube	2	5.000	29x114	Included	2	PP Sealing	75003799	4	4	-	-
3139-0050	50	50	PP Oak Ridge Tube	10	5.000	29x114	Included	10	PP Sealing	75003799	4	4	-	-
3138-0050	50	50	PC Oak Ridge Tube	10	5.000	29x114	Included	10	PP Sealing	75003799	4	4	-	-
45500-30	30	25	30/25 ml DIN Round/Flat Bottom Tube	6	-	25,5 x 108	-	-	-	75003703	4	5	-	-
-	25	-	Universal Tube	-	-	25 x 110	-	-	-	75003706	4	3	-	-
-	25	-	Round Bottom Tube	-	-	-	-	-	-	75003705	4	5	-	-
366036	15	15	Nunc Conical	50	5.000	17x120	Included	50	PP Sealing	75003682	4	9	-	-
-	15	-	Blood Collection	-	-	16x125	-	-	-	75003794	4	4	-	-
45500-15	15	12	KIMAX Glass Tube	50	5.000	17x102	-	-	-	75003704	4	10	-	-
-	14	-	Conical Urine Tube	-	-	18x124	-	-	-	75003798	4	7	-	-
3139-0010	10	8	PP Oak Ridge Tube	10	5.000	16x82	Included	10	PP Sealing	75003681	4	14	-	-
3138-0010	10	8	PC Oak Ridge Tube	10	5.000	16x82	Included	10	PP Sealing	75003681	4	14	-	-
-	10	-	Blood Collection	-	-	16x100	-	-	-	75003681	4	14	-	-
-	7	-	Blood Collection	-	-	13x100	-	-	-	75003680	4	19	-	-
-	5	-	Blood Collection	-	-	13x75	-	-	-	75003680	4	19	-	-
-	5	-	RIA Tubes	-	-	13x75	-	-	-	75003793	4	19	-	-
-	1.5/2	-	Conical Microtube	-	-	11x42	-	-	-	75003700	4	34	-	-

# AutoLock™

## Contents

- “Rotor Installation” on page 3-2
- “Removing the Rotor” on page 3-3

## Rotor Installation



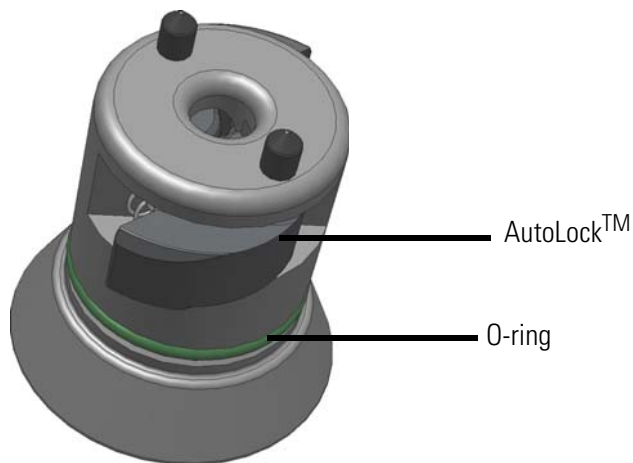
**CAUTION** Unapproved or incorrectly combined accessories can cause serious damage to the centrifuge.

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 3-1.** 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.



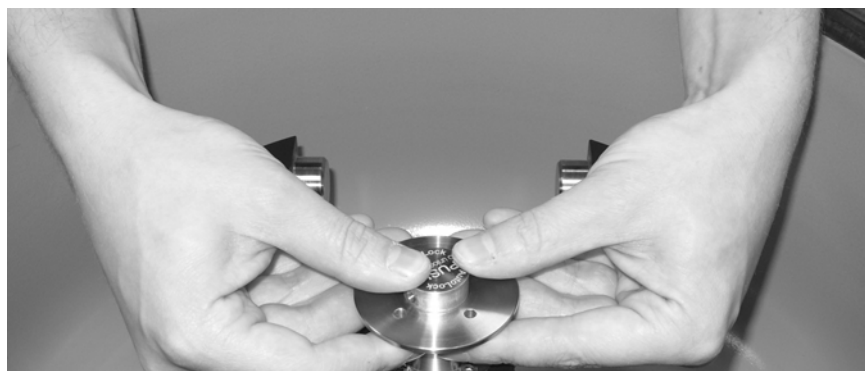
Be sure to check all seals before starting any aerosol-tight applications.

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 a Run” on page 4-2
- “Proper Loading” on page 4-2
- “Improper Loading” on page 4-3
- “Maximum Loading” on page 4-3
- “Cycle Counter” on page 4-4

## Before a Run

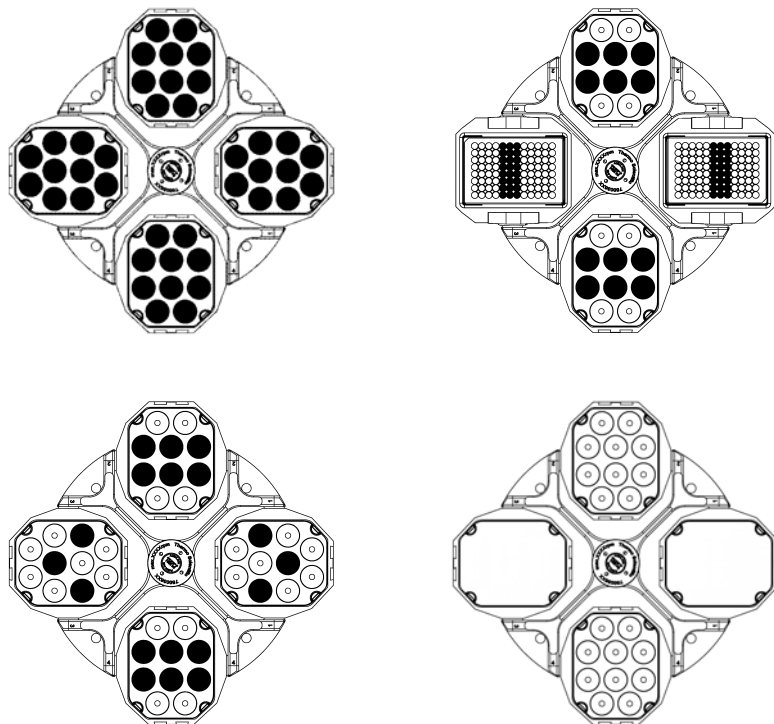
1. Please read and observe the safety instructions contained in these operating instructions and in the instructions for use.
2. Check the rotor and all accessory parts for damages such as cracks, scratches or traces of corrosion.
3. Check the rotor chamber, the motor shaft and the AutoLock™.
4. Check the rotor's suitability using the chemical compatibility chart on [page B-1](#).
5. Make sure the tubes or bottles do not touch the bucket lid.
6. Check the rotor bolts and apply grease 7500 3786 before using for the first time.
7. Check that each bucket or microplate carrier can swing freely by moving it carefully with your hand. Weigh the bucket content (adaptor and tube). Make sure you do not exceed the maximum compartment load.



**CAUTION** Always use identical bucket types in a rotor. Always be sure to use buckets of the same weight class, which is marked on the buckets themselves.

## Proper Loading

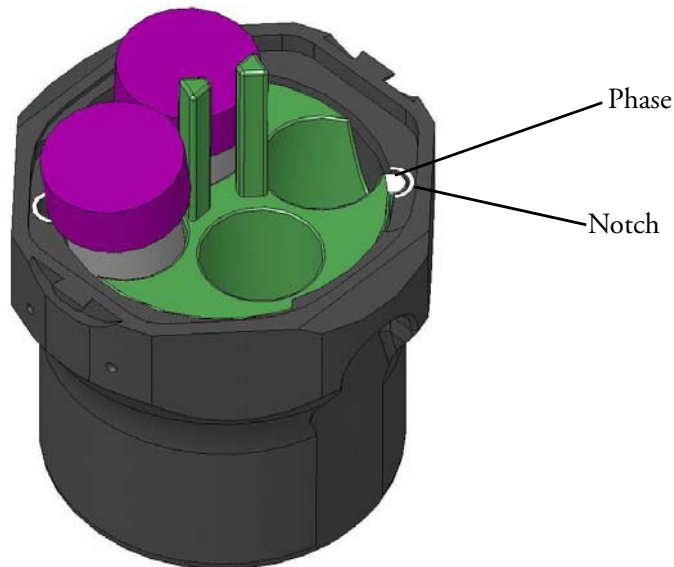
To ensure safe operation of the centrifuge, the rotor must be evenly loaded at all times



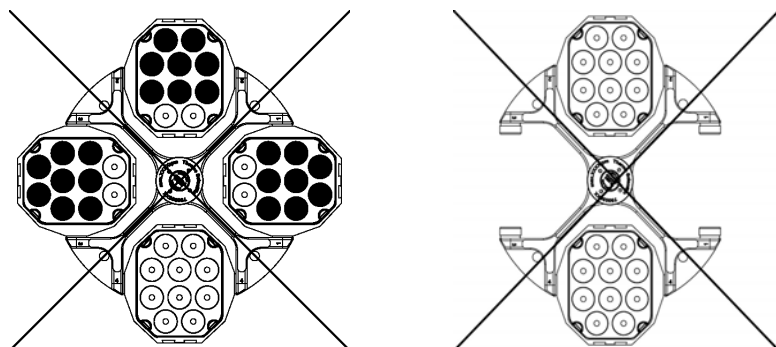
## Applying Adapter

When running the bucket 75003655 with adapter 75003683 or 75003682 keep in mind the following:

The adapter has a phase that fits into a notch in the bucket. If the phase is not in the notch, the lid cannot be closed and the bucket cannot swing out.



## 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 do not overload the rotor.

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 the table or the formula:

Actual Load (g/bucket)	RPM <sub>max</sub>
570	5000
590	4915
610	4833
630	4756
650	4682
670	4612
690	4544
710	4480
730	4418
750	4359
770	4302
790	4247
810	4194

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

$n_{adm}$  = admissible speed

$n_{max}$  = maximum speed

## Cycle Counter

The lifetime of rotors and buckets is dependent on the amount of mechanical load. Do not exceed the number of cycles recommended for rotors and buckets.

The maximum number of cycles is given in the rotor table in the rotor specification section.

The maximum number of cycles for buckets is marked on the buckets themselves.



**WARNING** Replace the rotor when the specified number of cycles is reached. Due to the mechanical load a rotor can break and thus damage the centrifuge



### Service life examples

Usage profile	Maximum service life at 30,000 cycles
frequent use 20 runs / day 220 days / year	7 years

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# Aerosol-tight Applications

## Contents

- “Basic Principles” on page 5-2
- “Fill Level” on page 5-2
- “Checking the Aerosol-Tightness” on page 5-2

## 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 aerosol-tight applications.

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

## Placing O-ring

The o-ring fulfills its purpose best, when it is neither stressed nor bulked. Meaning the o-ring should 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.

**Note** If the o-ring seems to be too long or too short, take it off the lid and repeat the 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-tight buckets using the following process:

1. Lubricate all seals lightly.  
Always use the special grease 7600 3500 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.

5. Dry the rotor, rotor cover and the cover seal.



**CAUTION** Prior to each use, the seals in the bucket 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!



**CAUTION** This quick test is not suited for validating the aerosol tightness of your BIOShield™ 720. Check the seals and sealing surfaces of the lid thoroughly.

# Maintenance and Care

## Contents

- “Cleaning intervals” on page 6-2
- “Cleaning” on page 6-2
- “Disinfection” on page 6-3
- “Decontamination” on page 6-4
- “Autoclaving” on page 6-5
- “Service of Thermo Fisher Scientific” on page 6-5

## Cleaning intervals

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 accessories 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.
  - Treat the bold of 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 there 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 needed.

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 accessories 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.
  - Treat the rotor with grease (75003786).

## Decontamination

Decantamine 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 accessories 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.
  - Treat the bottom of the swing out rotor with grease (75003786).

## Autoclaving

1. Before autoclaving clean rotor and accessories as described above.
2. Place the rotor on a flat surface.
  - Rotors and adapter can be autoclaved 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 <sub>min</sub>	R <sub>max</sub>	RCF R <sub>min</sub>	RCF R <sub>max</sub>
300	6.8	16.8	7	17
400	6.8	16.8	12	30
500	6.8	16.8	19	47
600	6.8	16.8	27	68
700	6.8	16.8	37	92
800	6.8	16.8	49	120
900	6.8	16.8	62	152
1000	6.8	16.8	76	188
1100	6.8	16.8	92	227
1200	6.8	16.8	109	270
1300	6.8	16.8	128	317
1400	6.8	16.8	149	368
1500	6.8	16.8	171	423
1600	6.8	16.8	195	481
1700	6.8	16.8	220	543
1800	6.8	16.8	246	609
1900	6.8	16.8	274	678
2000	6.8	16.8	304	751
2100	6.8	16.8	335	828
2200	6.8	16.8	368	909
2300	6.8	16.8	402	994
2400	6.8	16.8	438	1082
2500	6.8	16.8	475	1174
2600	6.8	16.8	514	1270
2700	6.8	16.8	554	1369
2800	6.8	16.8	596	1473
2900	6.8	16.8	639	1580
3000	6.8	16.8	684	1690

**A RCF-Values**

<b>speed rpm</b>	<b>R<sub>min</sub></b>	<b>R<sub>max</sub></b>	<b>RCF R<sub>min</sub></b>	<b>RCF R<sub>max</sub></b>
3100	6.8	16.8	731	1805
3200	6.8	16.8	778	1923
3300	6.8	16.8	828	2045
3400	6.8	16.8	879	2171
3500	6.8	16.8	931	2301
3600	6.8	16.8	985	2434
3700	6.8	16.8	1041	2571
3800	6.8	16.8	1098	2712
3900	6.8	16.8	1156	2857
4000	6.8	16.8	1216	3005
4100	6.8	16.8	1278	3157
4200	6.8	16.8	1341	3313
4300	6.8	16.8	1406	3473
4400	6.8	16.8	1472	3636
4500	6.8	16.8	1539	3803
4600	6.8	16.8	1609	3974
4700	6.8	16.8	1679	4149
4800	6.8	16.8	1752	4327
4900	6.8	16.8	1825	4510
5000	6.8	16.8	1901	4696

# Chemical Compatibility Chart

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELIRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET®, POLYCLEAR®, CLEARCRIMP®, CCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYMER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULONA®, 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	M	U	M	U	U	U	U	S	U	U	S	U	S
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

## B 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	NORLYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®, CCLEARCRIMP®	POLYALLUMER	POLYCARBONATE	POLTER, GLASS THERMOSET	POLYETHERIMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®
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	U	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
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	M	S	S	S	S

<b>CHEMICAL</b>	<b>MATERIAL</b>	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®,CCLEARCRIMP®	POLYALLUMER	POLYCARBONATE	POLTER, GLASS THERMOSET	POLYETHERIMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
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	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	M	S	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	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	
Methyl Alcohol	S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	M	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	U	M	U	U	U	S	M	U	S	U	

## B 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	NORLYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®, CCLEARCRIMP®	POLYALLUMER	POLYCARBONATE	POLTER, GLASS THERMOSET	POLYETHERIMIDE	POLYTRHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®	
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	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	M	S	S	S	S	
Oils (Petroleum)	S	S	S	-	-	-	S	U	S	S	S	S	U	U	M	S	M	U	U	S	S	U	S	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	U	S	U	S	S	S	S	S	S	S	S	U	M	S	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	
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	

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®,CCLEARCRIMP®	POLYALLUMER	POLYCARBONATE	POLTER, GLASS THERMOSET	POLYETHERIMIDE	POLYTRHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
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	M	U	M	U	U	U	U	S	U	M	S	U	S
Zinc Chloride	U	U	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S
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



## B Chemical Compatibility Chart

\*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.

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