

# Thermo Scientific Microliter 24 x 2 ml

## Instructions for Use

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## Contents

## Preface

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

The information contained in this 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
75003424	Microliter 24 x 2 ml	1	<input type="checkbox"/>
76003500	Grease for rubber sealing	1	<input type="checkbox"/>
50134706	CD with manual	1	<input type="checkbox"/>

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



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.

# Precautions

In order to ensure safe operation of the Microliter 24x2ml, 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.
- Operate the rotor always with the lid closed.
- 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:  $1.2 \frac{g}{cm^3}$

# Rotor Data

## Contents

- “Technical Data” on page 1-2

## Technical Data

### 230 V, 50 / 60 Hz

Centrifuge	PICO 17	PICO 21
Catalog Number	75002410	75002415
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	FRESCO 17	FRESCO 21
Catalog Number	75002420	75002425
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [°C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK



## 120 V, 60 Hz

Centrifuge	PICO 17	PICO 21
Catalog Number	75002411	75002416
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	FRESCO 17	FRESCO 21
Catalog Number	75002421	75002426
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 100 V, 50 / 60 Hz

Centrifuge	PICO 17	PICO 21
Catalog Number	75002412	75002417
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	FRESCO 17	FRESCO 21
Catalog Number	75002422	75002427
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 230 V, 50 / 60 Hz

Centrifuge	Sorvall Legend Micro 17	Sorvall Legend Micro 21
Catalog Number	75002430	75002435
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Sorvall Sorvall Legend Micro 17R	Sorvall Sorvall Legend Micro 21R
Catalog Number	75002440	75002445
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 120 V, 60 Hz

Centrifuge	Sorvall Legend Micro 17	Sorvall Legend Micro 21
Catalog Number	75002431	75002436
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Sorvall Legend Micro 17R	Sorvall Legend Micro 21R
Catalog Number	75002441	75002446
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 100 V, 50 / 60 Hz

Centrifuge	Sorvall Legend Micro 17	Sorvall Legend Micro 21
Catalog Number	75002432	75002437
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Sorvall Legend Micro 17R	Sorvall Legend Micro 21R
Catalog Number	75002442	75002447
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 230 V, 50 / 60 Hz

Centrifuge	Micro CL 17	Micro CL 21
Catalog Number	75002450	75002465
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	16800	20800
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	12 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Micro CL 17R	Micro CL 21R
Catalog Number	75002455	75002470
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

**120 V, 60 Hz**

Centrifuge	Micro CL 17	Micro CL 21
Catalog Number	75002451	75002466
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	16800	20800
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	12 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Micro CL 17R	Micro CL 21R
Catalog Number	75002456	75002471
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 100 V, 50 / 60 Hz

Centrifuge	Micro CL 17	Micro CL 21
Catalog Number	75002452	75002467
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Micro CL 17R	Micro CL 21R
Catalog Number	75002457	75002472
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK



**230 V, 50 / 60 Hz**

<b>Centrifuge</b>	<b>Fisher Scientific AccuSpin 17</b>
Catalog Number	75002460
Places / Volume	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300
Maximum RCF-Value at $n_{\max}$	17000
Radius max. / min. [ cm ]	8.6 / 5.1
Angle [ ° ]	45
Acceleration / Braking Time [ s ]	11 / 12
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33
Aerosol-tight*	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

<b>Centrifuge</b>	<b>Fisher Scientific AccuSpin 17R</b>
Catalog Number	75002462
Places / Volume	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300
Maximum RCF-Value at $n_{\max}$	17000
Radius max. / min. [ cm ]	8.6 / 5.1
Angle [ ° ]	45
Acceleration / Braking Time [ s ]	10 / 12
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0
Aerosol-tight*	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 120 V, 60 Hz

Centrifuge	Fisher Scientific AccuSpin 17
Catalog Number	75002461
Places / Volume	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300
Maximum RCF-Value at $n_{\max}$	17000
Radius max. / min. [ cm ]	8.6 / 5.1
Angle [ ° ]	45
Acceleration / Braking Time [ s ]	11 / 12
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33
Aerosol-tight*	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)

\* Tested and approved by HPA, Porton-Down, UK

Centrifuge	Fisher Scientific AccuSpin 17R
Catalog Number	75002463
Places / Volume	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300
Maximum RCF-Value at $n_{\max}$	17000
Radius max. / min. [ cm ]	8.6 / 5.1
Angle [ ° ]	45
Acceleration / Braking Time [ s ]	10 / 12
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0
Aerosol-tight*	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)

\* Tested and approved by HPA, Porton-Down, UK

## 230 V, 50 / 60 Hz

Centrifuge	Thermo Scientific Micro CL 17	Thermo Scientific Micro CL 21
Catalog Number	75002479	75002451
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Thermo Scientific Micro CL 17R	Thermo Scientific Micro CL 21R
Catalog Number	75002483	75002485
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

## 120 V, 60 Hz

Centrifuge	Thermo Scientific Micro CL 17	Thermo Scientific Micro CL 21
Catalog Number	75002480	75002482
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	11 / 12	13 / 13
Sample Heating at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C, Running Time 60 Minutes	33	36
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

Centrifuge	Thermo Scientific Micro CL 17R	Thermo Scientific Micro CL 21R
Catalog Number	75002484	75002486
Places / Volume	24 x 1.5 / 2 ml	24 x 1.5 / 2 ml
Maximum permissible Load [ g ]	24 x 4	24 x 4
Maximum Speed $n_{\max}$ [ rpm ]	13300	14800
Maximum RCF-Value at $n_{\max}$	17000	21100
Radius max. / min. [ cm ]	8.6 / 5.1	8.6 / 5.1
Angle [ ° ]	45	45
Acceleration / Braking Time [ s ]	10 / 12	12 / 13
Min. Temperature at $n_{\max}$ [ °C ] referred to Ambient Temperature of 23 °C	≤0	≤0
Aerosol-tight*	yes	yes
Permissible Temperature Range autoclavable (Number of Cycles)	121 °C (20 Cycles)	121 °C (20 Cycles)

\*Tested and approved by HPA, Porton-Down, UK

# Accessories

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- “Adapter” on page 2-2

## Adapter

**Table 2-1.** Adapter

Adapter for	Max. Tube Dimensions Ø x Length [mm]	Tube Capacity [ ml ]	Number per Set	Color	Catalog Number
Reduction Sleeve PRC	6.2 x 20	0.2	24	grey	76003250
Reduction Sleeve	8 x 43.5	0.5 / 0.6	24	turquoise	76003252
Reduction Sleeve	6 x 46	0.25 / 0.4	24	red	76003251

# Rotor Application

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- “Rotor Temperature Range” on page 3-2
- “Rotor Life-time” on page 3-2
- “Rotor Lid” on page 3-3
- “Operation without Lid” on page 3-3
- “Proper Loading” on page 3-3
- “Improper Loading” on page 3-4

## Rotor Installation

Use the rotor only in centrifuges that listed in there manual.

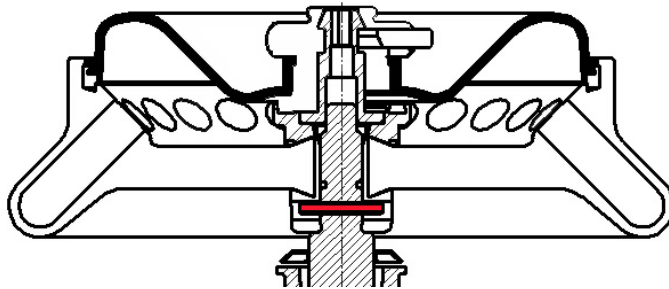
The wrench (20360104) is needed for the rotor installation.

Do not install the rotor when the temperature difference between shaft and rotor lock is  $>20\text{ }^{\circ}\text{C}$ . Otherwise the rotor might jam during the installation.

The installation of a jammed rotor can lead to damages of centrifuge and rotor.

Proceed as follows:

1. Open the centrifuge door.
2. If necessary remove any dust, foreign objects or residue. The thread and the O-ring on the shaft must be in perfect conditions.
3. Turn the rotor so that the notch for the engaging the shaft points downwards.
4. Place the rotor onto the shaft so that the notch of the rotor is placed precisely above the retaining pin.  
The two bars in the labeling on the upper side of the rotor indicate the position of th notch. These bars help you to position the rotor.



## Rotor Temperature Range



**Note** Operate the rotor in a temperature range between  $-9\text{ }^{\circ}\text{C}$  and  $+40\text{ }^{\circ}\text{C}$  only. A pre-tempering in a freezer below  $-9\text{ }^{\circ}\text{C}$  is not allowed.

## Rotor Life-time

The rotor has no life-time restrictions. For safety reasons please bear the following in mind:

- UV rays reduce the stability of plastics. Do not subject the centrifuge, rotors and plastic accessories to direct sunlight.
- If the rotor shows signs of decoloration, deformation, wear or imbalance it must be replaced.



## Rotor Lid

### Open

The rotor lid is held on the integrated central rotor nut.

1. Press the red unlocking button at the handle order to open the lid.  
The lid can be lifted now.

### Close

1. Place the rotor lid centrally on the rotor nut.
2. Press the rotor lid down until you see and hear the lock closing.

If the lid cannot be closed at all or only by using force, check whether the o-rings are placed correctly; Clean and grease them if necessary. Check the lid mechanism for dirt and proper functionality.

Damaged parts must be replaced immediately.

**Note** Check if the rotor is properly installed by lifting it slightly on the handle.

## Operation without Lid

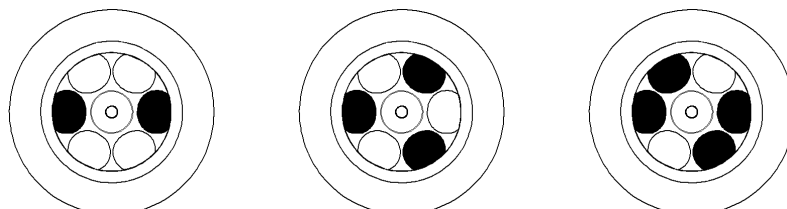
If you plan to operate the rotor without the lid, please bear the following in mind:

- Remove the aerosol-seals because they are no longer fixed without lid.
- Always close the tubes because the caps might tear off otherwise.

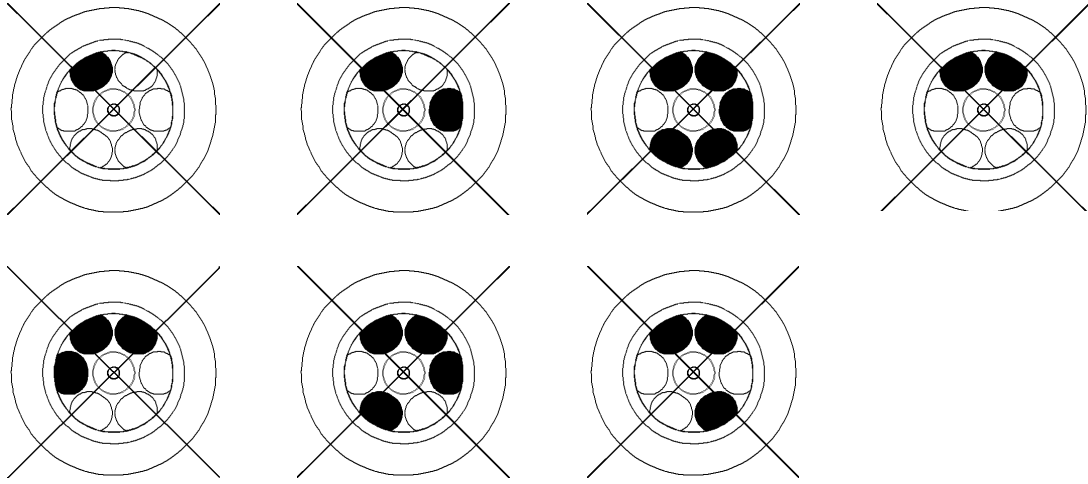


**WARNING** Loose parts might damage the centrifuge.

## Proper Loading



# Improper Loading



# Aerosol-tight Applications

## Contents

- “Fill Level” on page 4-2
- “Checking the Aerosol-Tightness” on page 4-2
- “Replace Seals” on page 4-3



**CAUTION** Aerosol-tight rotors and tubes may only be opened in an approved safety work-bench when centrifuging dangerous samples. Mind the maximum permissible load.

1. Check that the sample containers are well suited for the desired centrifugation process.
  - Gravitation fields up to 21100 x g.
  - The temperature in ventilated centrifuges can reach 15 °C above room temperature.

## 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.

Mind the fill level.

Nominal volume	Permissible volume
2.0 ml	1.5 ml
1.5 ml	1.0 ml
others	2/3 of nominal volume

## 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 are extremely important.

Aerosol-tight applications are not possible if the lids are open.

Aerosol-tightness requires the correct operation when filling the sample vessels and closing the rotor lid.

## Quick Test

As a quick test, it is possible to test the aerosol-tightness of fixed-angle rotors using the following process:

1. Lubricate all seals lightly.  
Always use the special grease (76003500) when lubricating the seals.
2. Fill the cavities with approx. 10 ml of carbonated mineral water.

3. Close the rotor as explained in the handling instructions.  
Shake the rotor vigorously using your hands. This releases the carbonic acid gas which is bound in the water, resulting in excess pressure. Do not apply pressure to the lid when doing so.

Leaks can be detected by escaping water or the sound of escaping gas.

Replace the seals if you detect any leaks. Then repeat the test.

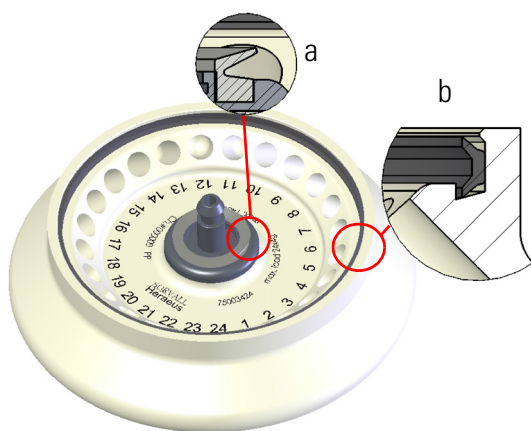
4. Dry the rotor, rotor lid and the cover seal.



**CAUTION** Prior to each use, the seals in the rotor are to be inspected in order to assure that they are correctly seated and are not worn or damaged. Damaged seals are to be replaced immediately. Replacement seals are supplied with the rotor or can be order as spare part 50135324. When loading the rotor, ensure that the rotor lid closes securely. Damaged or clouded rotor covers are to be replaced immediately.

## Replace Seals

1. Grease the seals (75003405) before inserting.
2. Press the smaller V-seal into the groove of the rotor collar (a).
3. Press the larger C-seal in the outer groove of the rotor body (b).



## 4 Aerosol-tight Applications

Replace Seals

# Maintenance and Care

## Contents

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

## Cleaning Intervals

For the sake of personal, environmental, and material protection, it is your duty to clean and if necessary disinfect the rotor 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



**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

Clean rotor and accessories as follows:

- 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 (70009824). 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 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 adapters.
  6. Use a neutral cleaning agent with a pH value between 6 and 8 for cleaning.
  7. Dry all 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 (70009824). Also treat the cavities with oil.



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

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

## Disinfection

Disinfect rotor and 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.

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



**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 adapters and dispose of them or disinfect them.
6. Treat the rotor and accessories according to the instructions for the disinfectant (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 accessories thoroughly with water.
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 (70009824). Also treat the cavities with oil.

## Decontamination

Decontaminate rotor and 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.

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 adapters 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 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 (70009824). Also treat the cavities with oil.

## Autoclaving

1. Before autoclaving clean rotor and accessories and 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.
  - Use the autoclaving protocol “Autoclaving Protocol” on page C-1 to record the cycles.

**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. 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 Fisher Scientific service technician.



## RCF-Values

Speed rpm	Radius min	Radius max	RCF R <sub>min</sub>	RCF R <sub>max</sub>
300	5.1	8.6	5	9
400	5.1	8.6	9	15
500	5.1	8.6	14	24
600	5.1	8.6	21	35
700	5.1	8.6	28	47
800	5.1	8.6	36	62
900	5.1	8.6	46	78
1000	5.1	8.6	57	96
1100	5.1	8.6	69	116
1200	5.1	8.6	82	138
1300	5.1	8.6	96	162
1400	5.1	8.6	112	188
1500	5.1	8.6	128	216
1600	5.1	8.6	146	246
1700	5.1	8.6	165	278
1800	5.1	8.6	185	312
1900	5.1	8.6	206	347
2000	5.1	8.6	228	385
2100	5.1	8.6	251	424
2200	5.1	8.6	276	465
2300	5.1	8.6	302	509
2400	5.1	8.6	328	554
2500	5.1	8.6	356	601
2600	5.1	8.6	385	650
2700	5.1	8.6	416	701
2800	5.1	8.6	447	754
2900	5.1	8.6	480	809
3000	5.1	8.6	513	865

**A RCF-Values**

<b>Speed rpm</b>	<b>Radius min</b>	<b>Radius max</b>	<b>RCF R<sub>min</sub></b>	<b>RCF R<sub>max</sub></b>
3100	5.1	8.6	548	924
3200	5.1	8.6	584	985
3300	5.1	8.6	621	1047
3400	5.1	8.6	659	1111
3500	5.1	8.6	698	1178
3600	5.1	8.6	739	1246
3700	5.1	8.6	781	1316
3800	5.1	8.6	823	1388
3900	5.1	8.6	867	1462
4000	5.1	8.6	912	1538
4100	5.1	8.6	958	1616
4200	5.1	8.6	1006	1696
4300	5.1	8.6	1054	1778
4400	5.1	8.6	1104	1861
4500	5.1	8.6	1155	1947
4600	5.1	8.6	1207	2034
4700	5.1	8.6	1260	2124
4800	5.1	8.6	1314	2215
4900	5.1	8.6	1369	2309
5000	5.1	8.6	1425	2404
5100	5.1	8.6	1483	2501
5200	5.1	8.6	1542	2600
5300	5.1	8.6	1602	2701
5400	5.1	8.6	1663	2804
5500	5.1	8.6	1725	2908
5600	5.1	8.6	1788	3015
5700	5.1	8.6	1853	3124
5800	5.1	8.6	1918	3234
5900	5.1	8.6	1985	3347
6000	5.1	8.6	2053	3461
6030	5.1	8.6	2073	3496
6100	5.1	8.6	2122	3578
6200	5.1	8.6	2192	3696
6300	5.1	8.6	2263	3816
6400	5.1	8.6	2335	3938
6500	5.1	8.6	2409	4062
6600	5.1	8.6	2484	4188

Speed rpm	Radius min	Radius max	RCF R <sub>min</sub>	RCF R <sub>max</sub>
6700	5.1	8.6	2560	4316
6800	5.1	8.6	2637	4446
6900	5.1	8.6	2715	4578
7000	5.1	8.6	2794	4711
7100	5.1	8.6	2874	4847
7200	5.1	8.6	2956	4984
7300	5.1	8.6	3038	5124
7400	5.1	8.6	3122	5265
7500	5.1	8.6	3207	5408
7600	5.1	8.6	3293	5554
7700	5.1	8.6	3381	5701
7800	5.1	8.6	3469	5850
7900	5.1	8.6	3558	6001
8000	5.1	8.6	3649	6153
8100	5.1	8.6	3741	6308
8200	5.1	8.6	3834	6465
8300	5.1	8.6	3928	6624
8400	5.1	8.6	4023	6784
8500	5.1	8.6	4120	6947
8600	5.1	8.6	4217	7111
8700	5.1	8.6	4316	7277
8800	5.1	8.6	4415	7446
8900	5.1	8.6	4516	7616
9000	5.1	8.6	4618	7788
9100	5.1	8.6	4722	7962
9200	5.1	8.6	4826	8138
9300	5.1	8.6	4931	8316
9400	5.1	8.6	5038	8496
9500	5.1	8.6	5146	8677
9600	5.1	8.6	5255	8861
9700	5.1	8.6	5365	9047
9800	5.1	8.6	5476	9234
9900	5.1	8.6	5588	9423
10000	5.1	8.6	5702	9615
10100	5.1	8.6	5816	9808
10200	5.1	8.6	5932	10003
10300	5.1	8.6	6049	10200

**A RCF-Values**

<b>Speed rpm</b>	<b>Radius min</b>	<b>Radius max</b>	<b>RCF R<sub>min</sub></b>	<b>RCF R<sub>max</sub></b>
10350	5.1	8.6	6108	10300
10400	5.1	8.6	6167	10399
10500	5.1	8.6	6286	10600
10600	5.1	8.6	6407	10803
10700	5.1	8.6	6528	11008
10800	5.1	8.6	6651	11215
10900	5.1	8.6	6774	11423
11000	5.1	8.6	6899	11634
11100	5.1	8.6	7025	11846
11200	5.1	8.6	7152	12061
11300	5.1	8.6	7281	12277
11400	5.1	8.6	7410	12495
11500	5.1	8.6	7541	12716
11600	5.1	8.6	7672	12938
11700	5.1	8.6	7805	13162
11800	5.1	8.6	7939	13388
11900	5.1	8.6	8074	13616
12000	5.1	8.6	8211	13845
12100	5.1	8.6	8348	14077
12200	5.1	8.6	8487	14311
12300	5.1	8.6	8626	14546
12400	5.1	8.6	8767	14784
12500	5.1	8.6	8909	15023
12600	5.1	8.6	9052	15264
12700	5.1	8.6	9196	15508
12800	5.1	8.6	9342	15753
12900	5.1	8.6	9488	16000
13000	5.1	8.6	9636	16249
13100	5.1	8.6	9785	16500
13200	5.1	8.6	9935	16753
13300	5.1	8.6	10086	17008
13400	5.1	8.6	10238	17264
13500	5.1	8.6	10392	17523
13600	5.1	8.6	10546	17784



# Chemical Compatibility Chart

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

<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	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A, TEFLON	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON	VITON	
Hydrochloric Acid (conc.)		U	U	U	U	-	U	U	M	-	U	M	U	U	M	U	U	U	-	S	-	U	S	U	U	U	-	-	
Formaldehyde (40 %)		M	M	M	S	S	S	S	M	S	S	S	S	M	S	S	S	U	S	S	M	S	S	S	M	S	M	U	
Glutaraldehyde		S	S	S	S	-	-	S	-	S	S	S	S	S	S	S	-	-	S	S	S	-	-	S	S	S	-	-	
Glycerol		M	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S	
Guanidine Hydrochloride		U	U	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	U	S	S	S	
Haemo-Sol		S	S	S	-	-	-	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	S	S	S	S	
Hexane		S	S	S	-	S	S	S	-	S	S	U	S	U	M	U	S	S	U	S	S	M	S	U	S	S	U	S	
Isobutyl Alcohol		-	-	M	U	-	-	S	S	-	U	-	S	U	S	S	M	S	S	S	-	S	S	S	-	S	-	S	
Isopropyl Alcohol		M	M	M	U	S	S	S	S	S	U	S	S	U	S	U	M	S	S	S	S	S	S	S	M	M	M	S	
Iodoacetic Acid		S	S	M	-	S	S	S	-	S	M	S	S	M	S	S	-	M	S	S	S	S	S	M	S	S	M	M	
Potassium Bromide		U	S	S	-	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	M	S	S	S	
Potassium Carbonate		M	U	S	S	S	S	S	-	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S	
Potassium Chloride		U	S	S	-	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	S	U	S	S	S	
Potassium Hydroxide (5 %)		U	U	S	S	S	S	M	-	S	S	S	S	-	S	U	S	S	S	S	S	S	S	M	U	M	S	U	
Potassium Hydroxide (conc.)		U	U	M	U	-	-	M	-	M	S	S	-	U	M	U	U	U	S	M	-	M	U	-	U	U	-	U	
Potassium Permanganate		S	S	S	-	S	S	S	-	S	S	S	U	S	S	S	M	-	S	M	S	U	S	S	M	S	U	S	
Calcium Chloride		M	U	S	S	S	S	S	S	S	S	S	S	S	S	M	S	-	S	S	S	S	S	M	S	S	S	S	
Calcium Hypochlorite		M	-	U	-	S	M	M	S	-	M	-	S	-	S	M	S	-	S	S	S	M	S	M	U	S	-	S	
Kerosene		S	S	S	-	S	S	S	U	S	M	U	S	U	M	M	S	-	M	M	M	S	S	U	S	S	U	S	
Sodium Chloride (10 %)		S	-	S	S	S	S	S	S	-	-	-	S	S	S	S	S	-	S	S	S	S	-	S	S	M	-	S	
Sodium Chloride (sat'd)		U	-	S	U	S	S	S	-	-	-	-	S	S	S	S	S	-	S	S	-	S	-	S	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	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	M	S	S	S	S	
Lactic Acid (100 %)		-	-	S	-	-	-	-	-	-	M	S	U	-	S	S	S	M	S	S	-	M	S	M	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	NORYL	NYLON	PET*, POLYCLEAR, CLEARCRIMP	POLYALLUMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A, TEFLON	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON	VITON
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	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	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
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	M	S	S	S	S
Rubidium Chloride	M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	M	S	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

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 <sup>+</sup> , POLYCLEAR, CLEARCRIMP	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERIMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A, TEFLON	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON	VITON	
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	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	

Polyethyleneterephthalate

## **B** Chemical Compatibility Chart

### 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. No organized chemical resistance data exists for materials under the stress of centrifugation. When in doubt we recommend pretesting sample lots.

# Autoclaving Protocol

Date	Comment	Operator	Signature
1			
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**Thermo Electron LED GmbH**  
Zweigniederlassung Osterode  
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Germany

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