

Thermo Scientific

Hematocrit Rotor

For use with Thermo Scientific Heraeus Megafuge 8,
Sorvall ST 8 and SL 8 Centrifuges

Instruction Manual

50139071-a

February 2013

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Preface

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

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

Items Supplied

| | Quantity | Check |
|--------------------|----------|--------------------------|
| Hematocrit Rotor | 1 | <input type="checkbox"/> |
| Anti-corrosion Oil | 1 | <input type="checkbox"/> |
| Linear scale | 1 | <input type="checkbox"/> |
| Instruction manual | 1 | <input type="checkbox"/> |

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

Intended Use

This rotor is used in combination with the according centrifuge as a laboratory product designed to separate components by generation of Relative Centrifugal Force. It separates human samples (e.g. blood, urine and other body fluids) collected in appropriate containers, either alone or after addition of reagents or other additives.

The rotor in the centrifuge is designed to run other containers filled with chemicals, environmental samples and other non-human body samples.

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

Together with this hematocrit rotor the centrifuge becomes an in-vitro diagnostics device to define the hematocrit value by centrifugation.

Apply DIN 58933 to define the hematocrit value. To obtain reproducible results, standardization is required both in interest of patients and blood donors and to guarantee the comparability of research results. The hematocrit value allows you to calculate the rate of erythrocytes in the blood. This applies only if the Hematocrit Rotor is used with approved accessories and items listed in the items supplied.

This rotor should be operated by trained specialists only.

Precautions

In order to ensure safe operation of the Hematocrit Rotor, 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. Do not touch the electronic components of the rotor and do not make any changes to the electronic or mechanical components.
- Use only with rotors which have been loaded properly.
- Never overload the rotor.
- Use only accessories which have been approved by Thermo Fisher Scientific. Exceptions to this rule are commercially available glass or plastic centrifuge tubes, provided they have been approved for the speed or the RCF value of the rotor.
- Observe the safety instructions.

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: $1,2 \frac{\text{g}}{\text{cm}^3}$



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



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

Rotor Specifications

Contents

- “Thermo Scientific Heraeus Megafuge 8 Centrifuge” on page 10
- “Thermo Scientific Sorvall ST 8 Centrifuge” on page 11
- “Thermo Scientific SL 8 Centrifuge” on page 13

2 Rotor Specifications

Thermo Scientific Heraeus Megafuge 8 Centrifuge

Thermo Scientific Heraeus Megafuge 8 Centrifuge

Table 1. Heraeus 230V 50Hz/60Hz

| Centrifuge | Heraeus® Megafuge® 8 |
|--|----------------------|
| Catalog # | 75007211 |
| Weight empty [kg] | 1.0 |
| Maximum permissible load [g] | 24 x 0.2 |
| Maximum speed n_{\max} [rpm] | 13300 |
| Maximum RCF value at n_{\max} | 16810 |
| Max. / min. radius [cm] | 8.5 / 2.0 |
| Pitch angle [°] | 90 |
| Accel. / braking time [s] | 14 / 24 |
| Sample heating at n_{\max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes | 16 |
| Aerosol-tight ¹ | No |
| Permissible temperature range autoclavable °C | 134 |

¹Tested by HPA, Porton-down, UK

Table 2. Heraeus 120V 60Hz

| Centrifuge | Heraeus® Megafuge® 8 |
|--|----------------------|
| Catalog # | 75007210 |
| Weight empty [kg] | 1.0 |
| Maximum permissible load [g] | 24 x 0.2 |
| Maximum speed n_{\max} [rpm] | 13300 |
| Maximum RCF value at n_{\max} | 16810 |
| Max. / min. radius [cm] | 8.5 / 2.0 |
| Pitch angle [°] | 90 |
| Accel. / braking time [s] | 14 / 24 |
| Sample heating at n_{\max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes | 16 |
| Aerosol-tight ¹ | No |
| Permissible temperature range autoclavable °C | 134 |

¹Tested by HPA, Porton-down, UK

Thermo Scientific Sorvall ST 8 Centrifuge

Table 3. Sorvall 230V 50/60Hz

| Centrifuge | Sorvall® ST 8 |
|--|---------------|
| Catalog # | 75007201 |
| Weight empty [kg] | 1.0 |
| Maximum permissible load [g] | 24 x 0.2 |
| Maximum speed n_{\max} [rpm] | 13300 |
| Maximum RCF value at n_{\max} | 16810 |
| Max. / min. radius [cm] | 8.5 / 2.0 |
| Pitch angle [°] | 90 |
| Accel. / braking time [s] | 14 / 24 |
| Sample heating at n_{\max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes | 16 |
| Aerosol-tight ¹ | No |
| Permissible temperature range autoclavable °C | 134 |

¹Tested by HPA, Porton-down, UK

Table 4. Sorvall 120V 60Hz

| Centrifuge | Sorvall® ST 8 |
|--|---------------|
| Catalog # | 75007200 |
| Weight empty [kg] | 1.0 |
| Maximum permissible load [g] | 24 x 0.2 |
| Maximum speed n_{\max} [rpm] | 13300 |
| Maximum RCF value at n_{\max} | 16810 |
| Max. / min. radius [cm] | 8.5 / 2.0 |
| Pitch angle [°] | 90 |
| Accel. / braking time [s] | 14 / 24 |
| Sample heating at n_{\max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes | 16 |
| Aerosol-tight ¹ | No |
| Permissible temperature range autoclavable °C | 134 |

¹Tested by HPA, Porton-down, UK

2 Rotor Specifications

Thermo Scientific Sorvall ST 8 Centrifuge

Table 5. Sorvall 100V 50/60Hz

| Centrifuge | Sorvall® ST 8 |
|--|---------------|
| Catalog # | 75007202 |
| Weight empty [kg] | 1.0 |
| Maximum permissible load [g] | 24 x 0.2 |
| Maximum speed n_{\max} [rpm] | 13300 |
| Maximum RCF value at n_{\max} | 16810 |
| Max. / min. radius [cm] | 8.5 / 2.0 |
| Pitch angle [°] | 90 |
| Accel. / braking time [s] | 14 / 24 |
| Sample heating at n_{\max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes | 16 |
| Aerosol-tight ¹ | No |
| Permissible temperature range autoclavable °C | 134 |

¹Tested by HPA, Porton-down, UK

Thermo Scientific SL 8 Centrifuge

Table 6. Thermo Scientific 230V 50/60Hz

| Centrifuge | SL 8 |
|--|-----------|
| Catalog # | 75007221 |
| Weight empty [kg] | 1.0 |
| Maximum permissible load [g] | 24 x 0.2 |
| Maximum speed n_{\max} [rpm] | 13300 |
| Maximum RCF value at n_{\max} | 16810 |
| Max. / min. radius [cm] | 8.5 / 2.0 |
| Pitch angle [°] | 90 |
| Accel. / braking time [s] | 14 / 24 |
| Sample heating at n_{\max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes | 16 |
| Aerosol-tight ¹ | No |
| Permissible temperature range autoclavable °C | 134 |

¹Tested by HPA, Porton-down, UK

Table 7. Thermo Scientific 120V 60Hz

| Centrifuge | SL 8 |
|--|-----------|
| Catalog # | 75007220 |
| Weight empty [kg] | 1.0 |
| Maximum permissible load [g] | 24 x 0.2 |
| Maximum speed n_{\max} [rpm] | 13300 |
| Maximum RCF value at n_{\max} | 16810 |
| Max. / min. radius [cm] | 8.5 / 2.0 |
| Pitch angle [°] | 90 |
| Accel. / braking time [s] | 14 / 24 |
| Sample heating at n_{\max} [° C] referred to ambient temperature of 23 °C, running time 60 minutes | 16 |
| Aerosol-tight ¹ | No |
| Permissible temperature range autoclavable °C | 134 |

¹Tested by HPA, Porton-down, UK

Accessories

| Article | No. |
|--|----------|
| Capillaries | 76000923 |
| Sealing Kit | 75000964 |
| Rotor Seal Replacement | 75003437 |
| Replacement Linear Scale Reading Graph | 76000938 |

Thermo Scientific Auto-Lock Rotor Exchange

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- “Rotor Installation” on page 18
- “Removing the Rotor” on page 19

Rotor Installation



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

This rotor is equipped with an Auto-Lock™-system.

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

Proceed as follows:

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

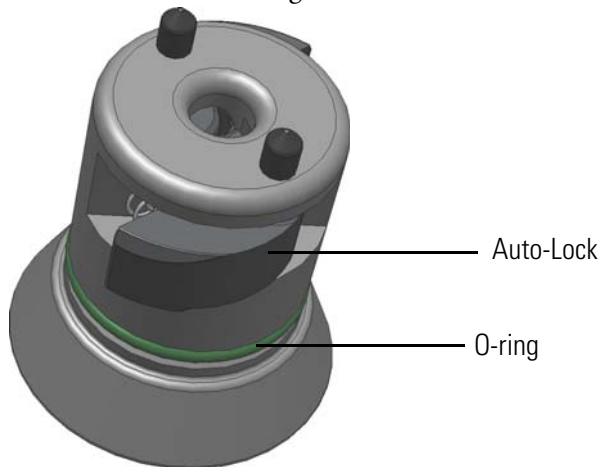


Figure 1. Auto-Lock

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



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

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



WARNING If the rotor cannot be properly locked in place after several attempts, then the Auto-Lock is defective and you are not permitted to operate the rotor. Check for any damage to the rotor. Damaged rotors must not be used. Keep the hub area clear of objects.



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



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

4. Close the centrifuge door.

Removing the Rotor

To remove the rotor, proceed as follows:

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

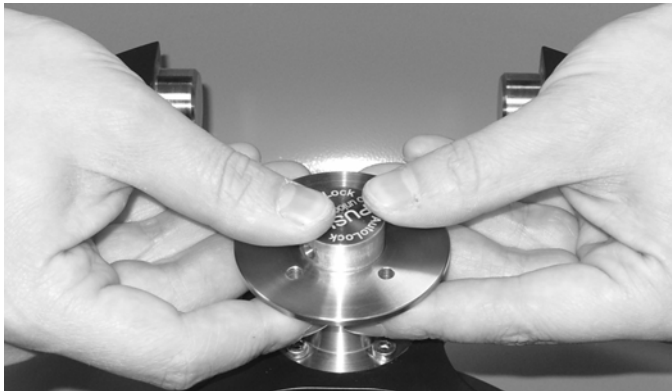


Figure 2. Handling of Auto-Lock

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Removing the Rotor

Rotor Loading

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- “Filling the Hematocrit Capillaries” on page 22
- “Rotor Temperature Range” on page 22
- “Duration” on page 23
- “Rotor Loading” on page 23
- “Maximum Loading” on page 24
- “Using the Reading Graph” on page 24
- “Rotor Life-time” on page 25

Before a Run

1. Please read and observe the safety instructions contained in these operating instructions and in the instructions for use.
2. Check the rotor and all accessory parts for damages such as cracks, scratches or traces of corrosion.
3. Check the rotor chamber, the centrifuge spindle and the Auto-Lock.
4. Check the rotor suitability using the “[Chemical Compatibility Chart](#)” on [page 39](#).

Filling the Hematocrit Capillaries

Note Mind the lifetime of the capillaries.

1. Fill the hematocrit capillary (760000923) with a blood column of approximately 65 mm. Make sure that the second opening remains dry.
2. Close the dry end of the hematocrit capillary with sealing putty (75000964). To do this, push the hematocrit capillary vertically into the sealing putty until its rim touches the sealing putty’s plate.

Tilt it slightly and pull the hematocrit capillary carefully out of the putty. Make sure that the capillaries are well sealed with the sealing putty.



WARNING The rotor cannot be used for aerosol-tight applications. The O-ring on the rotor lock has the function to secure the rotor lid when screwed on. The external lid lip cannot be sealed.

Rotor Temperature Range



CAUTION Operate the rotor in a temperature range between -9°C and +40°C only. A pre-tempering in a freezer below -9°C is not allowed.

Note The rotor can warm up in ventilated centrifuges. Temperature above 45°C the samples can be damaged. Let the rotor cool down between two runs.

Duration

The duration depends on the RCF-value. For a clear separation the run should last at least 5 minutes. The following values are suggested for reproducible results.

| Speed rpm | Duration in Minutes |
|-----------|---------------------|
| 13300 | 8 |

Explanation of RCF-Value

The relative centrifugal force (RCF) is given as a multiple of the force of gravity g . It is a unitless numerical value which is used to compare the separation or sedimentation capacity of various centrifuges, since it is independent of the type of device. Only the centrifuging radius and the speed come into play in it:

$$\text{RCF} = 11,18 \times \left(\frac{n}{1000} \right)^2 \times r$$

r = centrifuging radius in cm

n = rotational speed in rpm

The maximum RCF value is related to the maximum radius of the tube opening.

Remember that this value is reduced depending on the tubes and adapters used.

This can be accounted for in the calculation above if required.

Rotor Loading

1. Place the hematocrit capillary with its closed end pointing outwards (towards the rim of the rotor) horizontally into the hematocrit rotor. The hematocrit capillary must touch the sealing (7500 3437). The sealing protects the sensible capillaries from the hard rotor rim. The capillaries can break during a run when the sealing is missing.



CAUTION Ensure that a balancing hematocrit capillary is placed opposite in order to avoid imbalance and possible damage.

If not all places are filled with hematocrit capillaries, they must be placed with an opposite.

2. Close the rotor lid by turning it clockwise.



CAUTION Damaged parts must be replaced immediately.

Maximum Loading

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

The safety system of the centrifuge requires that you do not overload the rotor.

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

- Reduce the fill level.
- Reduce the speed.

Use the table or the formula:

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

n_{adm} = admissible speed

n_{max} = maximum speed

| Actual Load (g/cavity) | RPM _{max} |
|------------------------|--------------------|
| 0.2 | 13300 |
| 0.3 | 10859 |
| 0.4 | 9405 |
| 0.5 | 8412 |
| 0.6 | 7679 |
| 0.7 | 7109 |
| 0.8 | 6650 |
| 0.9 | 6270 |
| 1.0 | 5948 |

Using the Reading Graph

The reading graph (76000938) is supplied with the rotor. To read the values, proceed as follows:

1. Remove the hematocrit capillaries one by one from the rotor.

Note Be careful not to shake up the sample while removing. If the samples have been shaken up during removal, they can be centrifuge again.

2. Place the bottom end of the hematocrit capillary on the zero line with the blood column and the upper end of the plasma column on the 100% line of the graph.

The dividing line between erythrocytes and plasma indicates the percentage of packed cells.

Note Be careful to place the hematocrit capillary at a right angle to the zero line.

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.

Maintenance and Care

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- “Cleaning Intervals” on page 28
- “Cleaning” on page 29
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- “Decontamination” on page 32
- “Autoclaving” on page 33
- “Thermo Fisher Scientific Service” on page 33

Cleaning Intervals

For the sake of personal, environmental, and material protection, you have to clean and if necessary disinfect the centrifuge on a regular basis.

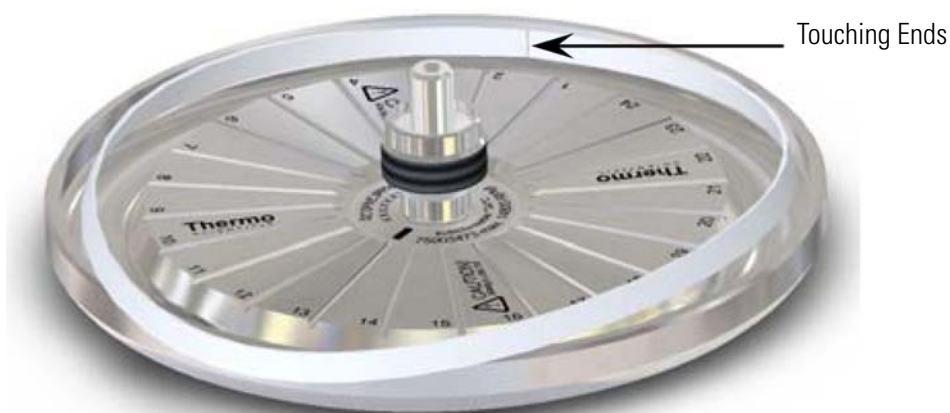
| Maintenance | Recommended Interval |
|---------------------|------------------------|
| Clean rotor chamber | Daily or when polluted |
| Clean rotor | Daily or when polluted |
| Accessories | Daily or when polluted |



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.

Replace Sealing

1. Remove the old sealing.
2. Form the new sealing into a ring without twisting it.
3. Put the touching ends into the rotor groove so that they are placed between two capillary slots.



Press the cushion ring completely into the groove, avoiding creases or waves.

How To Deal With Broken Hematocrit Capillary Tubes



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.

Broken capillary tubes have sharp edges and are a risk of injury

1. Remove the lid of the Hematocrit Rotor carefully.
2. Remove the larger pieces of the capillary tubes with tweezers.
3. Remove the rotor.
4. Remove the sealing slowly and carefully with the tweezers.
5. Clean and disinfect the rotor as described below.
6. Place a new sealing.

Cleaning

When cleaning the centrifuge:

- 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 (part no. 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 centrifuge and accessories as follows:

1. Open the centrifuge.
2. Turn off the centrifuge.
3. Pull out the power supply plug.
4. Grasp the rotor with both hands and lift it vertically off the centrifuge spindle.
5. Remove the centrifuge tubes and adapters.
6. Use a neutral cleaning agent with a pH 6-8 for cleaning.
7. Dry all of the rotors and accessories after cleaning with a cloth or in a warm air cabinet at a maximum temperature of 50 °C.
8. Clean the housing of the centrifuge as needed.
 - After cleaning, treat the entire surface of aluminum parts with corrosion protection oil (part no. 70009824). Also treat the cavities with oil.
 - Tread the bolt of the swing out rotor with bolt grease (part no. 75003786).



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

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

Disinfection

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



WARNING Infectious material can get into the centrifuge when a tube breaks or as a result of spills. Keep in mind the risk of infection when touching the rotor and take all necessary precautions.

In case of contamination, make sure that others are not put at risk.

Decontaminate the affected parts immediately.

Take other precautions if need be.

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

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



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 (spray or soak in solution). Adhere strictly to the given application times.
7. Be sure the disinfectant can drain off the rotor.
8. Rinse the rotor and rotor lid thoroughly with water and then rub down.
9. Dispose of the disinfectant according to the applicable guidelines.
10. Dry all of the rotors and accessories after cleaning with a cloth or in a warm air cabinet at a maximum temperature of 50 °C.
 - After cleaning, treat the entire surface of aluminum parts with corrosion protection oil (part no. 70009824). Also treat the cavities with oil.
 - Tread the bolt of the swing out rotor with bolt grease (part no. 75003786).

Decontamination

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



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



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

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

Disinfect the rotor and accessories as follows:

1. Open the centrifuge.
2. Turn off the centrifuge.
3. Pull out the power supply plug.
4. Grasp the rotor with both hands and lift it vertically off the centrifuge spindle.
5. Remove the centrifuge tubes and 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 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 (part no. 70009824). Also treat the cavities with oil.
 - Tread the bolt of the swing out rotor with bolt grease (part no. 75003786).

Autoclaving

1. Before autoclaving clean rotor and accessories.
2. Place the rotor on a flat surface.
 - Rotors and adapter can be autoclaved at 121 °C.
 - The maximum permissible autoclave cycle is 20 minutes at 121 °C.

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

Note No chemical additives are permitted in the steam.



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



WARNING Dangerous materials through leaky seals. The O-ring of a sealed bucket will be damaged through heat exposure. Remove it before autoclaving a sealed bucket. Use a new O-ring.

Thermo Fisher Scientific Service

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

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

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

RCF-Values

| Speed (rpm) | R _{min} | R _{max} | RCF R _{min} | RCF R _{max} |
|-------------|------------------|------------------|----------------------|----------------------|
| 300 | 2.0 | 8.5 | 2 | 9 |
| 400 | 2.0 | 8.5 | 4 | 15 |
| 500 | 2.0 | 8.5 | 6 | 24 |
| 600 | 2.0 | 8.5 | 8 | 34 |
| 700 | 2.0 | 8.5 | 11 | 47 |
| 800 | 2.0 | 8.5 | 14 | 61 |
| 900 | 2.0 | 8.5 | 18 | 77 |
| 1000 | 2.0 | 8.5 | 22 | 95 |
| 1100 | 2.0 | 8.5 | 27 | 115 |
| 1200 | 2.0 | 8.5 | 32 | 137 |
| 1300 | 2.0 | 8.5 | 38 | 161 |
| 1400 | 2.0 | 8.5 | 44 | 186 |
| 1500 | 2.0 | 8.5 | 50 | 214 |
| 1600 | 2.0 | 8.5 | 57 | 243 |
| 1700 | 2.0 | 8.5 | 65 | 275 |
| 1800 | 2.0 | 8.5 | 72 | 308 |
| 1900 | 2.0 | 8.5 | 81 | 343 |
| 2000 | 2.0 | 8.5 | 89 | 380 |
| 2100 | 2.0 | 8.5 | 99 | 419 |
| 2200 | 2.0 | 8.5 | 108 | 460 |
| 2300 | 2.0 | 8.5 | 118 | 503 |
| 2400 | 2.0 | 8.5 | 129 | 547 |
| 2500 | 2.0 | 8.5 | 140 | 594 |
| 2600 | 2.0 | 8.5 | 151 | 642 |
| 2700 | 2.0 | 8.5 | 163 | 693 |
| 2800 | 2.0 | 8.5 | 175 | 745 |
| 2900 | 2.0 | 8.5 | 188 | 799 |
| 3000 | 2.0 | 8.5 | 201 | 855 |
| 3100 | 2.0 | 8.5 | 215 | 913 |
| 3200 | 2.0 | 8.5 | 229 | 973 |
| 3300 | 2.0 | 8.5 | 244 | 1035 |
| 3400 | 2.0 | 8.5 | 258 | 1099 |

A RCF-Values

| Speed (rpm) | R _{min} | R _{max} | RCF R _{min} | RCF R _{max} |
|-------------|------------------|------------------|----------------------|----------------------|
| 3500 | 2.0 | 8.5 | 274 | 1164 |
| 3600 | 2.0 | 8.5 | 290 | 1232 |
| 3700 | 2.0 | 8.5 | 306 | 1301 |
| 3800 | 2.0 | 8.5 | 323 | 1372 |
| 3900 | 2.0 | 8.5 | 340 | 1445 |
| 4000 | 2.0 | 8.5 | 358 | 1520 |
| 4100 | 2.0 | 8.5 | 376 | 1597 |
| 4200 | 2.0 | 8.5 | 394 | 1676 |
| 4300 | 2.0 | 8.5 | 413 | 1757 |
| 4400 | 2.0 | 8.5 | 433 | 1840 |
| 4500 | 2.0 | 8.5 | 453 | 1924 |
| 4600 | 2.0 | 8.5 | 473 | 2011 |
| 4700 | 2.0 | 8.5 | 494 | 2099 |
| 4800 | 2.0 | 8.5 | 515 | 2189 |
| 4900 | 2.0 | 8.5 | 537 | 2282 |
| 5000 | 2.0 | 8.5 | 559 | 2376 |
| 5100 | 2.0 | 8.5 | 582 | 2472 |
| 5200 | 2.0 | 8.5 | 605 | 2570 |
| 5300 | 2.0 | 8.5 | 628 | 2669 |
| 5400 | 2.0 | 8.5 | 652 | 2771 |
| 5500 | 2.0 | 8.5 | 676 | 2875 |
| 5600 | 2.0 | 8.5 | 701 | 2980 |
| 5700 | 2.0 | 8.5 | 726 | 3088 |
| 5800 | 2.0 | 8.5 | 752 | 3197 |
| 5900 | 2.0 | 8.5 | 778 | 3308 |
| 6000 | 2.0 | 8.5 | 805 | 3421 |
| 6100 | 2.0 | 8.5 | 832 | 3536 |
| 6200 | 2.0 | 8.5 | 860 | 3653 |
| 6300 | 2.0 | 8.5 | 887 | 3772 |
| 6400 | 2.0 | 8.5 | 916 | 3892 |
| 6500 | 2.0 | 8.5 | 945 | 4015 |
| 6600 | 2.0 | 8.5 | 974 | 4140 |
| 6700 | 2.0 | 8.5 | 1004 | 4266 |
| 6800 | 2.0 | 8.5 | 1034 | 4394 |
| 6900 | 2.0 | 8.5 | 1065 | 4524 |
| 7000 | 2.0 | 8.5 | 1096 | 4656 |
| 7100 | 2.0 | 8.5 | 1127 | 4790 |

| Speed (rpm) | R _{min} | R _{max} | RCF R _{min} | RCF R _{max} |
|-------------|------------------|------------------|----------------------|----------------------|
| 7200 | 2.0 | 8.5 | 1159 | 4926 |
| 7300 | 2.0 | 8.5 | 1192 | 5064 |
| 7400 | 2.0 | 8.5 | 1224 | 5204 |
| 7500 | 2.0 | 8.5 | 1258 | 5345 |
| 7600 | 2.0 | 8.5 | 1292 | 5489 |
| 7700 | 2.0 | 8.5 | 1326 | 5634 |
| 7800 | 2.0 | 8.5 | 1360 | 5782 |
| 7900 | 2.0 | 8.5 | 1395 | 5931 |
| 8000 | 2.0 | 8.5 | 1431 | 6082 |
| 8100 | 2.0 | 8.5 | 1467 | 6235 |
| 8200 | 2.0 | 8.5 | 1503 | 6390 |
| 8300 | 2.0 | 8.5 | 1540 | 6547 |
| 8400 | 2.0 | 8.5 | 1578 | 6705 |
| 8500 | 2.0 | 8.5 | 1616 | 6866 |
| 8600 | 2.0 | 8.5 | 1654 | 7028 |
| 8700 | 2.0 | 8.5 | 1692 | 7193 |
| 8800 | 2.0 | 8.5 | 1732 | 7359 |
| 8900 | 2.0 | 8.5 | 1771 | 7527 |
| 9000 | 2.0 | 8.5 | 1811 | 7697 |
| 9100 | 2.0 | 8.5 | 1852 | 7869 |
| 9200 | 2.0 | 8.5 | 1893 | 8043 |
| 9300 | 2.0 | 8.5 | 1934 | 8219 |
| 9400 | 2.0 | 8.5 | 1976 | 8397 |
| 9500 | 2.0 | 8.5 | 2018 | 8576 |
| 9600 | 2.0 | 8.5 | 2061 | 8758 |
| 9700 | 2.0 | 8.5 | 2104 | 8941 |
| 9800 | 2.0 | 8.5 | 2147 | 9127 |
| 9900 | 2.0 | 8.5 | 2192 | 9314 |
| 10000 | 2.0 | 8.5 | 2236 | 9503 |
| 10100 | 2.0 | 8.5 | 2281 | 9694 |
| 10200 | 2.0 | 8.5 | 2326 | 9887 |
| 10300 | 2.0 | 8.5 | 2372 | 10082 |
| 10400 | 2.0 | 8.5 | 2418 | 10278 |
| 10500 | 2.0 | 8.5 | 2465 | 10477 |
| 10600 | 2.0 | 8.5 | 2512 | 10678 |
| 10700 | 2.0 | 8.5 | 2560 | 10880 |
| 10800 | 2.0 | 8.5 | 2608 | 11084 |

A RCF-Values

| Speed (rpm) | R _{min} | R _{max} | RCF R _{min} | RCF R _{max} |
|-------------|------------------|------------------|----------------------|----------------------|
| 10900 | 2.0 | 8.5 | 2657 | 11291 |
| 11000 | 2.0 | 8.5 | 2706 | 11499 |
| 11100 | 2.0 | 8.5 | 2755 | 11709 |
| 11200 | 2.0 | 8.5 | 2805 | 11921 |
| 11300 | 2.0 | 8.5 | 2855 | 12134 |
| 11400 | 2.0 | 8.5 | 2906 | 12350 |
| 11500 | 2.0 | 8.5 | 2957 | 12568 |
| 11600 | 2.0 | 8.5 | 3009 | 12787 |
| 11700 | 2.0 | 8.5 | 3061 | 13009 |
| 11800 | 2.0 | 8.5 | 3113 | 13232 |
| 11900 | 2.0 | 8.5 | 3166 | 13457 |
| 12000 | 2.0 | 8.5 | 3220 | 13684 |
| 12100 | 2.0 | 8.5 | 3274 | 13913 |
| 12200 | 2.0 | 8.5 | 3328 | 14144 |
| 12300 | 2.0 | 8.5 | 3383 | 14377 |
| 12400 | 2.0 | 8.5 | 3438 | 14612 |
| 12500 | 2.0 | 8.5 | 3494 | 14848 |
| 12600 | 2.0 | 8.5 | 3550 | 15087 |
| 12700 | 2.0 | 8.5 | 3606 | 15327 |
| 12800 | 2.0 | 8.5 | 3663 | 15570 |
| 12900 | 2.0 | 8.5 | 3721 | 15814 |
| 13000 | 2.0 | 8.5 | 3779 | 16060 |
| 13100 | 2.0 | 8.5 | 3837 | 16308 |
| 13200 | 2.0 | 8.5 | 3896 | 16558 |
| 13300 | 2.0 | 8.5 | 3955 | 16810 |

Chemical Compatibility Chart

| CHEMICAL | MATERIAL | ALUMINUM | ANODIC COATING for ALUMINIUM | BUNA N | CELLULOSE ACETATE BUTYRATE | POLYURETHANE ROTOR PAINT | COMPOSITE Carbon Fiber/Epoxy | DELTRIN® | ETHYLENE PROPYLENE | GLASS | NEOPRENE | NORYL® | NYLON | PET ¹ , POLYCLEAR®, CLEARCRIMP®, CCCLEARCRIMP® | 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 | 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 | S | M | S | S | S | |
| Ammonium Hydroxide (10%) | U | U | S | U | S | S | M | S | 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 | 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 | S | - | U | |
| Ammonium Phosphate | U | - | S | - | S | S | S | S | S | S | S | S | S | - | S | S | M | - | S | S | S | S | S | S | M | S | S | S | |
| Ammonium Sulfate | U | M | S | - | S | S | U | S | S | S | S | S | S | S | S | S | S | - | S | S | S | S | S | 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 | S | U | S | |
| Sodium Hydroxide (<1%) | U | - | M | S | S | S | - | - | S | M | S | S | - | S | M | M | S | 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 | S | M | S | S | - | U | |

B Chemical Compatibility Chart

| CHEMICAL | MATERIAL | ALUMINUM | ANODIC COATING for ALUMINIUM | BUNA N | CELLULOSE ACETATE BUTYRATE | POLYURETHANE ROTOR PAINT | COMPOSITE Carbon Fiber/Epoxy DELRIN® | ETHYLENE PROPYLENE | GLASS | NEOPRENE | NORYL® | NYLON | PET ¹ , POLYCLEAR®, CLEARCRIMP®, CCCLEARCRIMP® | POLYALLUMER | POLYCARBONATE | POLYESTER, GLASS THERMOSET | POLYETHERIMIDE | POLYTHYLENE | POLYPROPYLENE | POLYSULFONE | POLYVINYL CHLORIDE | RULON A®, TEFLON® | SILICONE RUBBER | STAINLESS STEEL | TITANIUM | TYGON® | VITON® |
|-----------------------|----------|----------|------------------------------|--------|----------------------------|--------------------------|--------------------------------------|--------------------|-------|----------|--------|-------|---|-------------|---------------|----------------------------|----------------|-------------|---------------|-------------|--------------------|-------------------|-----------------|-----------------|----------|--------|--------|
| Barium Salts | M | U | S | - | S | S | S | S | S | S | S | S | S | S | S | M | - | S | S | S | S | S | S | M | S | S | S |
| Benzene | S | S | U | U | S | U | M | U | S | U | U | S | U | U | U | M | U | M | U | U | U | S | U | U | S | U | S |
| Benzyl Alcohol | S | - | U | U | - | - | M | M | - | M | - | S | U | U | U | U | U | U | U | - | M | S | M | - | S | - | S |
| Boric Acid | U | S | S | M | S | S | U | S | S | S | S | S | S | S | S | S | U | S | S | S | S | S | S | S | S | S | S |
| Cesium Acetate | M | - | S | - | S | S | S | - | S | S | S | S | - | S | S | - | - | S | S | S | S | S | S | M | S | S | S |
| Cesium Bromide | M | S | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | M | S | S | S |
| Cesium Chloride | M | S | S | U | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | M | S | S | S |
| Cesium Formate | M | S | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | M | S | S | S |
| Cesium Iodide | M | S | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | M | S | S | S |
| Cesium Sulfate | M | S | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | M | S | S | S |
| Chloroform | U | U | U | U | S | S | M | U | S | U | U | M | U | M | U | U | U | M | M | U | U | S | U | U | U | M | S |
| Chromic Acid (10%) | U | - | U | U | S | U | U | - | S | S | S | U | S | S | M | U | M | S | S | U | M | S | M | U | S | S | S |
| Chromic Acid (50%) | U | - | U | U | - | U | U | - | - | - | S | U | U | S | M | U | M | S | S | U | M | S | - | U | M | - | S |
| Cresol Mixture | S | S | U | - | - | - | S | - | S | U | U | U | U | U | U | - | - | U | U | - | U | S | S | S | S | U | S |
| Cyclohexane | S | S | S | - | S | S | S | U | S | U | S | S | U | U | U | M | S | M | U | M | M | S | U | M | M | U | S |
| Deoxycholate | S | S | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | S | S | S | S |
| Distilled Water | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S |
| Dextran | M | S | S | S | S | S | S | - | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | M | S | S | S |
| Diethyl Ether | S | S | U | U | S | S | S | U | S | U | U | S | U | U | U | U | U | U | U | U | U | S | S | S | S | M | U |
| Diethyl Ketone | S | - | U | U | - | - | M | - | S | U | - | S | - | M | U | U | U | M | M | - | U | S | - | - | S | U | U |
| Diethylpyrocarbonate | S | S | U | - | S | S | S | - | S | S | U | S | U | S | U | - | - | S | S | S | M | S | S | S | S | S | S |
| Dimethylsulfoxide | S | S | U | U | S | S | S | - | S | U | S | S | U | S | U | U | - | S | S | U | U | S | S | S | S | U | U |
| Dioxane | M | S | U | U | S | S | M | M | S | U | U | S | U | M | U | U | - | M | M | M | U | S | S | S | S | U | U |
| Ferric Chloride | U | U | S | - | - | - | M | S | - | M | - | S | - | S | - | - | - | S | S | - | - | - | M | U | S | - | S |
| Acetic Acid (Glacial) | S | S | U | U | S | S | U | M | S | U | S | U | U | U | U | U | M | S | U | M | U | S | U | U | S | - | U |

| CHEMICAL | MATERIAL | ALUMINUM | ANODIC COATING for ALUMINIUM | BUNA N | CELLULOSE ACETATE BUTYRATE | POLYURETHANE ROTOR PAINT | COMPOSITE Carbon Fiber/Epoxy | DELRIN® | ETHYLENE PROPYLENE | GLASS | NEOPRENE | NORYL® | NYLON | PET ¹ , POLYCLEAR®, CLEARCRIMP®, CCCLEARCRIMP® | POLYALLOMER | POLYCARBONATE | POLYESTER, GLASS THERMOSET | POLYETHERIMIDE | POLYRTHYLENE | POLYPROPYLENE | POLYSULFONE | POLYVINYL CHLORIDE | RULON A®, TEFLON® | SILICONE RUBBER | STAINLESS STEEL | TITANIUM | TYGON® | VITON® |
|---------------------------|----------|----------|------------------------------|--------|----------------------------|--------------------------|------------------------------|---------|--------------------|-------|----------|--------|-------|---|-------------|---------------|----------------------------|----------------|--------------|---------------|-------------|--------------------|-------------------|-----------------|-----------------|----------|--------|--------|
| Acetic Acid (5%) | S | S | M | S | S | S | M | S | 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 | 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 | 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 | - | U | S | U | - | S | - | S |
| Ethylene Glycol | S | S | S | S | S | S | S | S | S | S | S | S | S | - | S | U | S | S | S | S | S | S | S | S | M | S | M | S |
| Ethylene Oxide Vapor | S | - | U | - | - | U | - | - | S | U | - | S | - | S | M | - | - | S | S | S | U | S | U | S | S | S | U | |
| Ficoll-Hypaque® | M | S | S | - | S | S | S | - | S | S | S | S | - | S | S | - | S | S | S | S | S | S | S | S | M | S | S | S |
| Hydrofluoric Acid (10%) | U | U | U | M | - | - | U | - | - | U | U | S | - | S | M | U | S | S | S | S | M | S | U | U | U | - | - | |
| Hydrofluoric Acid (50%) | U | U | U | U | - | - | U | - | - | U | U | U | U | S | U | U | U | S | S | M | M | S | U | U | U | - | M | |
| Hydrochloric Acid (conc.) | U | U | U | U | - | U | U | M | - | U | M | U | U | M | U | U | U | - | S | - | U | S | U | U | U | - | - | |
| Formaldehyde (40%) | M | M | M | S | S | S | S | M | S | S | S | S | M | S | S | S | U | S | S | M | S | S | S | M | S | M | U | |
| Glutaraldehyde | S | S | S | S | - | - | S | - | S | S | S | S | S | S | S | - | - | S | S | S | - | - | S | S | S | - | - | |
| Glycerol | M | S | S | - | S | S | S | S | S | S | S | S | S | S | S | S | - | S | S | S | S | S | S | S | S | S | S | |
| Guanidine Hydrochloride | U | U | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | U | S | S | S | |
| Haemo-Sol® | S | S | S | - | - | - | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | S | S | S | S | |
| Hexane | S | S | S | - | S | S | S | - | S | S | U | S | U | M | U | S | S | U | S | S | M | S | U | S | S | U | S | |
| Isobutyl Alcohol | - | - | M | U | - | - | S | S | - | U | - | S | U | S | S | M | S | S | S | - | S | S | S | - | S | - | S | |
| Isopropyl Alcohol | M | M | M | U | S | S | S | S | U | S | S | U | S | U | M | S | S | S | S | S | S | S | S | S | M | M | M | |
| 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 | U | S | 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 | |

B Chemical Compatibility Chart

| CHEMICAL | MATERIAL | ALUMINUM | ANODIC COATING for ALUMINIUM | BUNA N | CELLULOSE ACETATE BUTYRATE | POLYURETHANE ROTOR PAINT | COMPOSITE Carbon Fiber/Epoxy | DELRIN® | ETHYLENE PROPYLENE | GLASS | NEOPRENE | NORYL® | NYLON | PET ¹ , POLYCLEAR®, CLEARCRIMP®, CCCLEARCRIMP® | POLYALLOMER | POLYCARBONATE | POLYESTER, GLASS THERMOSET | POLYETHERIMIDE | POLYTHYLENE | POLYPROPYLENE | POLYSULFONE | POLYVINYL CHLORIDE | RULON A®, TEFLON® | SILICONE RUBBER | STAINLESS STEEL | TITANIUM | TYGON® | VITON® | |
|-----------------------------|----------|----------|------------------------------|--------|----------------------------|--------------------------|------------------------------|---------|--------------------|-------|----------|--------|-------|---|-------------|---------------|----------------------------|----------------|-------------|---------------|-------------|--------------------|-------------------|-----------------|-----------------|----------|--------|--------|---|
| Potassium Hydroxide (5%) | | U | U | S | S | S | S | M | - | S | S | S | S | - | S | U | S | S | S | S | S | S | S | M | U | M | S | U | |
| Potassium Hydroxide (conc.) | | U | U | M | U | - | - | M | - | M | S | S | - | U | M | U | U | U | S | M | - | M | U | - | U | U | - | U | |
| Potassium Permanganate | | S | S | S | - | S | S | S | - | S | S | S | U | S | S | S | M | - | S | M | S | U | S | S | M | S | U | S | |
| Calcium Chloride | | M | U | S | S | S | S | S | S | S | S | S | S | S | S | M | S | - | S | S | S | S | S | S | M | S | S | S | |
| Calcium Hypochlorite | | M | - | U | - | S | M | M | S | - | M | - | S | - | S | M | S | - | S | S | S | M | S | M | U | S | - | S | |
| Kerosene | | S | S | S | - | S | S | S | U | S | M | U | S | U | M | M | S | - | M | M | M | S | S | U | S | S | U | S | |
| Sodium Chloride (10%) | | S | - | S | S | S | S | S | S | - | - | - | S | S | S | S | S | - | S | S | S | S | - | S | S | M | - | S | |
| Sodium Chloride (sat'd) | | U | - | S | U | S | S | S | - | - | - | - | S | S | S | S | S | - | S | S | - | S | - | S | S | M | - | S | |
| Carbon Tetrachloride | | U | U | M | S | S | U | M | U | S | U | U | S | U | M | U | S | S | M | M | S | M | M | M | M | U | S | S | |
| Aqua Regia | | U | - | U | U | - | - | U | - | - | - | - | - | U | U | U | U | U | U | U | U | - | - | - | - | - | S | - | M |
| Solution 555 (20%) | | S | S | S | - | - | - | S | - | S | S | S | S | S | S | S | S | - | - | S | S | S | - | S | S | S | S | S | |
| Magnesium Chloride | | M | S | S | - | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | M | S | S | S | |
| Mercaptoacetic Acid | | U | S | U | - | S | M | S | - | S | M | S | U | U | U | U | - | S | U | U | S | M | S | U | S | S | S | S | |
| Methyl Alcohol | | S | S | S | U | S | S | M | S | S | S | S | S | U | S | U | M | S | S | S | S | S | S | S | M | S | M | U | |
| Methylene Chloride | | U | U | U | U | M | S | S | U | S | U | U | S | U | U | U | U | U | M | U | U | U | S | S | M | U | S | U | |
| Methyl Ethyl Ketone | | S | S | U | U | S | S | M | S | S | U | U | S | U | S | U | U | U | S | S | U | U | S | S | S | S | U | U | |
| Metrizamide® | | M | S | S | - | S | S | S | - | S | S | S | S | - | S | S | - | - | S | S | S | S | S | S | M | S | S | S | |
| Lactic Acid (100%) | | - | - | S | - | - | - | - | - | - | M | S | U | - | S | S | S | M | S | S | - | M | S | M | S | S | - | S | |
| Lactic Acid (20%) | | - | - | S | S | - | - | - | - | - | M | S | M | - | S | S | S | S | S | S | S | M | S | M | S | S | - | S | |
| N-Butyl Alcohol | | S | - | S | U | - | - | S | - | - | S | M | - | U | S | M | S | S | S | S | M | M | S | M | - | S | - | S | |
| N-Butyl Phthalate | | S | S | U | - | S | S | S | - | S | U | U | S | U | U | U | M | - | U | U | S | U | S | M | M | S | U | S | |
| N, N-Dimethylformamide | | S | S | S | U | S | M | S | - | S | S | U | S | U | S | U | U | - | S | S | U | U | S | M | S | S | S | U | |

| CHEMICAL | MATERIAL | ALUMINUM | ANODIC COATING for ALUMINIUM | BUNA N | CELLULOSE ACETATE BUTYRATE | POLYURETHANE ROTOR PAINT | COMPOSITE Carbon Fiber/Epoxy DELRIN® | ETHYLENE PROPYLENE | GLASS | NEOPRENE | NORYL® | NYLON | PET ¹ , POLYCLEAR®, CLEARCRIMP®, CCCLEARCRIMP® | POLYALLOMER | POLYCARBONATE | POLYESTER, GLASS THERMOSET | POLYETHERIMIDE | POLYRTHYLENE | POLYPROPYLENE | POLYSULFONE | POLYVINYL CHLORIDE | RULON A®, TEFLON® | SILICONE RUBBER | STAINLESS STEEL | TITANIUM | TYGON® | VITON® |
|----------------------------------|----------|----------|------------------------------|--------|----------------------------|--------------------------|--------------------------------------|--------------------|-------|----------|--------|-------|---|-------------|---------------|----------------------------|----------------|--------------|---------------|-------------|--------------------|-------------------|-----------------|-----------------|----------|--------|--------|
| 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 | S | U | S | S | S |
| Sodium Sulfate | U | S | S | - | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | M | S | S | S |
| Sodium Sulfide | S | - | S | S | - | - | - | S | - | - | - | S | S | S | U | U | - | - | S | - | - | - | S | S | M | - | S |
| Sodium Sulfite | S | S | S | - | S | S | S | S | M | S | S | S | S | S | S | M | - | S | S | S | S | S | S | S | S | S | S |
| Nickel Salts | U | S | S | S | S | S | - | S | S | S | - | - | S | S | S | S | - | S | S | S | S | S | S | M | S | S | S |
| Oils (Petroleum) | S | S | S | - | - | - | S | U | S | S | S | S | U | U | M | S | M | U | U | S | S | S | U | S | S | S | S |
| Oils (Other) | S | - | S | - | - | - | S | M | S | S | S | S | U | S | S | S | S | U | S | S | S | S | - | S | S | M | S |
| Oleic Acid | S | - | U | S | S | S | U | U | S | U | S | S | M | S | S | S | S | S | S | S | S | S | M | U | S | M | M |
| Oxalic Acid | U | U | M | S | S | S | U | S | S | S | S | S | U | S | U | S | S | S | S | S | S | S | S | U | M | S | S |
| Perchloric Acid (10%) | U | - | U | - | S | U | U | - | S | M | M | - | - | M | U | M | S | M | M | - | M | S | U | - | S | - | S |
| Perchloric Acid (70%) | U | U | U | - | - | U | U | - | S | U | M | U | U | M | U | U | U | M | M | U | M | S | U | U | S | U | S |
| Phenol (5%) | U | S | U | - | S | M | M | - | S | U | M | U | U | S | U | M | S | M | S | U | U | S | U | M | M | M | S |
| Phenol (50%) | U | S | U | - | S | U | M | - | S | U | M | U | U | U | U | S | U | M | U | U | S | U | 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 | M | S | U | S | S | S | U | S | S | S | S | U | S | U | M | S | M | S | S |
| Pyridine (50%) | U | S | U | U | S | U | U | - | U | S | S | U | U | M | U | U | - | U | S | M | U | S | U | U | U | U | U |

B Chemical Compatibility Chart

| CHEMICAL | MATERIAL | ALUMINUM | ANODIC COATING for ALUMINIUM | BUNA N | CELLULOSE ACETATE BUTYRATE | POLYURETHANE ROTOR PAINT | COMPOSITE Carbon Fiber/Epoxy | DELRIN® | ETHYLENE PROPYLENE | GLASS | NEOPRENE | NORYL® | NYLON | PET ¹ , POLYCLEAR®, CLEARCRIMP®, CCCLEARCRIMP® | POLYALLOMER | POLYCARBONATE | POLYESTER, GLASS THERMOSET | POLYETHERIMIDE | POLYRTHYLENE | POLYPROPYLENE | POLYSULFONE | POLYVINYL CHLORIDE | RULON A®, TEFLON® | SILICONE RUBBER | STAINLESS STEEL | TITANIUM | TYGON® | VITON® |
|--------------------------|----------|----------|------------------------------|--------|----------------------------|--------------------------|------------------------------|---------|--------------------|-------|----------|--------|-------|---|-------------|---------------|----------------------------|----------------|--------------|---------------|-------------|--------------------|-------------------|-----------------|-----------------|----------|--------|--------|
| Rubidium Bromide | M | S | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | M | S | S | S | |
| Rubidium Chloride | M | S | S | - | S | S | S | - | S | S | S | S | S | S | S | - | - | S | S | S | S | S | S | M | S | S | S | |
| Sucrose | M | S | S | - | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | |
| Sucrose, Alkaline | M | S | S | - | S | S | S | - | S | S | S | S | S | S | U | S | S | S | S | S | S | S | S | M | S | S | S | |
| Sulfosalicylic Acid | U | U | S | S | S | S | S | - | S | S | S | U | S | S | S | - | S | S | S | - | S | S | S | U | S | S | S | |
| Nitric Acid (10%) | U | S | U | S | S | U | U | - | S | U | S | U | - | S | S | S | S | S | S | S | S | S | M | S | S | S | S | |
| Nitric Acid (50%) | U | S | U | M | S | U | U | - | S | U | S | U | U | M | M | U | M | M | M | S | S | S | U | S | S | M | S | |
| Nitric Acid (95%) | U | - | U | U | - | U | U | - | - | U | U | U | U | M | U | U | U | U | M | U | U | S | U | S | S | - | S | |
| Hydrochloric Acid (10%) | U | U | M | S | S | S | U | - | S | S | S | U | U | S | U | S | S | S | S | S | S | S | S | U | M | S | S | |
| Hydrochloric Acid (50%) | U | U | U | U | S | U | U | - | S | M | S | U | U | M | U | U | S | S | S | S | 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 | 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 | 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 | 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 | |

| CHEMICAL | MATERIAL | ALUMINUM | ANODIC COATING for ALUMINIUM | BUNA N | CELLULOSE ACETATE BUTYRATE | POLYURETHANE ROTOR PAINT | COMPOSITE Carbon Fiber/Epoxy | DELTRIN® | ETHYLENE PROPYLENE | GLASS | NEOPRENE | NORYL® | NYLON | PET ¹ , POLYCLEAR®, CLEARCRIMP®, CCCLEARCRIMP® | POLYALLOMER | POLYCARBONATE | POLYESTER, GLASS THERMOSET | POLYETHERIMIDE | POLYRTHYLENE | POLYPROPYLENE | POLYSULFONE | POLYVINYL CHLORIDE | RULON A®, TEFLON® | SILICONE RUBBER | STAINLESS STEEL | TITANIUM | TYGON® | VITON® | |
|------------------------|----------|----------|------------------------------|--------|----------------------------|--------------------------|------------------------------|----------|--------------------|-------|----------|--------|-------|---|-------------|---------------|----------------------------|----------------|--------------|---------------|-------------|--------------------|-------------------|-----------------|-----------------|----------|--------|--------|---|
| 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 | 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 | |

¹Polyethyleneterephthalate

Key

S Satisfactory

M 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 U = Unsatisfactory, not recommended.

-- No data available. Because no organized chemical resistance data exists for materials under the stress of centrifugation, when in doubt we recommend pretesting sample lots. suggest testing, using sample to avoid loss of valuable material.

Chemical resistance data is included only as a guide to product use.

Contact

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|---------------------------------|--------------------------------------|
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