



**Thermo Fisher Scientific**

# **BIOShield™ 1000A**

## **Instruction Manual**

50119946-5

August 2009

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



## Certificate of Containment Testing

### Containment Testing of Thermo Scientific rotor 75003603

**Report No. 59-08 G**

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

#### Test Summary

A Thermo Scientific 75003603 contained rotor (Max speed 6,030 rpm) was supplied by Thermo Fisher and containment tested at 6,030 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 purple ink, written over a horizontal dashed line.

**Report Authorised By**

A handwritten signature in purple ink, written over a horizontal dashed line, followed by the date "(28/1/09)".

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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
75003603	BIOShield™ 1000A	1	<input type="checkbox"/>
76003500	Rubber seal grease	1	<input type="checkbox"/>
7500 3786	Bolt grease	1	<input type="checkbox"/>
50119946	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 BIOShield™ 1000A, 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.
- Never run the rotor without lid.

## 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.  
CAUTION 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 X3	Heraeus Multifuge X3 F	Heraeus Megafuge 40
Catalog #	75004500	75004530	75004503
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	80 / 80	80 / 80	65 / 60
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 120 minutes	12	12	8
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\* tested by HPA, Porton-down, UK

Centrifuge	Heraeus Multifuge X3R	Heraeus Multifuge X3 FR	Heraeus Megafuge 40R
Catalog #	75004515	75004536	75004518
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	75 / 80	75 / 80	45 / 55
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\* tested by HPA, Porton-down, UK

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

<b>Centrifuge</b>	<b>Heraeus Multifuge X3</b>	<b>Heraeus Multifuge X3 F</b>	<b>Heraeus Megafuge 40</b>
Catalog #	75004501	75004531	75004504
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	120 / 80	120 / 80	70 / 60
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 120 minutes	12	12	8
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*tested by HPA, Porton-down, UK

<b>Centrifuge</b>	<b>Heraeus Multifuge X3R</b>	<b>Heraeus Multifuge X3 FR</b>	<b>Heraeus Megafuge 40R</b>
Catalog #	75004516	75004537	75004519
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	115 / 80	115 / 80	120 / 75
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*tested by HPA, Porton-down, UK

## 1 Rotor Specifications

Sorvall

# Sorvall

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

Centrifuge	Sorvall Legend XT	Sorvall Legend XF	Sorvall ST 40
Catalog #	75004505	75004532	75004509
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	80 / 80	80 / 80	65 / 60
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 120 minutes	12	12	8
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*tested by HPA, Porton-down, UK

Centrifuge	Sorvall Legend XTR	Sorvall Legend XFR	Sorvall ST 40R
Catalog #	75004520	75004538	75004524
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	75 / 80	75 / 80	45 / 55
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*tested by HPA, Porton-down, UK

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

<b>Centrifuge</b>	<b>Sorvall Legend XT</b>	<b>Sorvall Legend XF</b>	<b>Sorvall ST 40</b>
Catalog #	75004506	75004533	75004510
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	120 / 80	120 / 80	70 / 60
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 120 minutes	12	12	8
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*tested by HPA, Porton-down, UK

<b>Centrifuge</b>	<b>Sorvall Legend XTR</b>	<b>Sorvall Legend XFR</b>	<b>Sorvall ST 40R</b>
Catalog #	75004521	75004539	75004525
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	115 / 80	115 / 80	120 / 75
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*tested by HPA, Porton-down, UK

## 1 Rotor Specifications

Sorvall

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

Centrifuge	Sorvall Legend XT	Sorvall Legend XF	Sorvall ST 40
Catalog #	75004507	75004534	75004511
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	125 / 80	125 / 80	75 / 60
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 120 minutes	12	12	8
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*Tested by HPA, Porton-down, UK

Centrifuge	Sorvall Legend XTR	Sorvall Legend XFR	Sorvall ST 40R
Catalog #	75004522	75004540	75004526
Weight of empty rotor [kg]	8.5	8.5	8.5
Max. cycle number	30,000	30,000	30,000
Maximum permissible load [g]	4x250	4x250	4x250
Maximum speed $n_{max}$ [rpm]	6,000	6,000	5,300
Maximum RCF value at $n_{max}$	7,164	7,164	5,590
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90	90
Accel. / braking time [s]	115 / 90	115 / 90	100 / 75
Aerosol-tight*	yes	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121	121

\*Tested by HPA, Porton-down, UK

# Thermo Scientific

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

Centrifuge	Thermo Scientific SL 40	Thermo Scientific SL 40 F
Catalog #	75004512	75004542
Weight of empty rotor [kg]	8.5	8.5
Max. cycle number	30,000	30,000
Maximum permissible load [g]	4x250	4x250
Maximum speed $n_{max}$ [rpm]	5,300	6,000
Maximum RCF value at $n_{max}$	5,590	7,164
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90
Accel. / braking time [s]	65 / 60	80 / 80
Sample heating at $n_{max}$ [° C] referred to ambient temperature of 23 °C, running time 120 minutes	8	12
Aerosol-tight*	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121

\*tested by HPA, Porton-down, UK

Centrifuge	Thermo Scientific SL 40R	Thermo Scientific SL 40 FR
Catalog #	75004527	75004543
Weight of empty rotor [kg]	8.5	8.5
Max. cycle number	30,000	30,000
Maximum permissible load [g]	4x250	4x250
Maximum speed $n_{max}$ [rpm]	5,300	6,000
Maximum RCF value at $n_{max}$	5,590	7,164
Max. / min. radius [cm]	17.8 / 8.2	17.8 / 8.2
Pitch angle [°]	90	90
Accel. / braking time [s]	45 / 55	75 / 80
Aerosol-tight*	yes	yes
Permissible temperature range autoclavable (cycle number) °C	121	121

\*tested by HPA, Porton-down, UK

## 1 Rotor Specifications

Thermo Scientific

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

Centrifuge	Thermo Scientific SL 40
Catalog #	75004513
Weight of empty rotor [kg]	8.5
Max. cycle number	30,000
Maximum permissible load [g]	4x250
Maximum speed $n_{\max}$ [rpm]	5,300
Maximum RCF value at $n_{\max}$	5,590
Max. / min. radius [cm]	17.8 / 8.2
Pitch angle [°]	90
Accel. / braking time [s]	70 / 60
Sample heating at $n_{\max}$ [° C] referred to ambient temperature of 23 °C, running time 120 minutes	8
Aerosol-tight*	yes
Permissible temperature range autoclavable (cycle number) °C	121

\*Tested by HPA, Porton-down, UK

Centrifuge	Thermo Scientific SL 40R
Catalog #	75004528
Weight of empty rotor [kg]	8.5
Max. cycle number	30,000
Maximum permissible load [g]	4x250
Maximum speed $n_{\max}$ [rpm]	5,300
Maximum RCF value at $n_{\max}$	5,590
Max. / min. radius [cm]	17.8 / 8.2
Pitch angle [°]	90
Accel. / braking time [s]	120 / 75
Aerosol-tight*	yes
Permissible temperature range autoclavable (cycle number) °C	121

\*Tested by HPA, Porton-down, UK

# Accessories

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- „Rotor data“ on page 2-1
- „Accessories“ on page 2-1



# BIOShield 1000A Swinging Bucket Sealed Rotor



Rotor Specifications	
Capacity (ml)	4 x 250
Tube Dimensions (mm)	62.5 x 124
Angle °	90
Maximum Speed (rpm)	6,000*
K Factor	5,392
Net Weight (kg)	8,5
* Max Speed varies depending on model of centrifuge	
RCF/Radius	RCF (x g)      Radius (cm)
Maximum	7,164      17.8
Minimum	3,300      8.2



### BIOShield 1000A Rotor Package

Cat. No.	Description
75003603	BIOShield 1000A with buckets and sealing lid

### 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		
3141-0250	250	250	PP Oak Ridge Bottle	4	6,030	62.5x124	Included	4	PP Sealing	75003737	4	1	-	-
3140-0250	250	250	PC OakRidge Bottle	4	6,030	62.5x124	Included	4	PP Sealing	75003737	4	1	-	-
-	150	-	Round Bottom Open Top Tube	-	-	56.5x119	-	-	-	75003738	4	1	-	-
76009007	100	75	Glass Bottle	10	-	44x100	-	-	-	75003742	4	1	-	-
76009084	100	75	PP Bottle	1	6,030	45x98	-	-	-	75003742	4	1	-	-
76009095	100	75	PC Bottle	1	6,030	45x98	-	-	-	75003742	4	1	-	-
334959	50	50	Nunc Conical	25	6,030	30x121	Included	25	PP Sealing	75003643	4	4	-	-
-	50	-	Round Bottom Open Top Tube	-	-	35x113	-	-	-	75003749	4	3	-	-
3139-0050	50	50	PP Oak Ridge Tube	10	6,030	29x114	Included	10	PP Sealing	75003750	4	4	-	-
3138-0050	50	50	PC Oak Ridge Tube	10	6,030	29x114	Included	10	PP Sealing	75003750	4	4	-	-
3114-0050	50	50	Teflon Oak Ridge Tube	2	6,030	29x114	Included	2	PP Sealing	75003750	4	4	-	-
-	45	-	Flat or Round Bottom Tube	-	-	30x113	-	-	-	75003750	4	4	-	-
45500-30	30	25	KIMAX Glass Tube	6	6,030	24x106	-	-	-	75003756	4	6	-	-
-	25	-	Universal	-	-	26x113	-	-	-	75003755	4	4	-	-
366036	15	15	Nunc Conical	50	6,030	17x120	Included	50	PP Sealing	75003642	4	9	-	-
-	15	-	Conical Urine Tube	-	-	17x115	-	-	-	75003759	4	9	-	-
-	15	-	Blood Collection	-	-	17x109	-	-	-	75003767	4	16	-	-
-	14	-	Flanged Round Bottom Tube	-	-	18x113	-	-	-	75003758	4	9	-	-
3139-0010	10	8	PP Oak Ridge Tube	10	6,030	16x82	Included	10	PP Sealing	75003767	4	16	-	-
3138-0010	10	8	PC Oak Ridge Tube	10	6,030	16x82	Included	10	PP Sealing	75003767	4	16	-	-
-	10	-	Blood Collection	-	-	16x110	-	-	-	75003767	4	16	-	-
-	7	-	Blood Collection	-	-	13x100	-	-	-	75003768	4	20	-	-
-	5	-	Blood Collection	-	-	13x75	-	-	-	75003768	4	20	-	-
-	5	-	RIA Tubes	-	-	13x75	-	-	-	75003769	4	28	-	-
-	1.5/2	-	Conical Microtube	-	-	11x50	-	-	-	75003770	4	56	-	-

# AutoLock™

## Contents

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

## Rotor Installation



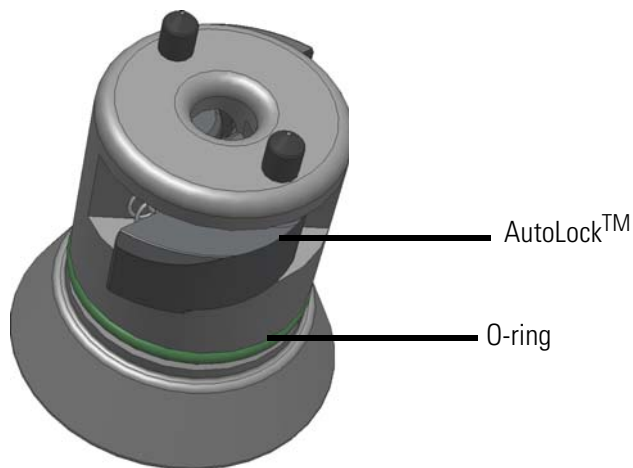
**CAUTION** Unapproved or incorrectly combined accessories can cause serious damage to the centrifuge.

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

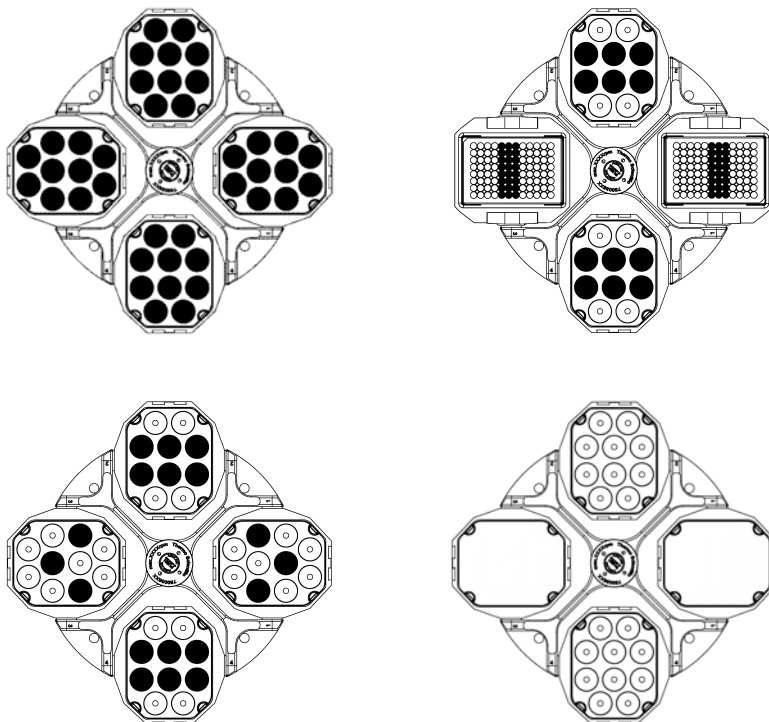
1. Please read and observe the safety instructions contained in these operating instructions and in the instructions for use.
2. Check the rotor and all accessory parts for damages such as cracks, scratches or traces of corrosion.
3. Check the rotor chamber, the motor shaft and the AutoLock™.
4. Check 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.



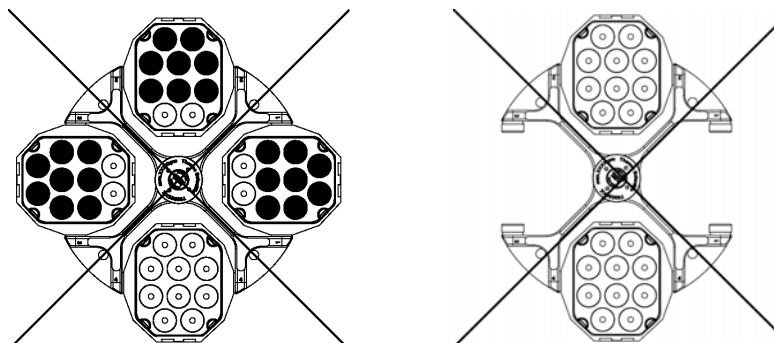
**CAUTION** Always use identical bucket types in a rotor.  
Always be sure to use buckets of the same weight class, which is marked on the buckets themselves.

## Proper Loading

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



## 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>
470	6300
490	6170
510	6048
530	5933
550	5824
570	5721
590	5623
610	5530
630	5442
650	5357
670	5277
690	5200
710	5126
730	5055

Actual Load (g/bucket)	RPM <sub>max</sub>
750	4987
770	4922

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

$n_{adm}$  = 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



# 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™ 1000A. 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.
  - Tread 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 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 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 bolt of the swing out rotor with bolt 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 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 bolt of the swing out rotor with bolt 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	8.2	17.8	8	18
400	8.2	17.8	15	32
500	8.2	17.8	23	50
600	8.2	17.8	33	72
700	8.2	17.8	45	98
800	8.2	17.8	59	127
900	8.2	17.8	74	161
1000	8.2	17.8	92	199
1100	8.2	17.8	111	241
1200	8.2	17.8	132	287
1300	8.2	17.8	155	336
1400	8.2	17.8	180	390
1500	8.2	17.8	206	448
1600	8.2	17.8	235	509
1700	8.2	17.8	265	575
1800	8.2	17.8	297	645
1900	8.2	17.8	331	718
2000	8.2	17.8	367	796
2100	8.2	17.8	404	878
2200	8.2	17.8	444	963
2300	8.2	17.8	485	1053
2400	8.2	17.8	528	1146
2500	8.2	17.8	573	1244
2600	8.2	17.8	620	1345
2700	8.2	17.8	668	1451
2800	8.2	17.8	719	1560
2900	8.2	17.8	771	1674
3000	8.2	17.8	825	1791

**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	8.2	17.8	881	1912
3200	8.2	17.8	939	2038
3300	8.2	17.8	998	2167
3400	8.2	17.8	1060	2300
3500	8.2	17.8	1123	2438
3600	8.2	17.8	1188	2579
3700	8.2	17.8	1255	2724
3800	8.2	17.8	1324	2874
3900	8.2	17.8	1394	3027
4000	8.2	17.8	1467	3184
4100	8.2	17.8	1541	3345
4200	8.2	17.8	1617	3510
4300	8.2	17.8	1695	3680
4400	8.2	17.8	1775	3853
4500	8.2	17.8	1856	4030
4600	8.2	17.8	1940	4211
4700	8.2	17.8	2025	4396
4800	8.2	17.8	2112	4585
4900	8.2	17.8	2201	4778
5000	8.2	17.8	2292	4975
5100	8.2	17.8	2384	5176
5200	8.2	17.8	2479	5381
5300	8.2	17.8	2575	5590
5400	8.2	17.8	2673	5803
5500	8.2	17.8	2773	6020
5600	8.2	17.8	2875	6241
5700	8.2	17.8	2979	6466
5800	8.2	17.8	3084	6694
5900	8.2	17.8	3191	6927
6000	8.2	17.8	3300	7164

# Chemical Compatibility Chart

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOP PAINT	COMPOSITE Carbon Fiber/Epoxy	DELIRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET®, POLYCLEAR®, CLEARCRIMP®, CCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYRTHYLENE	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	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	
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	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
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	M	S	S	M	S	S	M	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	S	M	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	POLYESTER, 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	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	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	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	POLYESTER, 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	POLYESTER, 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	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
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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