



Thermo Scientific

Fiberlite Rotors

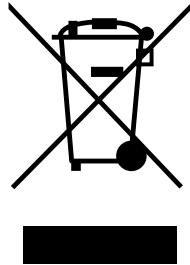
for the Thermo Scientific Sorvall LYNX Centrifuge

Instruction Manual

50141693-a • 09 / 2014 • Superspeed Centrifuge

WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:



Thermo Fisher Scientific has contracted with one or more recycling or disposal companies in each European Union (EU) Member State, and these companies should dispose of or recycle this product. See www.thermoscientific.com/rohswEEE for further information on Thermo Fisher Scientific's compliance with these Directives and the recyclers in your country.

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Preface

Before starting to use the rotor, read carefully through this instruction manual and follow the instructions. Keep for future reference.

Rotor Overview

This instruction manual contains information and instructions on the following Thermo Scientific™ Fiberlite™ rotors:

- F9-6x1000 LEX
- F10-4x1000 LEX
- F12-6x500y LEX
- F14-6x250y
- F14-14x50cy
- F20-12x50 LEX
- F21-8x50y
- F23-48x1.5

Intended Use

These rotors are used to separate substance mixtures of different sizes and densities.

If the rotor is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

This rotor should be operated by trained specialists only.

Precautions

Observe the safety instructions. Not following the safety instructions can result in severe damage and injuries.

Do not manipulate the safety devices.

The rotor is to be used for its intended use only.

The rotor is to be operated by trained specialists only.

Preparation

- Do not touch the mechanical components of the rotor and do not make any changes to the mechanical components.
- Do not remove the magnet at the rotor bottom.
- Do not use rotors which show any signs of damage.
- Use only rotors which have been properly installed. Make sure the rotor is locked properly into place before operating the centrifuge. (“Rotor Installation” on page 42)
- Maximum sample density at maximum speed: 1.2 g/ml
- Use only with rotors that have been loaded properly.
- Never overload the rotor.
- Always balance the samples.
- 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.

Hazardous Substances

- When working with corrosive samples (salt solutions, acids, bases), the accessory parts and vessel have to be cleaned carefully.
- Do not centrifuge explosive or flammable materials or substances which could react violently with one another.
- Do not centrifuge inflammable substances.
- Do not centrifuge toxic or radioactive materials or any pathogenic micro-organisms without suitable safety precautions.
- Do not centrifuge toxic or radioactive materials or any pathogenic micro-organisms without suitable safety precautions.

When centrifuging microbiological samples from the Risk Group II (according to the “Laboratory Biosafety Manual” of the World Health Organization (WHO), aerosol-tight biological seals have to be used. Look on the internet page of the World Health Organization (www.who.int) for the “Laboratory Biosafety Manual”.

For materials in a higher risk group, extra safety measures have to be taken.

- If toxins or pathogenic substances have contaminated the centrifuge or its parts, appropriate disinfection measures have to be taken. (“Disinfection” on page 45)
- Extreme care should be taken with highly corrosive substances which can cause damage and impair the mechanical stability of the rotor. These should only be centrifuged in fully sealed tubes.
- If a hazardous situation occurs, turn off the power supply to the centrifuge and leave the area immediately.

Operating

- Never open the lid until the rotor has come to a complete stop and this has been confirmed in the display.

Symbols used in this manual



This symbol refers to general hazards.

CAUTION means that minor injuries or material damage could occur.

WARNING means that serious injuries, 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.



This symbol means that the rotor and centrifuge manual contain additional important information.

Observe the information contained in the instruction manual to keep yourself and your environment safe.



Rotor Data

On the following pages you find information on the

- Items Supplied
- Technical Data
- Information on Tubes and Bottles
- RCF-Values
- Biocontainment Certificates (if applicable)

for every Fiberlite rotor available for the Thermo Scientific™ Sorvall™ LYNX Centrifuge.

For additional information please visit www.thermoscientific.com/rotors

Fiberlite F9-6x1000 LEX



Items Supplied

Description	Article Number
Fiberlite F9-6x1000 LEX Rotor	096-061075
1000 mL Sorvall™ PPCO High Performance Bottle (6x), with High Performance AI Caps	010-1456
Rotor Lid Assembly	099-061075
O-Ring Refresher Kit ¹	021-061075
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	15.68 kg	–
Maximum permissible load	6 x 1460 g	–
Maximum speed n_{max}	9000 rpm	–
Maximum RCF-Value at n_{max}	17568 x g	–
Minimum RCF-Value at n_{max}	5886 x g	–
K-Value at n_{max}	3415	–
Radius max. / min.	19.4 cm / 6.5 cm	–
Angle	20°	–
Accel. / Braking Time	135 s / 140 s	–
Maximum speed at 4 °C	9000 rpm	–
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	< 4 °C	–
Maximum autoclave temperature	121 °C	–

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Sorvall PPCO High Perf. Bottle ¹	010-1456	9000	17568	Closure	75003511 Included	High Perf. AI Cap
Sorvall PC High Perf. Bottle ²	010-1459	9000	17568	Closure	75003511 Included	High Perf. AI Cap
Nalgene™ PPCO Oak Ridge Bottle	3141-1002	8500	15180	Closure	Included	Noryl Cap with PP Plug
Nalgene PC Oak Ridge Bottle	3140-1002	8500	15180	Closure	Included	Noryl Cap with PP Plug
Nalgene PPCO Bottle	3141-0500	9000	17568	Closure	Included	PP Sealing
				Adapter	010-0145	1 place/adapter
Nalgene PC Bottle	3140-0500	9000	17568	Closure	Included	PP Sealing
				Adapter	010-0145	1 place/adapter
Corning™ Disposable Conical Tube	–	9000	17568	Adapter	010-1096	1 place/adapter
Nalgene PPCO Bottle	3141-0250	9000	17568	Closure	Included	PP Sealing
				Adapter	010-0150	1 place/adapter
Nalgene PC Bottle	3140-0250	9000	17568	Closure	Included	PP Sealing
				Adapter	010-0150	1 place/adapter
Nalgene PPCO Conical Wide-Mouth Tube	3143-0175	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1132	1 place/adapter
Nalgene PC Conical Wide-Mouth Tube	3144-0175	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1132	1 place/adapter
Pyrex™	–	–	–	Adapter	010-1425	2 places/adapter
PPCO Oak Ridge Tube	010-1280	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1093	3 places/adapter
Nalgene PC Oak Ridge Tube	3118-0085	9000	17568	Closure	Included	PP Screw Top
				Adapter	010-1093	3 places/adapter
Nunc™ Disposable Conical Tube	339653	9000	17568	Closure	Included	PP Sealing
				Adapter	010-0180	5 places/adapter
Corning Disposable Conical Tube	–	–	–	Adapter	010-0180	5 places/adapter
Falcon™ Disposable Conical Tube	–	–	–	Adapter	010-0180	5 places/adapter
Nalgene PC Oak Ridge Tube	3138-0050	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1091	6 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0050	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1091	6 places/adapter
Nalgene PSF Oak Ridge Tube	3137-0050	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1091	6 places/adapter
Nalgene FEP Oak Ridge Tube	3114-0050	9000	17568	Closure	Included	ETFE Screw Cap
				Adapter	010-1091	6 places/adapter
Nalgene PC Oak Ridge Tube	3138-0030	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1095	7 places/adapter

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Nalgene PPCO Oak Ridge Tube	3139-0030	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1095	7 places/adapter
Nalgene PSF Oak Ridge Tube	3137-0030	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1095	7 places/adapter
Nalgene FEP Oak Ridge Tube	3114-0030	9000	17568	Closure	Included	ETFE Screw Cap
				Adapter	010-1095	7 places/adapter
Nalgene PC Oak Ridge Tube	3138-0016	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1087	14 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0016	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1087	14 places/adapter
Corning Disposable Conical Tube	–	–	–	Adapter	010-1079	12 places/adapter
Falcon Disposable Conical Tube	–	–	–	Adapter	010-1079	12 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0010	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1307	18 places/adapter
Nalgene PC Oak Ridge Tube	3138-0010	9000	17568	Closure	Included	PP Sealing
				Adapter	010-1307	18 places/adapter
BD Vacutainer™ Tube	–	–	–	Adapter	010-1415	18 places/adapter
BD Vacutainer Tube	–	–	–	Adapter	010-1416	22 places/adapter
Filtration Tube and 1.5 mL Conical Tube	–	–	–	Adapter	010-1417	12 places/adapter
BD Vacutainer Tube	–	–	–	Adapter	010-1419	30 places/adapter

¹ Replacement PPCO bottle without closure, set of 2, 010-1455.

² Replacement PC bottle without closure, set of 2, 010-1458.

RCF-Values

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
500	65	194	18	54
1000	65	194	73	217
1500	65	194	164	488
2000	65	194	291	868
2500	65	194	454	1356
3000	65	194	654	1952
3500	65	194	890	2657
4000	65	194	1163	3470
4500	65	194	1472	4392
5000	65	194	1817	5422
5500	65	194	2198	6561
6000	65	194	2616	7808
6500	65	194	3070	9164
7000	65	194	3561	10628
7500	65	194	4088	12200
8000	65	194	4651	13881
8500	65	194	5250	15670
9000	65	194	5886	17568

Biocontainment Certificate

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



Certificate of Containment Testing

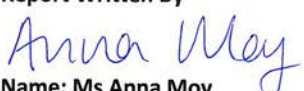
Containment Testing of Rotor F9-6x1000 LEX in a Thermo Scientific Centrifuge

Report No. 195-12 A

Report Prepared For: Thermo Fisher Scientific
Issue Date: 18th October 2012

Test Summary

A F9-6x1000 LEX rotor was containment tested in a Thermo Scientific centrifuge at 9,000 rpm at partial vacuum, using Annex AA of IEC 61010-2-020:2006 (2nd Ed.). The sealed rotor was shown to contain all contents.

<p>Report Written By  Name: Ms Anna Moy Title: Biosafety Scientist</p>	<p>Report Authorised By  Name: Mrs Sara Speight Title: Senior Biosafety Scientist</p>
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Fiberlite F10-4x1000 LEX



Items Supplied

Description	Article Number
Fiberlite F10-4x1000 LEX Rotor	096-041075
1000 mL Sorvall PPCO High Performance Bottle (4x), with High Performance AI Caps	010-1456
Rotor Lid Assembly	099-041075
O-Ring Refresher Kit ¹	021-041075
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	10.91 kg	10.91 kg
Maximum permissible load	4 x 1460 g	4 x 1460 g
Maximum speed n_{max}	10500 rpm	10500 rpm
Maximum RCF-Value at n_{max}	20584 x g	20584 x g
Minimum RCF-Value at n_{max}	3205 x g	3205 x g
K-Value at n_{max}	4268	4268
Radius max. / min.	16.7 cm / 2.6 cm	16.7 cm / 2.6 cm
Angle	20°	20°
Accel. / Braking Time	100 s / 110 s	100 s / 110 s
Maximum speed at 4 °C	10500 rpm	10500 rpm
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	< 4 °C	< 4 °C
Maximum autoclave temperature	121 °C	121 °C

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Sorvall PPCO High Perf. Bottle ¹	010-1456	10500	20584	Closure	75003511 Included	High Performance AI Cap
Sorvall PC High Perf. Bottle ²	010-1458	10500	20584	Closure	75003511 Included	High Performance AI Cap
Nalgene PPCO Bottle	3141-1002	9000	15180	Closure	Included	Noryl Cap with PP Plug
Nalgene PC Oak Ridge Bottle	3140-1002	9000	15180	Closure	Included	PP Sealing
Nalgene PPCO Oak Ridge Bottle	3141-0500	10500	18859	AI Cap Closure	Included	PP Sealing
				Adapter	010-0145	1 place/adapter
Nalgene PC Bottle	3140-0500	10500	18859	Closure	Included	PP Sealing
				Adapter	010-0145	1 place/adapter
Corning Disposable Conical Tube	–	10500	18366	Adapter	010-1096	1 place/adapter
Nalgene PPCO Bottle	3141-0250	10500	18366	Closure	Included	PP Sealing
				Adapter	010-0150	1 place/adapter
Nalgene PC Bottle	3140-0250	10500	18366	Closure	Included	PP Sealing
				Adapter	010-0150	1 place/adapter
Nalgene PPCO Conical Wide-Mouth Tube	3143-0175	10500	15777	Closure	Included	PP Sealing
				Adapter	110-1132	1 place/adapter
Nalgene PC Conical Wide-Mouth Tube	3144-0175	10500	15777	Closure	Included	PP Sealing
				Adapter	010-1132	1 place/adapter
Pyrex Tube	–	–	–	Adapter	010-1425	2 places/adapter
Nalgene PC Oak Ridge Tube	3118-0085	10500	19352	Closure	Included	PP Sealing
				Adapter	010-1093	3 places/adapter
PC Oak Ridge Tube	010-0515	10500	19352	Closure	Included	PP Sealing
				Adapter	010-1093	3 places/adapter
Nunc Disposable Conical Tube	334959	–	–	Closure	Included	PP Sealing
				Adapter	010-0180	5 places/adapter
Corning Disposable Conical Tube	–	–	–	Adapter	010-0180	5 places/adapter
Falcon Disposable Conical Tube	–	–	–	Adapter	010-0180	5 places/adapter
Nalgene PC Oak Ridge Tube	3138-0050	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1091	7 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0050	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1091	7 places/adapter
Nalgene PSF Oak Ridge Tube	3137-0050	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1091	7 places/adapter
Nalgene FEP Oak Ridge Tube	3114-0050	10500	18119	Closure	Included	ETFE Screw Cap
				Adapter	010-1091	7 places/adapter
Nalgene PC Oak Ridge Tube	3138-0030	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1095	7 places/adapter

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Nalgene PPCO Oak Ridge Tube	3139-0030	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1095	7 places/adapter
Nalgene PSF Oak Ridge Tube	3137-0030	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1095	7 places/adapter
Nalgene FEP Oak Ridge Tube	3114-0030	10500	18119	Closure	Included	ETFE Screw Cap
				Adapter	010-1095	7 places/adapter
Nalgene PC Oak Ridge Tube	3138-0016	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1087	15 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0016	10500	18119	Closure	Included	PP Sealing
				Adapter	010-1087	15 places/adapter
Corning Disposable Conical Tube	–	–	–	Adapter	010-1079	12 places/adapter
Falcon Disposable Conical Tube	–	–	–	Adapter	010-1079	12 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0010	10500	–	Closure	Included	PP Sealing
				Adapter	010-1307	18 places/adapter
Nalgene PC Oak Ridge Tube	3138-0010	10500	–	Closure	Included	PP Sealing
				Adapter	010-1307	18 places/adapter
BD Vacutainer Tube	–	–	–	Adapter	010-1415	18 places/adapter
BD Vacutainer Tube	–	–	–	Adapter	010-1416	22 places/adapter
Filtration Tube and 1.5 mL Conical Tube	–	–	–	Adapter	010-1417	12 places/adapter
BD Vacutainer Tube	–	–	–	Adapter	010-1419	30 places/adapter

¹ Replacement PPCO bottle without closure, set of 2, 010-1455.

² Replacement PC bottle without closure, set of 2, 010-1458.

RCF-Values

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
500	26	167	7	47
1000	26	167	29	187
1500	26	167	65	420
2000	26	167	116	474
2500	26	167	182	1167
3000	26	167	262	1680
3500	26	167	356	2287
4000	26	167	465	2987
4500	26	167	589	3781
5000	26	167	727	4668
5500	26	167	879	5648
6000	26	167	1046	6721
6500	26	167	1228	7888
7000	26	167	1424	9149
7500	26	167	1635	10502
8000	26	167	1860	11949
8500	26	167	2100	13490
9000	26	167	2355	15123
9500	26	167	2623	16850
10000	26	167	2907	18671
10500	26	167	3205	20584

Biocontainment Certificate

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



Certificate of Containment Testing

Containment Testing of Fiberlite F10-4x1000y LEX Rotor in the Thermo Fisher Scientific Centrifuge

Report No. 74-10A

Report prepared for: Thermo Fisher Scientific
Issue Date: 17th January 2011

Test Summary

A Piramoon Technologies Inc. Fiberlite F10-4x1000y LEX (max speed 10,500rpm) rotor was containment tested in the Thermo Fisher Scientific centrifuge at 10,500rpm, using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill within the rotor.

Report Written By

Anna May

Report Authorised By

[Signature]

Fiberlite F12-6x500 LEX



Items Supplied

Description	Article Number
Fiberlite F12-6x500 LEX Rotor	096-062375
500 mL Nalgene PPCO Oak Ridge Bottles (6x)	3141-0500
Rotor Lid Assembly	099-062375
O-Ring Refresher Kit ¹	021-062375
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	9.09 kg	9.09 kg
Maximum permissible load	6 x 675 g	6 x 675 g
Maximum speed n_{max}	12000 rpm	12000 rpm
Maximum RCF-Value at n_{max}	24471 x g	24471 x g
Minimum RCF-Value at n_{max}	6601 x g	6601 x g
K-Value at n_{max}	2302	2302
Radius max. / min.	15.2 cm / 4.1 cm	15.2 cm / 4.1 cm
Angle	20°	20°
Accel. / Braking Time	85 s / 95 s	85 s / 95 s
Maximum speed at 4 °C	12000 rpm	12000 rpm
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	< 4 °C	< 4 °C
Maximum autoclave temperature	121 °C	121 °C

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Nalgene PPCO Bottle	3141-0500	12000	24471	Closure	Included	PP Sealing
Nalgene PC Bottle	3141-0500	12000	24471	Closure	Included	PP Sealing
Corning Disposable Conical Bottle	–	–	–	Closure	Included	PP-Sealing
Nalgene PPCO Bottle	3141-0250	12000	22260	Closure	Included	PP Sealing
				Adapter	010-0151	1 place/adapter
Nalgene PC Bottle	3140-0250	12000	22260	Closure	Included	PP Sealing
				Adapter	010-0152	1 place/adapter
Nalgene PPCO Conical Wide-Mouth Bottle	3143-0175	–	–	Closure	Included	PP Sealing
				Adapter	010-0152	1 place/adapter
Nalgene PC Conical Wide-Mouth Bottle	3144-0175	–	–	Closure	Included	PP Sealing
				Adapter	010-0152	1 place/adapter
PC Oak Ridge Tube	010-0515	12000	19190	Closure	Included	PP Sealing
				Adapter	010-1114	1 place/adapter
PPCO Oak Ridge Tube	010-1280	12000	19190	Closure	Included	PP Screw Top
				Adapter	010-1114	1 place/adapter
Nunc Disposable Conical Tube	334959	–	–	Closure	Included	PP Sealing
				Adapter	010-1102	1 place/adapter
Corning Disposable Conical Tube	–	–	–	Adapter	010-1102	1 place/adapter
Falcon Disposable Conical Tube	–	–	–	Adapter	010-1102	1 place/adapter
Nalgene PC Oak Ridge Tube	3138-0050	12000	22580	Closure	Included	PP Sealing
				Adapter	010-1112	2 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0050	12000	22580	Closure	Included	PP Sealing
				Adapter	010-1112	2 places/adapter
Nalgene PSF Oak Ridge Tube	3137-0050	12000	22580	Closure	Included	PP Sealing
				Adapter	010-1112	2 places/adapter
Nalgene FEP Oak Ridge Tube	3114-0050	12000	22580	Closure	Included	ETFE Screw Cap
				Adapter	010-1112	2 places/adapter
Nalgene PC Oak Ridge Tube	3138-0030	12000	20640	Closure	Included	PP Sealing
				Adapter	010-1115	3 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0030	12000	20640	Closure	Included	PP Sealing
				Adapter	010-1115	3 places/adapter
Nalgene PSF Oak Ridge Tube	3137-0030	12000	20640	Closure	Included	PP Sealing
				Adapter	010-1115	3 places/adapter
Nalgene FEP Oak Ridge Tube	3114-0030	12000	20640	Closure	Included	ETFE Screw Cap
				Adapter	010-1115	3 places/adapter
Nalgene PC Oak Ridge Tube	3138-0016	12000	20640	Closure	Included	PP Sealing
				Adapter	010-1115	3 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0016	12000	20640	Closure	Included	PP Sealing
				Adapter	010-1115	3 places/adapter
Corning Disposable Conical Tube	–	–	–	Closure	Included	PP Sealing

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Falcon Disposable Conical Tube	–	–	–	Closure	Included	PP Sealing
Nalgene PPCO Oak Ridge Tube	3139-0010	12000	20640	Closure	Included	PP Sealing
				Adapter	010-1308	7 places/adapter
Nalgene PC Oak Ridge Tube	3138-0010	12000	20640	Closure	Included	PP Sealing
				Adapter	010-1308	7 places/adapter
BD Vacutainer Tube	–	–	–	Adapter	010-1103	7 places/adapter
BD Vacutainer Tube	–	–	–	Adapter	010-1137	14 places/adapter

RCF-Values

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
500	41	152	11	42
1000	41	152	46	170
1500	41	152	103	382
2000	41	152	183	680
2500	41	152	286	1062
3000	41	152	413	1529
3500	41	152	562	2082
4000	41	152	733	2719
4500	41	152	928	3441
5000	41	152	1146	4248
5500	41	152	1387	5151
6000	41	152	1650	6118
6500	41	152	1937	7180
7000	41	152	2246	8327
7500	41	152	2578	9559
8000	41	152	2934	10876
8500	41	152	3312	12278
9000	41	152	3713	13765
9500	41	152	4137	15337
10000	41	152	4584	16994
10500	41	152	5054	18735
11000	41	152	5546	20562
11500	41	152	6062	22474
12000	41	152	6601	24471

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Salisbury
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United Kingdom



Certificate of Containment Testing

Containment Testing of Fiberlite F12-6x500y LEX Rotor in the Thermo Fisher Scientific Centrifuge

Report No. 74-10B

Report prepared for: Thermo Fisher Scientific
Issue Date: 17th January 2011

Test Summary

A Piramoon Technologies Inc. Fiberlite F12-6x500y LEX (max speed 12,000rpm) rotor was containment tested in the Thermo Fisher Scientific centrifuge at 12,000rpm, using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill within the rotor.

Report Written By

Anna May

Report Authorised By

[Signature]

Fiberlite F14-6x250y



Items Supplied

Description	Article Number
F14-6x250y Rotor	096-062075
250 mL Nalgene PPCO Oak Ridge Bottle (6x)	3141-0250
Rotor Lid Assembly	099-062075
O-Ring Refresher Kit ¹	022-062075
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	7.95 kg	7.95 kg
Maximum permissible load	6 x 420 g	6 x 420 g
Maximum speed n_{max}	14000 rpm	14000 rpm
Maximum RCF-Value at n_{max}	30240 x g	30240 x g
Minimum RCF-Value at n_{max}	8108 x g	8108 x g
K-Value at n_{max}	1699	1699
Radius max. / min.	13.8 cm / 3.7 cm	13.8 cm / 3.7 cm
Angle	23°	23°
Accel. / Braking Time	90 s / 100 s	90 s / 95 s
Maximum speed at 4 °C	14000 rpm	14000 rpm
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	< 4 °C	< 4 °C
Maximum autoclave temperature	121 °C	121 °C

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Nalgene PPCO Bottle	3141-0250	14000	30240	Closure	Included	PP Sealing
Nalgene PC Bottle	3141-0250	14000	30240	Closure	Included	PP Sealing
Nalgene PC Oak Ridge Tube	3118-0085	14000	30240	Closure	Included	PP Screw Top
				Adapter	010-1119	1 place/adapter
PPCO Oak Ridge Tube	010-1280	14000	30240	Closure	Included	PP Sealing
				Adapter	010-1119	1 place/adapter
Nunc Disposable Conical Tube	339653	9000	12497	Closure	Included	PP Sealing
				Adapter	010-1119	1 place/adapter
Corning Disposable Conical Tube*	—	9000	12497	Adapter	010-0136	1 place/adapter
Falcon Disposable Conical Tube*	—	9000	12497	Adapter	010-0136	1 place/adapter
Nalgene PC Oak Ridge Screw Top Tube	3138-0050	14000	30240	Closure	Included	PP Sealing
				Adapter	010-0136	1 place/adapter
Nalgene PPCO Oak Ridge Tube	3139-0050	14000	30240	Closure	Included	PP Sealing
				Adapter	010-0138	1 place/adapter
Nalgene PSF Oak Ridge Tube	3137-0050	14000	30240	Closure	Included	PP Sealing
				Adapter	010-0138	1 place/adapter
Nalgene FEP Oak Ridge Screw Top Tube	3114-0050	14000	30240	Closure	Included	ETFE Screw Cap
				Adapter	010-0138	1 place/adapter
Nalgene PC Oak Ridge Screw Top Tube	3138-0030	14000	30240	Closure	Included	PP Sealing
				Adapter	010-1072	2 places/adapter
Nalgene PPCO Oak Ridge Screw Top Tube	3139-0030	14000	30240	Closure	Included	PP Sealing
				Adapter	010-1072	2 places/adapter
Nalgene PSF Oak Ridge Tube	3137-0030	14000	30240	Closure	Included	PP Sealing
				Adapter	010-1072	2 places/adapter
Nalgene FEP Oak Ridge Tube	3114-0030	14000	30240	Closure	Included	ETFE Screw Cap
				Adapter	010-1072	2 places/adapter
Nalgene PC Oak Ridge Tube	3138-0016	14000	30240	Closure	Included	PP Sealing
				Adapter	010-1074	5 places/adapter
Nalgene PPCO Oak Ridge Tube	3139-0016	14000	30240	Closure	Included	PP Sealing
				Adapter	010-1074	5 places/adapter
Corning Disposable Conical Tube*	—	—	—	Adapter	010-1073	5 places/adapter
				Adapter	010-1073	5 places/adapter
Falcon Disposable Conical Tube*	—	—	—	Closure	Included	PP Sealing
Nalgene PPCO Oak Ridge Tube	3139-0010	14000	30240	Adapter	010-1309	7 places/adapter
Nalgene PC Oak Ridge Tube	3138-0010	14000	30240	Closure	Included	PP Sealing
				Adapter	010-1309	7 places/adapter
BD Vacutainer Tube*	—	—	—	Adapter	010-1117	7 places/adapter
BD Vacutainer Tube*	—	—	—	Adapter	010-1138	7 places/adapter

* Listed Max Speeds for Conical Disposable tubes may be higher than OEM tube specifications and may result in crazing and other cosmetic damage to the tube. Do not use these tubes more than once.

RCF-Values

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
500	37	138	10	39
1000	37	138	41	154
1500	37	138	93	347
2000	37	138	165	617
2500	37	138	259	964
3000	37	138	372	1389
3500	37	138	507	1890
4000	37	138	662	2469
4500	37	138	838	3124
5000	37	138	1034	3857
5500	37	138	1251	4667
6000	37	138	1489	5554
6500	37	138	1748	6518
7000	37	138	2027	7560
7500	37	138	2327	8678
8000	37	138	2647	9874
8500	37	138	2989	11147
9000	37	138	3351	12497
9500	37	138	3733	13924
10000	37	138	4137	15428
10500	37	138	4561	17010
11000	37	138	5005	18668
11500	37	138	5471	20404
12000	37	138	5957	22217
12500	37	138	6463	24107
13000	37	138	6991	26074
13500	37	138	7539	28118
14000	37	138	8108	30240

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Health Protection Agency
Porton Down
Salisbury
Wiltshire SP4 0JG
United Kingdom



Certificate of Containment Testing

Containment Testing of Fiberlite F14-6X250y Rotor in the Thermo Sorvall RC6 plus Centrifuge

Report No. 46-09 B

Report prepared for: Thermo Fisher Scientific
Issue Date: 22nd July 2009

Test Summary

A Piramoon technologies Inc. Fiberlite F14-6X250y (max speed 14,000rpm) rotor was containment tested in the Thermo Sorvall RC6 Plus centrifuge at 14,000rpm, using the method described in Annex AA of EN 61010-2-020. The rotor was shown to contain a spill within the rotor.

Report Written By

A handwritten signature in blue ink, written over a horizontal line.

Report Authorised By

A handwritten signature in blue ink, written over a horizontal line.

Fiberlite F14-14x50cy



Items Supplied

Description	Article Number
Fiberlite F14-14x50cy Rotor	096-145075
Rotor Lid Assembly	099-145075
O-Ring Refresher Kit ¹	021-145075
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	7.73 kg	7.73 kg
Maximum permissible load	14 x 75 g	14 x 75 g
Maximum speed n_{max}	14000 rpm	13000 rpm
Maximum RCF-Value at n_{max}	33746 x g	29097 x g
Minimum RCF-Value at n_{max}	18188 x g	15682 x g
K-Value at n_{max}	798	798
Radius max. / min. [cm]	15.4 cm / 8.3 cm	15.4 cm / 8.3 cm
Angle	34°	34°
Accel. / Braking Time	80 s / 90 s	80 s / 90 s
Maximum speed at 4 °C	14000 rpm	13000 rpm
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	< 4 °C	4 °C
Maximum autoclave temperature	121 °C	121 °C

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Corning Disposable Conical Tube*	–	14000	33746	–	–	–
Falcon Disposable Conical Tube*	–	14000	33746	–	–	–
Nunc Disposable Conical Tube*	339653	8690	13000	Closure	Included	PP Sealing
Amicon Filtration Tube*	–	5000	4304	–	–	–
Nalgene PC Oak Ridge Tube	3138-0050	14000	33746	Closure	Included	PP Sealing
				Adapter	010-0377	1 place/adapter
Nalgene PPCO Oak Ridge Tube	3139-0050	14000	33527	Closure	Included	PP Sealing
				Adapter	010-0377	1 place/adapter
Nalgene PSF Oak Ridge Tube	3137-0050	14000	33527	Closure	Included	PP Sealing
				Adapter	010-0377	1 place/adapter
Nalgene FEP Oak Ridge	3114-0050	14000	33527	Closure	Included	ETFE Screw Cap
				Adapter	010-0377	1 place/adapter
Nalgene PC Oak Ridge	3138-0030	14000	33527	Closure	Included	PP Sealing
				Adapter	010-1147	1 place/adapter
Nalgene PPCO Oak Ridge Tube	3139-0030	14000	33527	Closure	Included	PP Sealing
				Adapter	010-1147	1 place/adapter
Nalgene PSF Oak Ridge Tube	3137-0030	14000	33527	Closure	Included	PP Sealing
				Adapter	010-1147	1 place/adapter
Nalgene FEP Oak Ridge Tube	3114-0030	14000	33527	Closure	Included	ETFE Screw Cap
				Adapter	010-1147	1 place/adapter
Nalgene PC Oak Ridge Tube	3139-0016	14000	33527	Closure	Included	PP Sealing
				Adapter	010-0376	1 place/adapter
Nalgene PPCO Oak Ridge Tube	3138-0016	14000	33527	Closure	Included	PP Sealing
				Adapter	010-0376	1 place/adapter
Corning Disposable Conical Tube*	–	14000	33527	Adapter	010-0378	1 place/adapter
Falcon Disposable Conical Tube*	–	14000	33527	Adapter	010-0378	1 place/adapter
Amicon Filtration Devices*	–	5400	4988	Adapter	010-0378	1 place/adapter
Nunc EZ Flip Conical Tube	362694	14000	33527	Adapter	010-1340	1 place/adapter
Nunc Conical Disposable Tube	339650	9000	13855	Closure	Included	PP Sealing
				Adapter	010-1340	1 place/adapter
Nalgene PPCO Oak Ridge Tube	3139-0010	14000	33527	Closure	Included	PP Sealing
				Adapter	010-1340	7 places/adapter
Nalgene PC Oak Ridge Tube	3138-0010	14000	33527	Closure	Included	PP Sealing
				Adapter	010-1311	7 places/adapter
BD Vacutainer Tube*	–	–	–	Adapter	010-1124	1 place/adapter
5 ml Eppendorf Microtube	–	12000	25000	Adapter	75005770	1 place/adapter

* Listed Max Speeds for Conical Disposable tubes may be higher than OEM tube specifications and may result in crazing and other cosmetic damage to the tube. Do not use these tubes more than once.

RCF-Values

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
500	37	138	10	39
1000	37	138	41	154
1500	37	138	93	347
2000	37	138	165	617
2500	37	138	259	964
3000	37	138	372	1389
3500	37	138	507	1890
4000	37	138	662	2469
4500	37	138	838	3124
5000	37	138	1034	3857
5500	37	138	1251	4667
6000	37	138	1489	5554
6500	37	138	1748	6518
7000	37	138	2027	7560
7500	37	138	2327	8678
8000	37	138	2647	9874
8500	37	138	2989	11147
9000	37	138	3351	12497
9500	37	138	3733	13924
10000	37	138	4137	15428
10500	37	138	4561	17010
11000	37	138	5005	18668
11500	37	138	5471	20404
12000	37	138	5957	22217
12500	37	138	6463	24107
13000	37	138	6991	26074
13500	37	138	7539	28118
14000	37	138	8108	30240

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SP4 0JG



Certificate of Containment Testing

Containment Testing of Rotor F14-14x50cy in a Thermo Scientific Centrifuge

Report No. 195-12 B

Report Prepared For: Thermo Fisher Scientific
Issue Date: 10th October 2012

Test Summary

A F14-14x50cy rotor was containment tested in a Thermo Scientific centrifuge at 14,000 rpm at partial vacuum, using Annex AA of IEC 61010-2-020:2006 (2nd Ed.). The sealed rotor was shown to contain all contents.

Report Written By  Name: Ms Anna Moy Title: Biosafety Scientist	Report Authorised By  Name: Mrs Sara Speight Title: Senior Biosafety Scientist
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Fiberlite F20-12x50 LEX



Items Supplied

Description	Article Number
Fiberlite F20-12x50 LEX Rotor	096-124375
50 mL Nalgene PPCO Oak Ridge Tube (12x)	3139-0050
Rotor Lid Assembly	099-124375
O-Ring Refresher Kit ¹	021-124375
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	5.25 kg	5.25 kg
Maximum permissible load	12 x 75 g	12 x 75 g
Maximum speed n_{max}	20000 rpm	18000 rpm
Maximum RCF-Value at n_{max}	51428 x g	41657 x g
Minimum RCF-Value at n_{max}	25043 x g	20285 x g
K-Value at n_{max}	455	562
Radius max. / min.	11.5 cm / 5.6 cm	11.5 cm / 5.6 cm
Angle	25°	25°
Accel. / Braking Time	60 s / 80 s	60 s / 80 s
Maximum speed at 4 °C	20000 rpm	17000 rpm
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	5 °C	9 °C
Maximum autoclave temperature	121 °C	121 °C

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Nalgene PC Oak Ridge Tube	3138-0050	20000	51428	Closure	Included	PP Sealing
Nalgene PPCO Oak Ridge Tube	3139-0050	20000	51428	Closure	Included	PP Sealing
Nalgene PSF Oak Ridge Tube	3137-0050	20000	51428	Closure	Included	PP Sealing
Nalgene FEP Oak Ridge Tube	3114-0050	20000	51428	Closure	Included	ETFE Screw Cap
Nalgene PC Oak Ridge Tube	3138-0030	20000	51428	Closure	Included	PP Sealing
				Adapter	010-0167	1 place / adapter
Nalgene PPCO Oak Ridge Tube	3139-0030	20000	51428	Closure	Included	PP Sealing
				Adapter	010-0167	1 place / adapter
Nalgene PSF Oak Ridge Tube	3137-0030	20000	51428	Closure	Included	PP Sealing
				Adapter	010-0167	1 place / adapter
Nalgene FEP Oak Ridge Tube	3114-0030	20000	51428	Closure	Included	ETFE Screw Cap
				Adapter	010-0167	1 place / adapter
Nalgene PC Oak Ridge Tube	3138-0016	20000	51428	Closure	Included	PP Sealing
				Adapter	010-0382	1 place / adapter
Nalgene PPCO Oak Ridge Tube	3139-0016	20000	51428	Closure	Included	PP Sealing
				Adapter	010-0382	1 place / adapter
Corning Disposable Conical Tube*	–	–	–	Closure	Included	PP Sealing
				Adapter	010-1123	1 place / adapter
Falcon Disposable Conical Tube*	–	–	–	Adapter	010-1123	1 place / adapter
PC Flanged Tube	03426	20000	51428	Closure	03269	PP Snap-on
				Adapter	75003025	1 place/adapter
Nalgene PPCO Oak Ridge Tube	3139-0010	20000	51428	Closure	Included	PP Sealing
				Adapter	010-1306	1 place / adapter
Nalgene PC Oak Ridge Tube	3138-0010	20000	51428	Closure	Included	PP Sealing
				Adapter	010-1306	1 place / adapter
PP Flanged Tube	03105	20000	47850	Closure	03624	PP Snap-on
				Adapter	75003023	2 places/adapter
PC Flanged Tube	03104	20000	47850	Closure	03264	PP Snap-on
				Adapter	75003023	1 place/adapter
BD Vacutainer Tube*	–	–	–	Adapter	010-1068	1 place / adapter
Conical Microtube	314352H01	20000	51428	Adapter	010-1128	1 place / adapter
BD Microtainer Tube*	–	–	–	Adapter	010-1127	3 places / adapter

* Listed Max Speeds for Conical Disposable tubes may be higher than OEM tube specifications and may result in crazing and other cosmetic damage to the tube. Do not use these tubes more than once.

RCF-Values

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
500	56	115	16	32
1000	56	115	63	129
1500	56	115	141	289
2000	56	115	250	514
2500	56	115	391	804
3000	56	115	563	1157
3500	56	115	767	1575
4000	56	115	1002	2057
4500	56	115	1268	2604
5000	56	115	1565	3214
5500	56	115	1894	3889
6000	56	115	2254	4629
6500	56	115	2645	5432
7000	56	115	3068	6300
7500	56	115	3522	7232
8000	56	115	4007	8228
8500	56	115	4523	9289
9000	56	115	5071	10414
9500	56	115	5650	11603
10000	56	115	6261	12857
10500	56	115	6903	14175
11000	56	115	7576	15557
11500	56	115	8280	17003
12000	56	115	9016	18514
12500	56	115	9783	20089
13000	56	115	10581	21728
13500	56	115	11410	23432
14000	56	115	12271	25200
14500	56	115	13163	27032
15000	56	115	14087	28928
15500	56	115	15042	30889
16000	56	115	16028	32914
16500	56	115	17045	35003
17000	56	115	18094	37157
17500	56	115	19174	39375
18000	56	115	20285	41657
18500	56	115	21428	44003
19000	56	115	22601	46414
19500	56	115	23807	48889
20000	56	115	25043	51428

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Wiltshire
SP4 0JG



Certificate of Containment Testing

Containment Testing of Rotor F20-12x50 LEX in a Thermo Scientific Centrifuge

Report No. 195-12 D

Report Prepared For: Thermo Fisher Scientific
Issue Date: 10th October 2012

Test Summary

A F20-12x50 LEX rotor was containment tested in a Thermo Scientific centrifuge at 20,000 rpm at partial vacuum, using Annex AA of IEC 61010-2-020:2006 (2nd Ed.). The sealed rotor was shown to contain all contents.

Report Written By  Name: Ms Anna Moy Title: Biosafety Scientist	Report Authorised By  Name: Mrs Sara Speight Title: Senior Biosafety Scientist
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Fiberlite F21-8x50y



Items Supplied

Description	Article Number
Fiberlite F21-8x50y Rotor	096-084275
50 mL Nalgene PPCO Oak Ridge Tube (8x)	3139-0050
Rotor Lid Assembly	099-084275
O-Ring Refresher Kit ¹	021-084275
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	4.77 kg	4.77 kg
Maximum permissible load	8 x 75 g	8 x 75 g
Maximum speed n_{max}	20000 rpm	18000 rpm
Maximum RCF-Value at n_{max}	47850 x g	38759 x g
Minimum RCF-Value at n_{max}	14758 x g	11954 x g
K-Value at n_{max}	744	919
Radius max. / min.	10.7 cm / 3.3 cm	10.7 cm / 3.3 cm
Angle	34°	34°
Accel. / Braking Time	40 s / 65 s	40 s / 65 s
Maximum speed at 4 °C	20000 rpm	18000 rpm
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	< 4 °C	< 4 °C
Maximum autoclave temperature	121 °C	121 °C

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Nalgene PC Oak Ridge Tube	3138-0050	20000	47850	Closure	Included	PP Sealing
Nalgene PPCO Oak Ridge Tube	3139-0050	20000	47850	Closure	Included	PP Sealing
Nalgene PSF Oak Ridge Tube	3137-0050	20000	47850	Closure	Included	PP Sealing
Nalgene FEP Oak Ridge Tube	3114-0050	20000	47850	Closure	Included	ETFE Screw Cap
Nalgene PC Oak Ridge Tube	3138-0030	20000	47850	Closure	Included	PP Sealing
				Adapter	010-0167	1 place / adapter
Nalgene PPCO Oak Ridge Tube	3139-0030	20000	47850	Closure	Included	PP Sealing
				Adapter	010-0167	1 place / adapter
Nalgene PSF Oak Ridge Tube	3137-0030	20000	47850	Closure	Included	PP Sealing
				Adapter	010-0167	1 place / adapter
Nalgene FEP Oak Ridge Tube	3114-0030	20000	47850	Closure	Included	ETFE Screw Cap
				Adapter	010-0167	1 place / adapter
Nalgene PC Oak Ridge Tube	3138-0016	20000	47850	Closure	Included	PP Sealing
				Adapter	010-0382	1 place / adapter
Nalgene PPCO Oak Ridge Tube	3139-0016	20000	47850	Closure	Included	PP Sealing
				Adapter	010-0382	1 place / adapter
Corning Disposable Conical Tube*	–	–	–	Closure	Included	PP Sealing
				Adapter	010-1123	1 place / adapter
Falcon Disposable Conical Tube*	–	–	–	Adapter	010-1123	1 place / adapter
PC Flanged Tube	03246	20000	47850	Closure	03269	PP Snap-on
				Adapter	75003025	1 place/adapter
Nalgene PPCO Oak Ridge Tube	3139-0010	20000	47850	Closure	Included	PP Sealing
				Adapter	010-1306	1 place / adapter
Nalgene PC Oak Ridge Tube	3138-0010	20000	47850	Closure	Included	PP Sealing
				Adapter	010-1306	1 place / adapter
BD Vacutainer Tube*	–	–	–	Adapter	010-1068	1 place / adapter
PP Flanged Tube	03105	20000	47850	Closure	03264	PP Snap-on
				Adapter	75003023	2 places/adapter
PC Flanged Tube	03104	20000	47850	Closure	03264	PP Snap-on
				Adapter	75003023	2 places/adapter
BD Vacutainer Tube*	–	–	–	Adapter	010-1128	1 place / adapter
BD Microtainer Tube*	–	–	–	Adapter	010-1127	3 places / adapter

* Listed Max Speeds for Conical Disposable tubes may be higher than OEM tube specifications and may result in crazing and other cosmetic damage to the tube. Do not use these tubes more than once..

RCF-Values

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
500	33	107	9	30
1000	33	107	37	120
1500	33	107	83	269
2000	33	107	148	479
2500	33	107	231	748
3000	33	107	332	1077
3500	33	107	452	1465
4000	33	107	590	1914
4500	33	107	474	2422
5000	33	107	922	2991
5500	33	107	1116	3619
6000	33	107	1328	4307
6500	33	107	1559	5054
7000	33	107	1808	5862
7500	33	107	2075	6729
8000	33	107	2361	7656
8500	33	107	2666	8643
9000	33	107	2988	9690
9500	33	107	3330	10796
10000	33	107	3689	11963
10500	33	107	4068	13189
11000	33	107	4464	14475
11500	33	107	4879	15821
12000	33	107	5313	17226
12500	33	107	5765	18692
13000	33	107	6235	20217
13500	33	107	6724	21802
14000	33	107	7231	23447
14500	33	107	7757	25151
15000	33	107	8301	26916
15500	33	107	8864	28740
16000	33	107	9445	30624
16500	33	107	10044	32568
17000	33	107	10662	34572
17500	33	107	11299	36635
18000	33	107	11954	38759
18500	33	107	12627	40942
19000	33	107	13319	43185
19500	33	107	14029	45488
20000	33	107	14758	47850

Biocontainment Certificate

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



Certificate of Containment Testing

Containment Testing of Rotor F21-8x50y in a Thermo Scientific Centrifuge

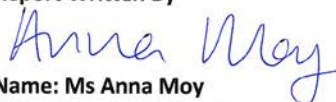
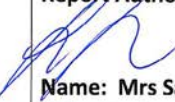
Report No. 195-12 C

Report Prepared For: Thermo Fisher Scientific

Issue Date: 17th October 2012

Test Summary

A F21-8x50y rotor was containment tested in a Thermo Scientific centrifuge at 20,000 rpm at partial vacuum, using Annex AA of IEC 61010-2-020:2006 (2nd Ed.). The sealed rotor was shown to contain all contents.

Report Written By  Name: Ms Anna Moy Title: Biosafety Scientist	Report Authorised By  Name: Mrs Sara Speight Title: Senior Biosafety Scientist
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Fiberlite F23-48x1.5



Items Supplied

Description	Article Number
Fiberlite F23-48x1.5 Rotor	096-484075
Rotor Lid Assembly	099-484075
O-Ring Refresher Kit ¹	021-484075
CD with Manual	50136234

¹ Includes 5 O-Rings and 1 O-Ring Grease Packet.

Technical Data

Centrifuge	Sorvall LYNX 6000	Sorvall LYNX 4000
Weight of empty rotor	4.54 kg	4.54 kg
Maximum permissible load	48 x 3.2 g	48 x 3.2 g
Maximum speed n_{max}	23000 rpm	18500 rpm
Maximum RCF-Value at n_{max}	57368 x g	37116 x g
Minimum RCF-Value at n_{max}	37851 x g	24489 x g
K-Value at n_{max}	199	307
Radius max. / min.	9.7 cm / 6.4 cm	9.7 cm / 6.4 cm
Angle	45°	45°
Accel. / Braking Time	40 s / 50 s	40 s / 50 s
Maximum speed at 4 °C	23000 rpm	18500 rpm
Sample Cooling at n_{max} (Ambient temperature of 23 °C, run time 60 minutes)	< 4 °C	< 4 °C
Maximum autoclave temperature	121 °C	121 °C

Information on Tubes and Bottles

REQUIRED TUBE CLOSURES, ADAPTERS, TOOLS & ACCESSORIES

Description	Article Number	Max Speed (rpm)	Max RCF (x g)	Type	Article Number	Description
Polyallomer Microtube	314352H01	23000	77427	Closure	Included	Snap-on Seal

RCF-Values

Speed rpm	R_{min}	R_{max}	RCF R_{min}	RCF R_{max}
500	64	97	18	27
1000	64	97	72	108
1500	64	97	161	244
2000	64	97	286	434

Speed rpm	R _{min}	R _{max}	RCF R _{min}	RCF R _{max}
2500	64	97	447	678
3000	64	97	644	976
3500	64	97	877	1328
4000	64	97	1145	1735
4500	64	97	1449	2196
5000	64	97	1789	2711
5500	64	97	2164	3280
6000	64	97	2576	3904
6500	64	97	3023	4582
7000	64	97	3506	5314
7500	64	97	4025	6100
8000	64	97	4579	6941
8500	64	97	5170	7835
9000	64	97	5796	8784
9500	64	97	6458	9787
10000	64	97	7155	10845
10500	64	97	7889	11956
11000	64	97	8658	13122
11500	64	97	9463	14342
12000	64	97	10303	15616
12500	64	97	11180	16945
13000	64	97	12092	18327
13500	64	97	13040	19764
14000	64	97	14024	21255
14500	64	97	15044	22801
15000	64	97	16099	24400
15500	64	97	17190	26054
16000	64	97	18317	27762
16500	64	97	19480	29524
17000	64	97	20679	31341
17500	64	97	21913	33212
18000	64	97	23183	35137
18500	64	97	24489	37116
19000	64	97	25830	39149
19500	64	97	27208	41237
20000	64	97	28621	43378
20500	64	97	30070	54574
21000	64	97	31554	47825
21500	64	97	33075	50129
22000	64	97	34631	52488
22500	64	97	36223	54901
23000	64	97	37851	57368

Rotor Preparation and Installation

Before a Run

1. Please read and observe the safety instructions contained in these operating instructions and in the instructions for use of the centrifuge.
2. Check the rotor and all accessory parts for damages such as cracks and scratches.
3. Check the rotor chamber, the centrifuge spindle and the Auto-Lock of the rotor.
4. Check the rotor's suitability using the chemical compatibility chart. ("Chemical Compatibility Chart" on page 51)
5. Make sure the tubes do not touch the lid.
6. For runs at other than room temperature, always refrigerate or warm the rotor for fast equilibration.

Rotor Loading

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

Figure 1
Rotor Loading



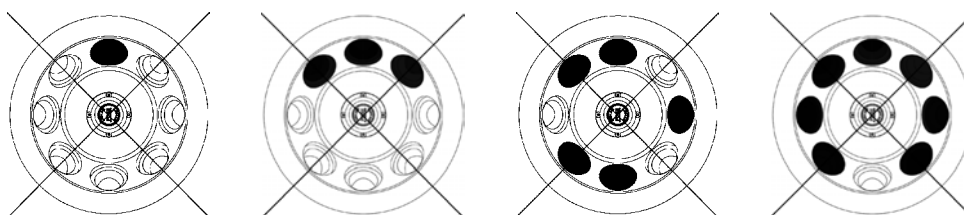
NOTE

You can also fully load the rotor. It is very important that the tubes are balanced against each other.

If the rotor is not fully loaded, the tubes or bottles must be arranged symmetrically in the rotor. Opposing tubes or bottles must be filled to the same level with liquid of the same density.

Improper Loading

Figure 2
Improper Loading



Open and Close Rotor

1. To tighten the lid, twist the lid handle clockwise until “hand tight”. As a general rule, once the lid is tightend to the point of resistance, tighten an additional 1/4 turn.
2. To remove the lid, twist the lid handle counter clockwise until the lid can be removed from the rotor.

NOTE

The rotor may be carried by the lid handle if the lid is properly tightened.

Rotor Installation



CAUTION

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

This rotor is equipped with a Thermo Scientific Auto-Lock™ rotor exchange.

This system is used to automatically lock the rotor to the centrifuge spindle, eliminating the need to manually bolt the rotor to the centrifuge spindle.

Proceed as follows:

1. Open the door of the centrifuge and if necessary remove any dust, foreign objects or residue from the chamber. Auto-Lock and O-ring must be clean and undamaged.

Figure 3
Auto-Lock Adapter



Place 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 bit of pressure.

2. Check if the rotor is properly installed by lifting it slightly on the handle. If the rotor has not been locked, place the rotor over the centrifuge spindle again.



WARNING

If the rotor cannot be properly locked in place after several attempts, then the Auto-Lock may be damaged and you are not permitted to operate the rotor. Check for any damage to the rotor: Damaged rotors must not be used. Keep the centrifuge spindle area of the rotor clear of objects. Operate the rotor always with the lid closed.

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

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

3. 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 one or both hands and push down the Auto-Lock button. At the same time, pull the rotor directly upwards and remove it from the centrifuge spindle. Make sure not to tilt the rotor while doing this.

NOTE
The rotor lid must be properly tightened to the rotor body in order to remove the rotor from the centrifuge.

Figure 4
Removing the
Rotor



Maximum Loading

Rotors can run at high speeds. Each rotor is specifically designed to run at its maximum speed with a defined load. For further details refer to the rotor manual supplied with the rotor.

The rotors are designed to work with substance mixtures with a density of up to 1.2 g/ml. Above this density or if total load is above the maximum weight the following steps should be taken:

- Reduce the fill level.
- Reduce the speed.

Use this formula:

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

n_{adm} = admissible speed

n_{max} = maximum speed


Maintenance and Care

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
Rotor Chamber	Daily or when polluted
Rotor	Daily or when polluted
Accessories	Daily or when polluted


Basics

	CAUTION
<p>Not rated procedures or agents could deteriorate the materials of the centrifuge and lead to malfunction.</p> <p>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.</p> <p>Use only approved cleansers.</p> <p>If in doubt, contact Thermo Fisher Scientific.</p>	

Use warm water with a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agents.

- Never use caustic cleaning agents such as soap suds, phosphoric acid, bleaching solutions or scrubbing powder.
- Remove rotor and clean bowl with a small amount of cleaning agent, applied to a clean cloth.
- Use a soft brush without metal bristles to remove stubborn residue.
Afterwards rinse with a small amount of distilled water and remove any excess with absorbent towels.
- Use only disinfectants with a pH of 6-8.
- Do not wash any rotor components in a dishwasher.
- Do not soak in detergent solutions for long periods, i. e. overnight.

Cleaning

	CAUTION
<p>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.</p>	


Clean as follows:

1. Clean rotor, buckets and accessories outside of the centrifuge bowl.
2. Separate all rotors, buckets, lids, adapters and tubes to allow thorough cleaning.
3. Rinse rotor and all accessories with warm water and a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agents.
4. Use a soft brush without metal bristles to remove stubborn residue.
5. Rinse rotor and all accessories with distilled water.
6. Air-dry all rotor components. Dry aluminum parts, like the knob, off with a soft cloth.


Once clean and dry, inspect the rotor and accessories.


Regularly check the condition of o-rings. Replace worn, cracked or damaged o-rings. Lubricate o-rings with vacuum grease and rotor threads with anti-galling grease (75003786) weekly.

Never use caustic cleaning agents such as soap suds, phosphoric acid, bleaching solutions or scrubbing powder.

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

Disinfection

	WARNING
<p>Hazardous infection is possible when touching the contaminated rotor and centrifuge parts. Infectious material can get into the centrifuge when a tube breaks or as a result of spills.</p> <p>In case of contamination, make sure that others are not put at risk.</p> <p>Disinfect the affected parts immediately.</p>	

	CAUTION
<p>Equipment can be damaged by inappropriate disinfection methods or agents.</p> <p>Before using any cleaning or disinfection methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.</p> <p>Observe the safety precautions and handling instructions for the cleaning agents used.</p>	

The rotor chamber and the rotor should be treated preferably with a neutral disinfectant.

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


Disinfect as follows:


1. Disinfect rotor, buckets and accessories outside of the centrifuge bowl.
2. Separate all rotors, buckets, lids, adapters and tubes to allow thorough disinfection.
3. Treat the rotor and accessories according to the instructions for the disinfectant. Adhere strictly to the given application times.

Be sure the disinfectant can drain off the rotor.

4. Rinse the rotor and rotor lid thoroughly with water and then rub down.
5. Place the rotors on a plastic grate with their cavities pointing down, to allow to fully drain and dry.
6. Dispose of the disinfectant according to the applicable guidelines.
7. Clean the rotor after disinfectin as described in “Cleaning” on page 44.

Decontamination

	WARNING
<p>Radiation is possible when touching the contaminated rotor and centrifuge parts. Radioactive material can get into the centrifuge when a tube breaks or as a result of spills.</p> <p>In case of contamination, make sure that others are not put at risk.</p> <p>Decontaminate the affected parts immediately.</p>	

	CAUTION
<p>Equipment can be damaged by inappropriate decontamination methods or agents.</p> <p>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.</p> <p>Observe the safety precautions and handling instructions for the cleaning agents used.</p>	

For general radioactive decontamination use a solution of equal parts of 70% ethanol, 10% SDS (Sodium Dodecyl Sulfate) and water.

Decontaminate as follows:

1. Decontaminate rotor, buckets and accessories outside of the centrifuge bowl.
2. Separate all rotors, buckets, lids, adapters and tubes to allow thorough decontamination.
3. Treat the rotor and accessories according to the instructions for the decontamination solution. Adhere strictly to the given application times.
Be sure the decontamination solution can drain off the rotor.
4. Rinse the rotor first with ethanol and then with de-ionized water.
Adhere strictly to the given application times.
5. Be sure the decontamination solution can drain off the rotor.
Rinse the rotor and accessories thoroughly with water.
6. Place the rotors on a plastic grate with their cavities pointing down, to allow to fully drain and dry.
7. Dispose of the decontamination solution according to the applicable guidelines.
8. Clean the rotor after disinfecting as described in “Cleaning” on page 44.

Given the nature of samples processed in a rotor, biological or radioactive contamination is possible. For biological contamination of rotors, a 2% glutaraldehyde solution, ethylene oxide or ultraviolet radiation are the recommended methods of sterilization, while for a rotor that may be contaminated by a radioactive sample, use a solution of equal parts of 70% ethanol, 10% SDS (Sodium Dodecyl Sulfate) and water. In addition:

- When autoclaving, rotor components should be separated.
- If sterilization is not necessary, a 70% solution of ethanol can be used.
- Rinse with ethanol, followed by water and dry with a soft cloth.

- Do not immerse Thermo Scientific Fiberlite rotors; spin rotor to remove liquid.
- Fiberlite composite rotors are not compatible with ethylene oxide.

Autoclaving

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

Rotor Maintenance

Each time you use a rotor, visually inspect its condition for signs of physical wear or damage:

- Scratches or gouges
- Missing or worn anodizing
- Damage to contact points, such as thread and hubs

Protect your rotor against damage or failure with preventive measures and maintain maximum centrifuge performance. However, if rotor damage is observed, ensure the safety of your lab by taking recommended action or contacting your sales representative for an inspection.

Potential Damage	Preventive Measures	Recommended Action
Damage to lid assembly	Lubricate periodically with a light film of o-ring or vacuum grease. Keep lid assembly lubricated with anti-galling grease. Avoid banging or dropping. Use care when removing o-rings. Clean with non-abrasive cloth and mild detergent.	Return lid assembly parts to manufacturer for repair or replacement.
Damage to biocontainment sealing lid	Use care when removing o-rings. Inspect and replace o-rings regularly.	Replace sealing lid to ensure proper containment.

Potential Damage	Preventive Measures	Recommended Action
Scoring to the bottom of the rotor (outside of cone area)	Gently place rotor on the centrifuge spindle. Clean with non-abrasive cloth and mild detergent. Inspect centrifuge mated parts for burrs and ensure no debris in centrifuge chamber. Store rotor on rotor stand or soft surface.	Return rotor to manufacturer for evaluation or replacement.
Cracked or de-laminated rotor	Avoid sharp impact. Avoid harsh chemicals. Clean and re-coat surface of rotor if corrosion appears.	Return rotor to manufacturer for evaluation.
Cartridge damage	Inspect cartridges regularly.	Replace cartridges, after 1000 hours of use or when begins to show signs of wear such as cracks, scoring or deformation.
Damage to rotor tie-down threads	Avoid cross threading of parts. Never use metallic or abrasive objects to clean. Clean and lubricate regularly.	Replace rotor tie-down assembly.
Damage to bucket seats	Lubricate buckets regularly. Slide buckets into place carefully to avoid dropping or forcing into position.	Replace rotor bucket set.
Windshield damage	Avoid banging or dropping. Do not exceed rotor's maximum compartment mass. Ensure windshield area is free of debris.	Replace rotor to avoid vibration that will wear the drive.
Rotor bucket cap damage	Avoid cross threading of parts. Never use metallic objects to clean. Clean and lubricate regularly.	Replace rotor bucket caps and return set for rebalancing.
Rotor bucket damage	Avoid banging or dropping. Do not exceed rotor's maximum compartment mass. Ensure buckets are free of debris.	Replace rotor buckets or return bucket set for rebalancing.
Gouges or corrosion on surface of rotor	Inspect before every use.	Return rotor to manufacturer for evaluation or replacement.
Septa damage in continuous flow or zonal rotor	Avoid sharp impact. Avoid harsh chemicals. Clean and re-coat surface of rotor if corrosion appears.	Return rotor to manufacturer for evaluation.
Bent centrifuge spindle	Remove rotor in a straight up motion. Ensure samples are properly balanced.	Call service for replacement of centrifuge spindle.

Rotor Evaluation and Care of Your Rotor

Rotors are frequently damaged in use and this damage may be got worse under centrifugal forces. As a result, even a tiny flaw in a critical part of the rotor may generate stresses greater than the rotor was designed to withstand. Rotors are also subject to high levels of stress due to the centrifugal force created by high rotational speeds, and repeated cycles can cause rotors to stretch and change in size.

Proper Handling

Improper installation can lead to failure so it is imperative to:

- Always lock rotors to the spindle, if applicable.
- Ensure buckets are properly seated on their pins.
- Always use the tightening tool on locking knobs and body caps, if applicable.
- Use the proper rotor extractor tool to remove a rotor, if applicable.
- Avoid dropping or striking the rotor against a hard surface.
- Avoid putting anything inside the rotor that could scratch or nick the surface.

In addition, ensure that all tubes, bottles and adapters are being used within their specified limits and according to the manufacturer's directions. Tube or bottle failures during centrifugation can result in minor to severe damage to rotors and centrifuges.

Stress Corrosion

Stress distribution is an important consideration when evaluating the extent of rotor damage. Ultraspeed rotors experience the highest level of stress of all rotors; if it is run above its rated speed, it probably has exceeded its yield point. In this event, the rotor is permanently stressed and rotor life is severely compromised. Lower speed rotors will also become fatigued, depending on the rotor type, number of runs and the speed of those runs. However, improper handling and misuse will often require that you retire your rotor long before normal fatigue becomes a danger.

Missing Paint

Missing paint will not affect the life of a carbon fiber rotor.

Dropped Rotors

Carbon fiber rotors are repairable if damaged.

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 technician checks the following

- electrical equipment
- suitability of set-up site
- door lock and safety system
- rotor
- fixation of rotor and centrifuge spindle

Thermo Fisher Scientific offers inspection and service contracts for this work. Any necessary repairs are performed for free during the warranty period and afterwards for a charge.

This is only valid if the centrifuge has only been maintained by a Thermo Scientific service technician.

Storage



WARNING

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

- Remove all adapters from rotor cavities when not in use.
- Rotors, buckets and accessories have to be thoroughly dried before storage.
Dry and store upside-down on a plastic matting to allow for airflow or a ventilated shelf to avoid gathering condensation in the cavity or bucket bottom.
- Avoid direct sunlight.

Shipping and Disposal

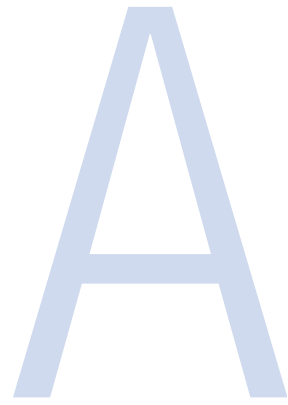


WARNING

Before shipping or depositing centrifuges and accessories you have to clean and if necessary disinfect or decontaminate everything.

For the disposal of the rotor mind the regulations in your country. Contact the Thermo Fisher Scientific Customer Service for the disposal of the rotor. For contact information check the backpage of this manual or visit www.thermoscientific.com/centrifuge

For the countries of the European Union the disposal is regulated by the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. ("WEEE Compliance" on page 2)



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	NORLY™	NYLON	PET™, POLYCLEAR™, CLEARCRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	FULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
2-mercaptoethanol		S	S	U	/	S	M	S	/	S	U	S	S	U	S	S	/	S	S	S	S	U	S	S	S	S	S	S
Acetaldehyde		S	/	U	U	/	/	/	M	/	U	/	/	/	M	U	U	U	M	M	/	M	S	U	/	S	/	U
Acetone		M	S	U	U	S	U	M	S	S	U	U	S	U	S	U	U	U	S	S	U	U	S	M	M	S	U	U
Acetonitrile		S	S	U	/	S	M	S	/	S	S	U	S	U	M	U	U	/	S	M	U	U	S	S	S	S	U	U
Alconox™		U	U	S	/	S	S	S	/	S	S	S	S	S	M	S	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	M	S	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	M	S	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	U	S	S	U	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	M	S	S	/	U	
Sodium Hydroxide (10%)		U	/	M	U	/	/	U	/	M	M	S	S	U	S	U	U	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	M	S	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
Cesium Acetate		M	/	S	/	S	S	S	/	S	S	S	S	/	S	S	/	/	S	S	S	S	S	M	S	S	S	S
Cesium Bromide		M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	M	S	S	S	S

CHEMICAL	MATERIAL	ALUMINIUM	ANODIC COATING for ALUMINIUM	BUNAN	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN™	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL™	NYLON	PET, POLYCLEAR™, CLEARCRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
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
Diethylpyro-carbonate		S	S	U	/	S	S	S	/	S	S	U	S	U	S	U	/	/	S	S	S	M	S	S	S	S	S	S
Dimethylsulfoxide		S	S	U	U	S	S	S	/	S	U	S	S	U	S	U	U	/	S	S	U	U	S	S	S	S	U	U
Dioxane		M	S	U	U	S	S	M	M	S	U	U	S	U	M	U	U	/	M	M	M	U	S	S	S	S	U	U
Ferric Chloride		U	U	S	/	/	/	M	S	/	M	/	S	/	S	/	/	/	S	S	/	/	/	M	U	S	/	S
Acetic Acid (Glacial)		S	S	U	U	S	S	U	M	S	U	S	U	U	U	U	U	M	S	U	M	U	S	U	U	S	/	U
Acetic Acid (5%)		S	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S	S	S	S	S	M	S	S	M	S	S	M
Acetic Acid (60%)		S	S	U	U	S	S	U	/	S	M	S	U	U	M	U	S	M	S	M	S	M	S	M	U	S	M	U
Ethyl Acetate		M	M	U	U	S	S	M	M	S	S	U	S	U	M	U	U	/	S	S	U	U	S	M	M	S	U	U
Ethyl Alcohol (50%)		S	S	S	S	S	S	M	S	S	S	S	S	U	S	U	S	S	S	S	S	S	S	S	M	S	M	U
Ethyl Alcohol (95%)		S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	/	S	S	S	M	S	S	S	U	S	M	U
Ethylene Dichloride		S	/	U	U	/	/	S	M	/	U	U	S	U	U	U	U	U	U	U	/	U	S	U	/	S	/	S
Ethylene Glycol		S	S	S	S	S	S	S	S	S	S	S	S	/	S	U	S	S	S	S	S	S	S	M	S	M	S	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
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	M	S	M	U	U
Glutaraldehyde		S	S	S	S	/	/	S	/	S	S	S	S	S	S	S	/	/	S	S	S	/	/	S	S	S	/	/
Glycerol		M	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	/	S	S	S	S	S	S	S	S	S	S
Guanidine Hydrochloride		U	U	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	U	S	S	S
Haemo-Sol™		S	S	S	/	/	/	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	S	S	S	S

CHEMICAL	MATERIAL	ALUMINIUM	ANODIC COATING for ALUMINIUM	BUNAN	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN™	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL™	NYLON	PETI, POLYCLEAR™, CLEARCRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
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	M	S	/	S	S	S	S	S	S	S	M	S	S	S
Calcium Hypochlorite		M	/	U	/	S	M	M	S	/	M	/	S	/	S	M	S	/	S	S	S	M	S	M	U	S	/	S
Kerosene		S	S	S	/	S	S	S	U	S	M	U	S	U	M	M	S	/	M	M	M	S	S	U	S	S	U	S
Sodium Chloride (10%)		S	/	S	S	S	S	S	S	/	/	/	S	S	S	S	S	/	S	S	S	S	/	S	S	M	/	S
Sodium Chloride (sat'd)		U	/	S	U	S	S	S	/	/	/	/	S	S	S	S	S	/	S	S	/	S	/	S	S	M	/	S
Carbon Tetrachloride		U	U	M	S	S	U	M	U	S	U	U	S	U	M	U	S	S	M	M	S	M	M	M	M	U	S	S
Aqua Regia		U	/	U	U	/	/	U	/	/	/	/	/	U	U	U	U	U	U	U	/	/	/	/	/	S	/	M
Solution 555 (20%)		S	S	S	/	/	/	S	/	S	S	S	S	S	S	S	/	/	S	S	S	/	S	S	S	S	S	S
Magnesium Chloride		M	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Mercaptoacetic Acid		U	S	U	/	S	M	S	/	S	M	S	U	U	U	U	/	S	U	U	S	M	S	U	S	S	S	S
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	U
Methylene Chloride		U	U	U	U	M	S	S	U	S	U	U	S	U	U	U	U	U	M	U	U	U	S	S	M	U	S	U
Methyl Ethyl Ketone		S	S	U	U	S	S	M	S	S	U	U	S	U	S	U	U	U	S	S	U	U	S	S	S	S	U	U
Metrizamide™		M	S	S	/	S	S	S	/	S	S	S	S	/	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Lactic Acid (100%)		/	/	S	/	/	/	/	/	/	M	S	U	/	S	S	S	M	S	S	/	M	S	M	S	S	/	S
Lactic Acid (20%)		/	/	S	S	/	/	/	/	/	M	S	M	/	S	S	S	S	S	S	S	M	S	M	S	S	/	S
N-Butyl Alcohol		S	/	S	U	/	/	S	/	/	S	M	/	U	S	M	S	S	S	S	M	M	S	M	/	S	/	S
N-Butyl Phthalate		S	S	U	/	S	S	S	/	S	U	U	S	U	U	U	M	/	U	U	S	U	S	M	M	S	U	S
N, N-Dimethyl-formamide		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	U	S	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	U	S	S	S	S	S	S	S	S	S	S	S	S	S

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINIUM	BUNAN	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELTRIN™	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL™	NYLON	PET, POLYCLEAR™, CLEARCRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
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	M	S	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	S	U	S	S	S	S
Oils (Other)		S	/	S	/	/	/	S	M	S	S	S	S	U	S	S	S	S	U	S	S	S	S	/	S	S	M	S
Oleic Acid		S	/	U	S	S	S	U	U	S	U	S	S	M	S	S	S	S	S	S	S	S	S	M	U	S	M	M
Oxalic Acid		U	U	M	S	S	S	U	S	S	S	S	S	U	S	U	S	S	S	S	S	S	S	S	U	M	S	S
Perchloric Acid (10%)		U	/	U	/	S	U	U	/	S	M	M	/	/	M	U	M	S	M	M	/	M	S	U	/	S	/	S
Perchloric Acid (70%)		U	U	U	/	/	U	U	/	S	U	M	U	U	M	U	U	U	M	M	U	M	S	U	U	S	U	S
Phenol (5%)		U	S	U	/	S	M	M	/	S	U	M	U	U	S	U	M	S	M	S	U	U	S	U	M	M	M	S
Phenol (50%)		U	S	U	/	S	U	M	/	S	U	M	U	U	U	U	U	S	U	M	U	U	S	U	U	U	M	S
Phosphoric Acid (10%)		U	U	M	S	S	S	U	S	S	S	S	U	/	S	S	S	S	S	S	S	S	S	U	M	U	S	S
Phosphoric Acid (conc.)		U	U	M	M	/	/	U	S	/	M	S	U	U	M	M	S	S	S	M	S	M	S	U	M	U	/	S
Physiologic Media (Serum, Urine)		M	S	S	S	/	/	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Picric Acid		S	S	U	/	S	M	S	S	S	M	S	U	S	S	S	U	S	S	S	S	U	S	U	M	S	M	S
Pyridine (50%)		U	S	U	U	S	U	U	/	U	S	S	U	U	M	U	U	/	U	S	M	U	S	S	U	U	U	U
Rubidium Bromide		M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Rubidium Chloride		M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Sucrose		M	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sucrose, Alkaline		M	S	S	/	S	S	S	/	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	M	S	S	S
Sulfosalicylic Acid		U	U	S	S	S	S	S	/	S	S	S	U	S	S	S	/	S	S	S	/	S	S	U	S	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	U	M	S	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	U	U	U	S	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	U	U	U	M	S	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

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINIUM	BUNAN	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN™	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL™	NYLON	PET, POLYCLEAR™, CLEARCRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
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	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	
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

†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.

NOTICE

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

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