Thermo Scientific

H-6000A HBB-6 HLR-6

Instruction Manual

11243-22 October 2010

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Table of contents

This manual is a guide for the use of

Thermo Scientific H-6000A, HBB-6 and HLR-6 Rotor

Data herein has been verified and is believed adequate for the intended use of the rotor. Because failure to follow the recommendations set forth in this manual could produce personal injury or property damage, always follow the recommendations set forth herein. Thermo Fisher Scientific does not guarantee results and assumes no obligation for the performance of rotors or other products that are not used in accordance with the instructions provided. This publication is not a license to operate under, nor a recommendation to infringe upon, any process patents.

Publications prior to the Issue Date of this manual may contain data in apparent conflict with that provided herein. Please consider all data in this manual to be the most current.

WARNING, CAUTION, and NOTE within the text of this manual are used to emphasize important and critical instructions.

WARNING informs the operator that injuries or material damage or contamination could occur.

CAUTION informs the operator that material damage could occur.

NOTE highlights essential information.

CAUTION and WARNING are accompanied by a hazard symbol and appear near the information they correspond to.

Important Safety Information

Certain potentially dangerous conditions are inherent to the use of all centrifuge rotors. To ensure safe operation of this rotor, anyone using it should be aware of all safe practices and take all precautions described below and throughout this manual.

WARNING

When using radioactive, toxic, or pathogenic materials, be aware of all characteristics of the materials and the hazards associated with them in the event leakage occurs during centrifugation. In the event of a rotor failure, neither the centrifuge nor the rotor can protect you from particles dispersed in the air. To protect yourself, we recommend to take additional precautions to prevent exposure to these materials, for example, use of controlled ventilation or isolation areas.

When using radioactive, toxic, or pathogenic materials, be aware of all characteristics of the materials and the hazards associated with them in the event leakage occurs during centrifugation. In the event of a rotor failure, neither the centrifuge nor the rotor can protect you from particles dispersed in the air. To protect yourself, we recommend additional precautions be taken to prevent exposure to these materials, for example, use of controlled ventilation or isolation areas.

Always be aware of the possibility of contamination when using radioactive, toxic, or pathogenic materials. Take all necessary precautions and use appropriate decontamination procedures if exposure occurs.

Never use any material capable of producing flammable or explosive vapors or creating extreme exothermic reactions.

Never exceed the maximum rated speed of the installed rotor; to do so can cause rotor failure.

Always reduce (derate) rotor speed as instructed in this manual whenever the compartment load exceeds the maximum allowable compartment load specified. “Compartment Loads in Excess of Design Mass” on page 2-5. Failure to reduce rotor speed under these conditions can cause rotor failure.

CAUTION

Do not expose aluminum rotor components to: strong acids, bases, or alkaline laboratory detergents, liquid chlorine bleach or salts (chlorides) of heavy metals such as cesium, lead, silver, or mercury. Use of these materials with aluminum can cause a chemical reaction that initiates corrosion.

Do not operate or precool a rotor at the critical speed, as this will have a detrimental effect on centrifuge component life. "Critical Speed" on page 2-3.

Do not operate the rotor unless it is symmetrically balanced as described in this manual. Operating the centrifuge with the rotor out of balance can cause damage to the centrifuge drive assembly.

Do not operate the rotor without the cover in position and the rotor locked to the centrifuge drive. "Rotor Installation" on page 3-4.

Always maintain the rotor in the recommended manner. The rotor and accessories must be clean and inspected regularly. Do not use rotor showing signs of corrosion or cracking. See "CARE and MAINTENANCE" on page 5-1.

Do not autoclave or expose any aluminum rotor parts to temperatures in excess of 121°C.

DESCRIPTION

This manual contains information required to operate and maintain the Thermo Scientific H-6000A, HBB-6, or HLR-6 Swinging Bucket Rotor. If you require additional information regarding operation or maintenance, please contact Thermo Fisher Scientific for assistance. Contact the nearest Thermo Fisher Scientific office (see Appendix C: "Contact Information") or your local representative for Thermo Fisher Scientific products. Thermo Fisher Scientific product information is available on our internet web site at http:// www.thermo.com.

Contents

Rotor Description

The Thermo Scientific H-6000A, HBB-6, and HLR-6 are six-place swinging bucket rotors designed for use in the Thermo Scientific RC 3B, RC 3B+ , RC 3C, RC 3C+, RC 3BP™ and RC 3BP™+ Centrifuges. Each rotor has a maximum speed of 5000 rpm[1] and can generate relative centrifugal force (RCF, or g-force) values in excess of 7200 (refer to Table 1-1 for the specifications of each rotor).

Each rotor consists of a stainless steel rotor body, an aluminum alloy windshield and cover, and six aluminum alloy buckets. The three rotors all use the same body, windshield and cover assembly, but they are differentiated by three different bucket configurations.

- Each H-6000A bucket can hold a large plastic bottle filled with up to 1000 ml of sample, one blood bag set, or any of several reducing adapters that accept numerous smaller tube or bottle sizes.
- Each HBB-6 bucket can hold one blood bag set filled with up to 550 ml of blood (refer to "HBB-6 Rotor" on page 3-9 for more detail).
- Each HLR-6 bucket can hold one blood bag set filled with up to 550 ml of blood, and incorporates a unique outboard filter holder (refer to "HLR-6 Rotor" on page 3-12 for more detail).

Optional clear plastic Biocontainment Seal covers are available for use with the H-6000A round threaded buckets. Optional Microplate Carriers are available for use in any of the three rotors.

CAUTION Microplate carriers are designed to withstand the forces incurred at the maximum speed listed. The microplates will not withstand these forces. To avoid microplate breakage and therefore sample loss as well as possible damage to the rotor or centrifuge, always be aware of the performance capabilities of the microplates you are using. Refer to manufacturer's specification and do not exceed those capabilities.

Rotor Specifications

Table 1-1 on the next page provides the basic specifications for the H-6000A, HBB-6, and HLR-6 rotors.

Table 1-1. Rotor Specifications

	H-6000A	HBB-6	HLR-6
Number of Places	6	6	6
Maximum Rotor Speed (rpm)	5000	5000	5000
Maximum RCF (g-force)	7277	7129	7205
K Factor at maximum speed	7823	8248	8355
Low Temperature Control at Maximum Speed*	4°C**	4°C	4°C
Design Mass*** (Maximum Compartment Mass)	2575 g	2800 g	2800 g

[1]Speed in revolutions per minute (rpm) is related to angular velocity, ω, according to the following:

$$\omega = (\text{rpm})\left(\frac{2\pi}{60}\right) = (\text{rpm})(0.10472)$$

Where ω = rad/s. All further references in this manual to speed will be designated as rpm.

Table 1-1. Rotor Specifications

	H-6000A	HBB-6	HLR-6
Critical Speed (rpm)	450	450	450
Rotor Code****	20-29	20-29	20-29
Rotor Diameter	55.4 cm (21.8 inch)	55.4 cm (21.8 inch)	55.4 cm (21.8 inch)
Rotor Mass			
body with windshield only	18.7 kg (41.3 lb)	18.7 kg (41.3 lb)	18.7 kg (41.3 lb)
rotor complete, including buckets & rotor cover, empty	27.4 kg (60.4 lb)	28.0 kg (61.7 lb)	31.0 kg (68.3 lb)

*Control to lower temperatures can be attained at lower operating speeds.

**6°C in older RC-3B and RC-3C 50 Hz centrifuges.

***Design Mass specified includes the mass of the complete, fully-loaded bucket assembly (including the bucket, plus sample, bags, tubing, filters, bucket liners, filter holders, balancing discs, tubes, bottles, sealing assemblies, adapters, or bucket covers).

****A Rotor Code setting is required for RC-3C or RC-3C PLUS centrifuges, to ensure proper acceleration, deceleration, temperature control and RCF calculation. The centrifuge's RCF display function will be calculated based on the H-6000A bucket maximum radius value, which is slightly greater than the radii of either the HBB-6 or the HLR-6. Microplate RCF values will be significantly less than those displayed (refer to RCF table in "Relative Centrifugal Force (RCF) Determination" on page 2-4). For a description of the rotor code function and how to enter it, refer to your centrifuge instruction manual.

Parts and Accessories

Parts for the H-6000A, HBB-6, and HLR-6 rotors are shown in figure 1-1 and described in Table 1-2. To order replacement parts or accessories, contact your local representative for Thermo Fisher Scientific products. Be sure to provide the catalog number and description of the item required, along with the rotor name and serial number when ordering.

Table 1-2. Rotor Parts (keyed to Figure 1-1)

Item No.	Catalog No.	Description	Quantity
-	11237	Rotor Cover Assembly (includes items 1, 4, 5, 7, and 8, below)	1
1	11232	Rotor Cover	1
2	44040	H-6000A Rotor Buckets (2/pkg)	3 pkgs
	11754	HBB-6 Rotor Buckets (2/pkg)	3 pkgs
	11351	HLR-6 Rotor Buckets (2/pkg), with one Filter Holder* for each	3 pkgs
3	11235	Rotor Drive Adapter	1
4	67483	Retaining Ring	1
5	11009	Speed Decal	1
6	11238	Locking Stud	1
7	11272	Cover Knob	1
8	11227	Nylon Washer	2
9	61835	Cap Screw, 10-32 x 5/8 inch lg	3
-	11273	Windshield Replacement Kit	1

*Filter Holder supplied (Cat. No. 11360) is designed to hold both filters of a Pall Leukotrap™ System: one Pall RCM1 plus one Pall ATS LPL.

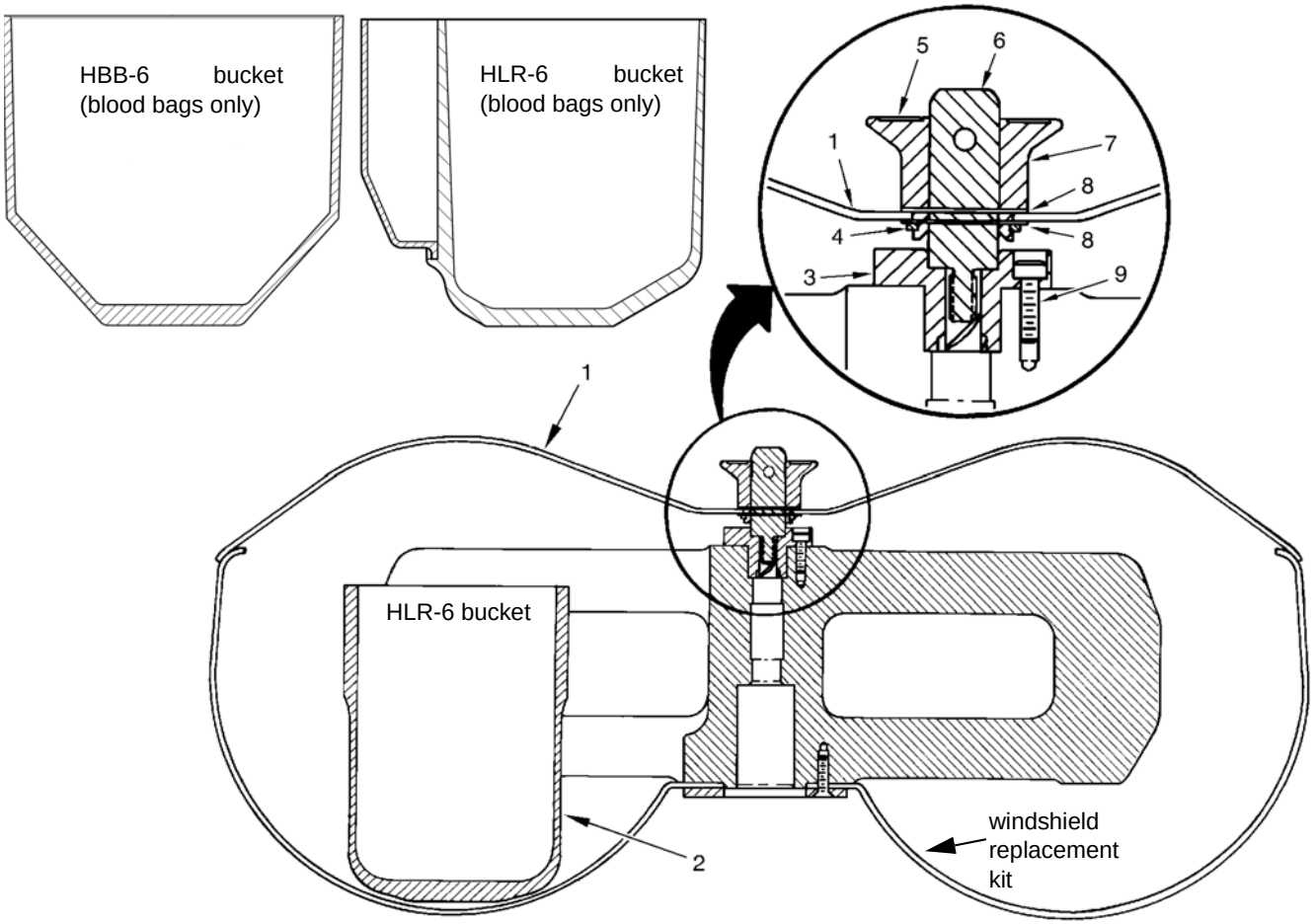

Figure 1-1. Parts of the H-6000A, HBB-6, and HLR-6 Rotors

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Table 1-3. Accessories Supplied

Catalog No.	Description	Quantity
00335	Rubber Balancing Discs, assorted, 6/pkg	1
12259	Rotor Cleaning Kit	1
11246	Rotor Locking Tool	1
65811	Loctite® 222, 10 ml	1
11243	Instruction Manual	1

Table 1-4. Other Accessories (not supplied)

Catalog No	Description	Quantity
11445	Rotor Extractor Tool	1
11776	Sealing Covers for H-6000A Bucket	2/pkg

Table 1-4. Other Accessories (not supplied)

Catalog No	Description	Quantity
12995	Replacement O-rings for Sealing Covers	6/pkg
11267	Microplate Carriers	2/pkg
11785	Neoprene Pad only	1
11445	Rotor Extractor Tool	1
11758	HBB-6 Conversion Kit (set of 6 buckets)	1
11355	HLR-6 Conversion Kit (set of 6 buckets with 6 Filter Holders*)	1
11358	Bucket Liner for HLR-6	1
11365	Blood Bag Inserts for HLR-6	4/pkg

* Filter Holder supplied (Cat. No. 11360) is designed to hold both filters of a Pall Leukotrap™ System: one Pall RCM1 plus one Pall ATS LPL.

Tubes, Bottles, Adapters, and Bucket Liners

All three rotors accept Thermo Scientific adapters and bucket liners for running blood bags; the H-6000A also accepts a variety of Thermo Scientific tubes and bottles, as well as adapters for running those. For a complete list and description of products available for use with your rotor, please contact Thermo Fisher Scientific for assistance. Contact the nearest Thermo Fisher Scientific office (see Appendix C: “Contact Information”) or your local representative for Thermo Fisher Scientific products. Thermo Fisher Scientific product information is available on our internet web site at http://www.thermo.com.

SPECIAL CONSIDERATIONS

This chapter contains general information on the rotor and centrifuging for operation and includes important safety information.

Contents

Rotor Compartment Envelope

Note The information in this paragraph applies to the use of buckets without cover assemblies. Safe clearance is ensured when bucket cover assemblies are used. If covers are used, make sure that the tubes or bottles used do not touch the inside surface of the cover.

The rotor compartment envelope is that area within which the rotor bucket contents, which includes any tubes or bottles and adapter, must remain to ensure proper clearance and safe operation.

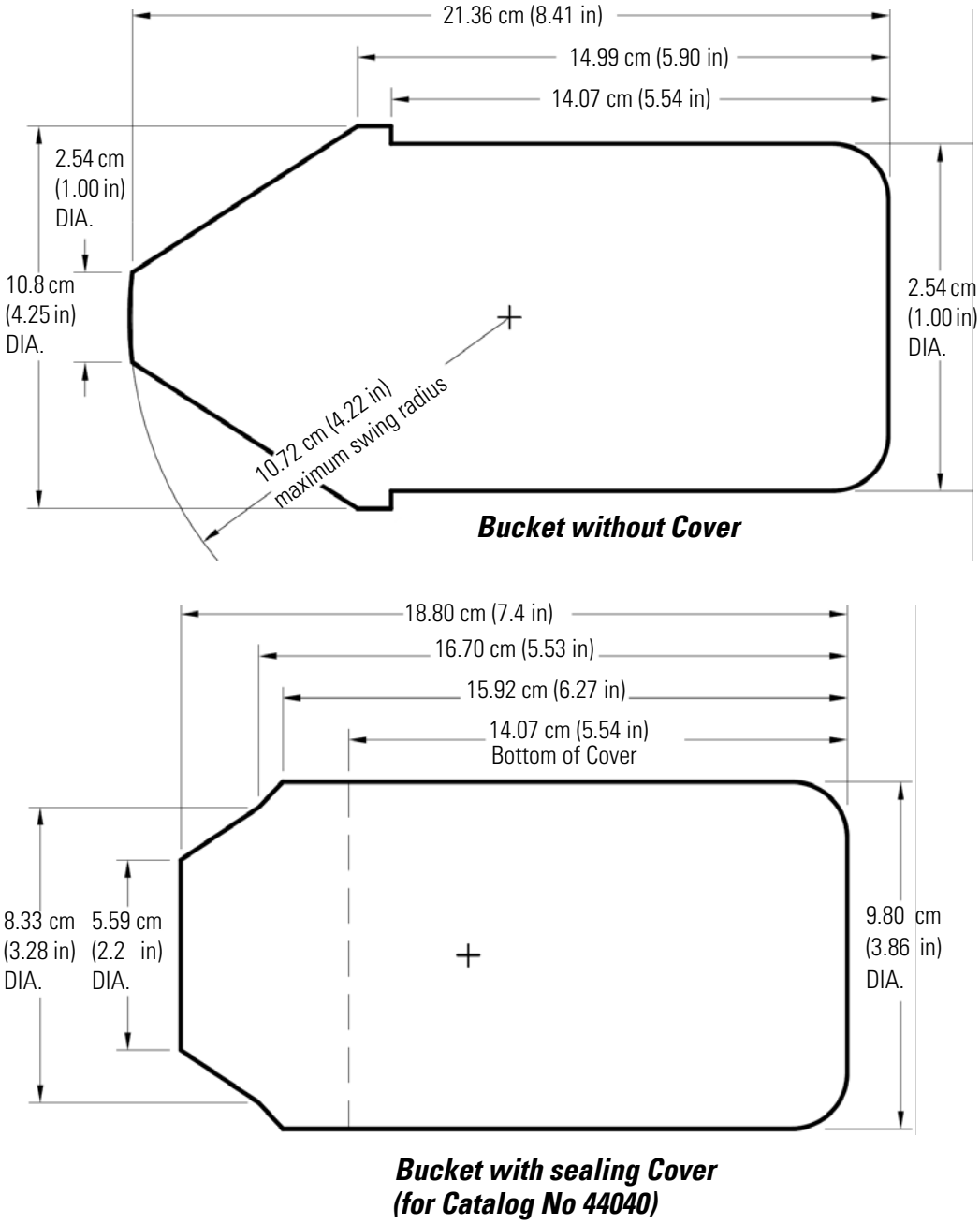


Figure 2-2. Rotor Compartment Envelope for H-6000A Rotor Buckets

In swinging bucket rotors, the swing clearance of the bucket and its contents as they swing from the vertical to the horizontal position during centrifugation is very important. The proper clearance must be allowed to prevent tubes, bottles, blood bags, or satellite bags from hitting the rotor body and breaking. Breaking results in loss of sample and possible damage to the rotor and the centrifuge.

H-6000A: The dimensions given in figure 2-1 should be used to make sure that the tubes or bottles (including covers) you intend to use with a particular adapter will allow for the proper clearance.

The dimensions given in figure 2-2 should be used to make sure that the microplates you intend to use with the optional microplate carriers will allow for the proper clearance.

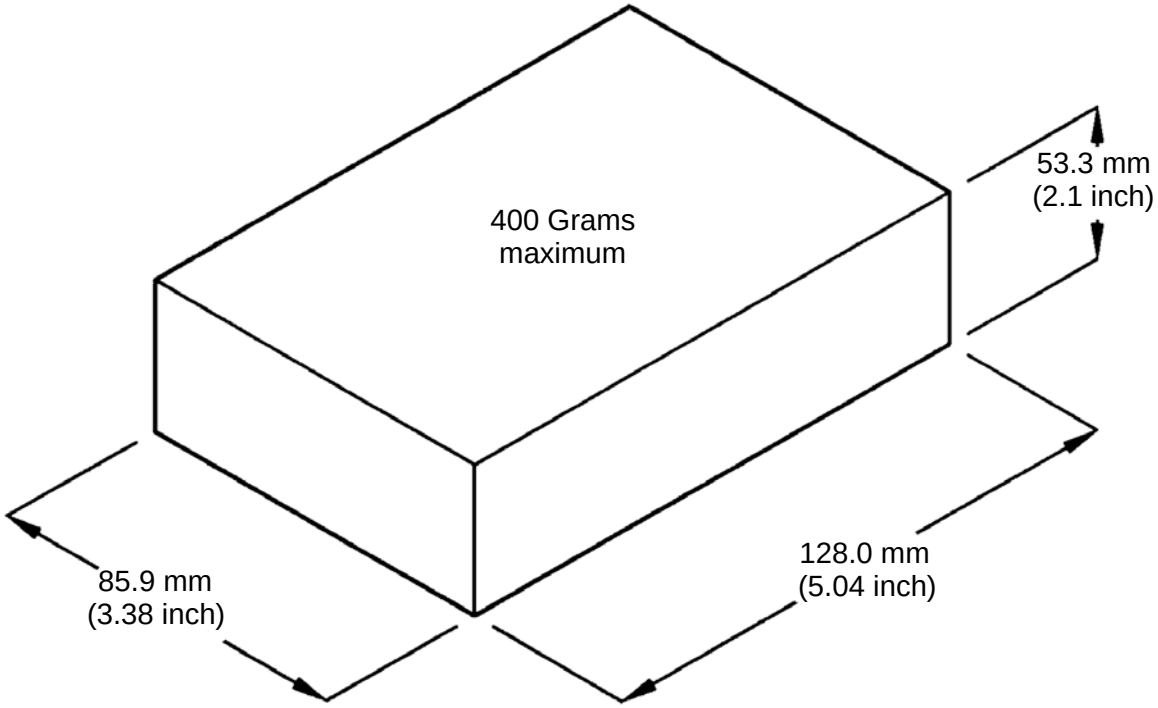


Figure 2-3. Rotor Compartment Envelope for optional Microplate Carriers (without pad)

Critical Speed

CAUTION Do not operate or precool a rotor at the critical speed, as this will have a detrimental effect on centrifuge component life.

The critical speed is that speed at which any rotor imbalance will produce a driving frequency equal to the resonant frequency of the rotating system (that is, the rotor and the centrifuge drive). At this speed, the rotor may produce large amplitude vibrations which can be felt in the instrument frame. Mass imbalance will contribute to increased vibration intensity at the critical speed. Operation at the critical speed will have a detrimental effect on centrifuge component life and therefore, should be avoided.

Relative Centrifugal Force (RCF) Determination

RCF refers to the force during centrifugation that moves the particulate outward from the center of rotation. This force is proportional to the radial distance and the square of the rotor speed. The RCF value is determined by the following formula:

$$RCF = 11.17(r)\left(\frac{rpm}{1000}\right)^2$$

when r = the radius in centimeters from the centerline of the rotor to the point in the tube where RCF value is required

and rpm = the rotor speed in revolutions per minute

Figure 2-3 defines maximum and minimum radii in the H-6000A (pictured), HBB-6, and HLR-6 rotors. Table 2-1 gives the RCF value at each radius at speeds from 500 rpm to 5,000 rpm (in increments of 500 rpm). The RCF value at any other speed or radius can be calculated by using the above formula.

Note The radii values given are the actual rotor specifications. The values do not take the height or thickness of tubes, bottles, adapters, or bucket liners into consideration.

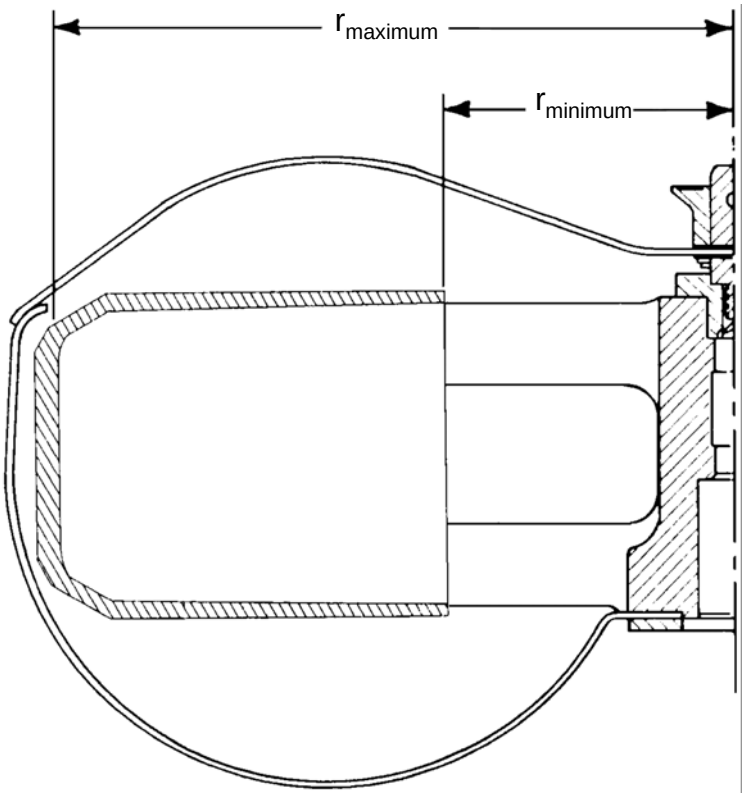


Figure 2-4. Rotor Radii for RCF Determination

Compartment Loads in Excess of Design Mass

WARNING Always reduce (derate) the maximum rotor speed of the installed rotor as instructed in this section whenever the compartment mass exceeds the design mass specified. Failure to reduce rotor speed under these conditions can cause rotor failure.

Maximum speed (5,000 rpm) is based on a recommended design mass, defined as the maximum mass that can safely be loaded into each rotor compartment for top-speed operation. To prevent rotor failure, the total contents for each rotor compartment including the bucket, adapter (if used), tubes and sample should not exceed the recommended figure unless the rotor speed is reduced proportionately.

Strict adherence to the maximum allowable compartment mass limitation specified is required to prevent rotor failure.

The design mass for each rotor compartment (that is, bucket and its contents) of the H-6000A Rotor is 2575 grams or 2.575 kg at 5000 rpm, and of the HBB-6 or HLR-6 Rotor is 2800 grams or 2.8 kg at 5000 rpm. The maximum run speed is based on the design mass - the maximum mass that a microplate carrier is designed to support at top-speed operation. A design mass of 462 grams per carrier (the rnicroplates and sample are not to exceed 400 grams, the weight of the pad is 62 grams) has been established for the rotor to be run at maximum speed. If the compartment mass is greater than that figure, the maximum allowable speed can be determined by using the following formula or the Reducing Curves shown in figure 2-4:

$$\text{Reduced Speed} = \text{maximum Speed} \sqrt{\frac{\text{maximum load}}{\text{actual load}}}$$

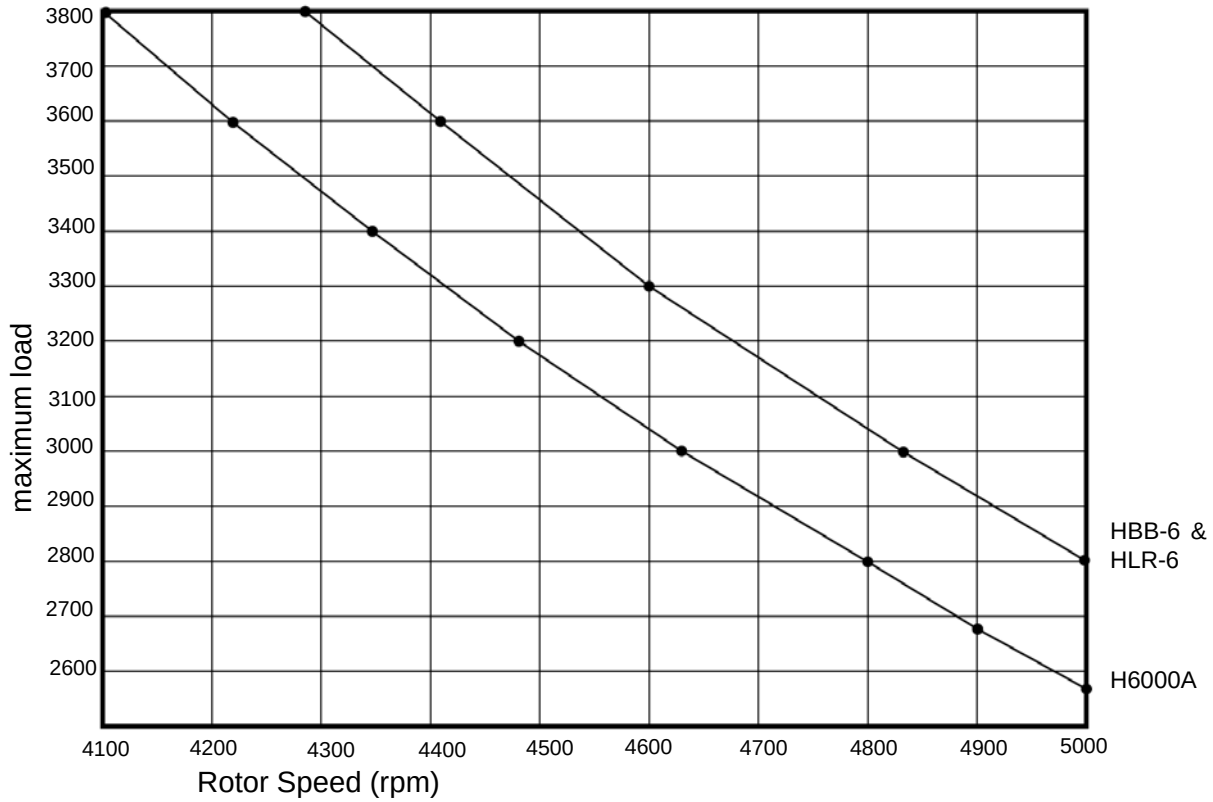


Figure 2-5. Speed Reducing Curves

An alternative Design Mass has been established for the optional Microplate Carriers (Catalog No. 11267, 2/pkg). Design Mass (not including the mass of the carrier) is 462 grams for each carrier, 62 grams of which is the pad. If actual mass of the microplates, sample and pad exceeds 462, use the formula above to be sure that set run speed does not exceed the Reduced Speed.

Chemical Compatibility

The critical components of the rotors that are apt to come in contact with solution are: the rotor body (stainless steel), the rotor buckets, windshield, rotor cover assembly, or optional microplate carriers (aluminum), filter holders (HLR-6, polyetherimide), optional bucket covers (H-6000A, polycarbonate), optional microplate carrier pads (neoprene) plus the material of the tubes, bottles, adapters, or bucket liners being used. Because no organized chemical resistance data exists for materials under the stress of centrifugation, this data is intended to be used only as a guide. Thermo Scientific recommends pretesting of sample lots when in doubt.

RUN PREPARATION

This chapter contains the information necessary to prepare an H-6000A, HBB-6, or HLR-6 rotor for operation and includes important safety information.

Contents

Prerun Safety Checks

To ensure safe performance of the rotor, before every run you should:

a. read the Safety Information Page at the front of this manual.

b. if the rotor is removed, before installing it: check the centrifuge chamber, drive spindle, and mounting surface of the rotor to be sure they are clean and free of scratches or burrs.

c. make sure that the rotor body (particularly the bolt area) and the buckets (particularly the bolt mating surfaces) have no burrs, scratches, cracks or signs of corrosion.

d. check the chemical compatibility of materials used (AppendixB: “Chemical Compatibility Chart”).

e. wipe the inside of the windshield to remove any liquid (that is, water, blood, or any other fluid) and any loose particles or objects.

f. make sure that a bucket is installed in all six places (even if some are to remain empty). Gently rock each bucket assembly slightly to be sure all buckets pivot freely on their bolts.

g. HLR-6: make sure that all six filter holders are snapped into place. One on the outboard side of each bucket (away from rotor center).

h. make sure that the rotor is symmetrically balanced. Equalize compartment mass by adjusting sample loads within bottles (or tubes), or by using rubber balancing discs (Catalog No. 00335).

i. be sure the proper environment has been selected for operation (such as controlled ventilation or isolation, if required).

j. H-6000A: all tubes and bottles must be wholly contained within boundaries specified in figure “Rotor Compartment Envelope for H-6000A Rotor Buckets” on page 2-2. If covers are used, make sure that the tubes or bottles used do not touch the inside surface of the cover.

k. HLR-6: make sure each bucket liner is fully seated in its bucket. The liner top edge should not extend more than 7 mm (1/4 inch) above the bucket top surface. Otherwise, remove bucket contents and reload the bucket so that the liner's angled bottom is oriented toward the rotor center, away from the filter holder.

l. before installing the rotor cover, make sure the rotor locking stud is tightened securely -if not tight, remove the stud, apply 2-3 drops of Loctite® 222 (supplied) to the threads, reinstall it and tighten securely.

CAUTION Before using tubes for the first time in the H-6000A rotor, place empty tubes in the proper adapters, put the adapters in the buckets, and install the buckets in the rotor. Then, check that the buckets swing freely to a horizontal position. If the tubes hit the rotor body, they are too long and should not be used.

Initial Assembly of a Thermo Scientific H-6000A, HBB-6 or HLR-6 Rotor

Note To reduce the potential damage in transit, your rotor has been packaged so that its windshield is not attached to its heavy rotor body. Because of this, a one-time assembly procedure must be performed before the rotor can be used.

Before beginning this procedure, inspect the parts to be sure they are not damaged in any way (see"Parts and Accessories" on page 1-3 for parts information).

Note The windshield has been dynamically balanced by affixing precise amounts of a putty-like balancing compound inside the windshield. During assembly (or later, during use or cleaning), be careful not to remove the compound, or increased imbalance will result.

To perform this procedure, you need a number 2 Phillips screwdriver and two support blocks at least 13 mm (1/2 inch) thick (books work as well). The parts required from the rotor shipping container are the rotor body, the windshield, the windshield retaining ring, the six flat screws, and the tube of Loctide 222®.

Instructions for assembly

1. Place the two support blocks on a sturdy surface, approximately 80 mm (3 inches) apart.
2. Orient the rotor body upside-down (with the lettering downwards), and position the body on the support blocks so that two armes are on each block and the silver-tone drive adapter extends downward between the blocks.
3. Place the windshield (upside-down) over the rotor body and align the six screw holes in the center of the windshield with those in the rotor body.

Note When aligning the six screw holes, be aware that one hole is offset (for balancing orientation) and will not align with the other five. For the windshield to seat properly on the rotor body, its rim must not be touching the support blocks.

4. Orient the windshield retaining ring with the screw hole counterbores facing up, then place it on the windshield, aligning the six screw holes.
5. Apply a drop of Loctide® 222 to the threads of one screw, then, being careful not to cross-thread the screw in the rotor body, thread the screw in until just snug in the retaining ring counterbore. Do not tighten yet. Do the same for each of the other five new screws.
6. When all six screws have been threaded in snug, use a cross-tightening technique and tighten the six srews securely.
7. Carefully lift the rotor assembly off the support blocks, and turn it upright on the work surface. Thereafter, to avoid twisting the windshield when moving the rotor, lift the rotor assembly using the rotor body arms. Refer to "Rotor Loading and Balancing" on page 3-5 for loading.

Note H-6000A/HBB-6/HLR-6 windshields are now available as replacement parts; order replacement kit catalog no. 11273.

Replacing the Rotor Windshield with Windshield Replacement Kit (Catalog No. 11273)

To perform this procedure, you need a number 2 Phillips screwdriver and two support blocks at least 13 mm (1/2 inch) thick (books work as well). The parts supplied are: one rotor windshield, six flat head screws, and one tube of Loctite® 222.

Before beginning this procedure, inspect the parts to be sure they are not damaged in any way.

Note The new windshield has been dynamically balanced by affixing precise amounts of a putty-like balancing compound inside the windshield. During assembly (or later, during use or cleaning), be careful not to remove the compound, or increased imbalance will result.

Replacement Instructions

1. Place the two support blocks on a sturdy surface, approximately 80 mm (3 inches) apart.
2. With the cover off, orient the rotor (with the damaged windshield) upside-down, and position the rotor body on the support blocks so that two rotor arms are on each block. Make sure that the silver-tone drive adapter is between the support blocks, and that the windshield rim is not touching the blocks.
3. Remove the six screws from the bottom of the rotor assembly, then remove the windshield retaining ring and the windshield. Discard the windshield and the six screws, but keep the windshield retaining ring for reassembly.
4. Place the new windshield (upside-down) over the rotor body and align the six screw holes in the center of the windshield with those in the rotor body.

Note When aligning the six screw holes, be aware that one hole is offset (for balancing orientation) and will not align with the other five. Also, for the windshield to seat properly on the rotor body, its rim must not be touching the support blocks.

5. Orient the windshield retaining ring (removed in step 3) with the screw hole counterbores facing up, then place it on the windshield, aligning the six screw holes.
6. Apply a drop of Loctite® 222 to the threads of one of the new screws, then, being careful not to cross-thread the screw in the rotor body, thread the screw in until just snug in the retaining ring counterbore. Do not tighten yet. Do the same for each of the other five new screws.
7. When all six screws have been threaded in snug, use a cross-tightening technique and tighten the six screws securely.
8. Carefully lift the rotor assembly off the support blocks, and turn it upright on the work surface. Thereafter, to avoid twisting the windshield when moving the rotor, lift the rotor assembly using the rotor body arms. Refer to the rotor manual for loading and use instructions.

Rotor Installation

Before installing the rotor, make sure that the rotor's center hole and centrifuge's square drive spindle are clean and dry, and free of nicks and scratches. Wipe these surfaces clean before installing the rotor.

Gently lower the rotor body onto the centrifuge's square drive spindle. A spiraling track in the rotor center hole is designed to guide the body into the proper position on the square spindle. When the rotor body is fully seated, the top of the drive spindle will be flush with the top of the drive adapter (see figure 2-5).

CAUTION The centrifuge spindle bearings can be damaged if the rotor is dropped on the drive spindle.

Apply two to three drops of Loctite® 222 (Catalog No. 65811, supplied), to the threads of the rotor locking stud (Catalog No. 11238, supplied). Thread the locking stud into the drive spindle counterclockwise (left-hand thread). Use the rotor locking tool (Catalog No. 11246, supplied) to tighten the locking stud and secure the rotor to the drive spindle.

CAUTION To prevent possible damage to the rotor or centrifuge, apply two or three drops of Loctite® #222 to the threads of the rotor locking stud. This should be done each time that the rotor is removed and reinstalled on the drive shaft.

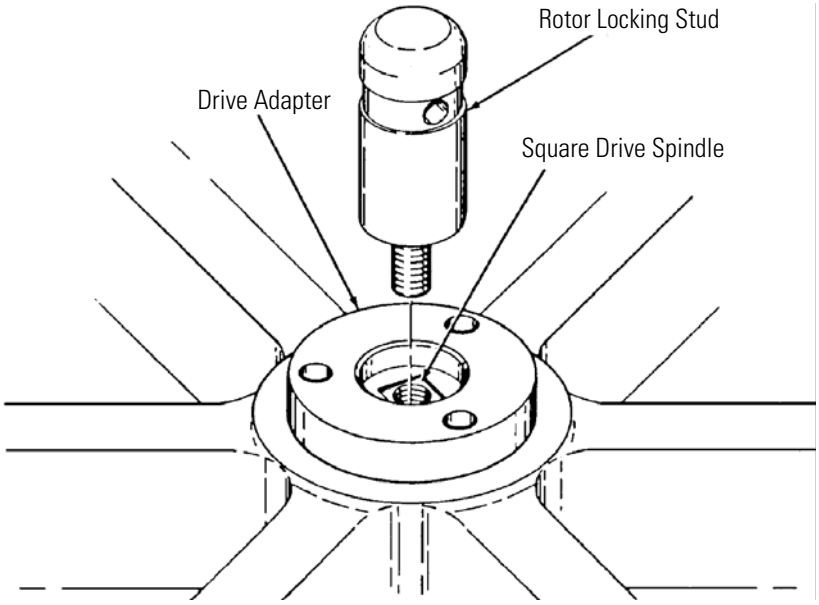


Figure 3-6. Rotor Installation

Rotor Loading and Balancing

If using an HBB-6 or HLR-6 rotor, we recommend that you read and understand the information in this section, but load the rotor as directed in "Blood Bag Set Packing and Loading (HBB-6 and HLR-6)" on page 3-8.

The design mass for each bucket must not be exceeded unless rotor speed is reduced as explained in "Compartment Loads in Excess of Design Mass" on page 2-5.

Always load and balance the rotor as follows:

- The contents of each rotor bucket (including bucket cover, if used) must allow for proper swing clearance ("Rotor Compartment Envelope" on page 2-2).
- Each bucket and its contents must be balanced with the opposing bucket to within 10 grams.
- The buckets must be symmetrically balanced. Equalize compartment mass by adjusting sample loads within bottles (or tubes), or by using rubber balancing discs (Catalog No. 00335).

CAUTION Always run all six buckets. If only two, three, or four buckets are loaded, place them in opposing rotor compartments and place empty buckets in the remaining compartments

1. The rotor is always to be run with all six buckets, but can be used with loaded buckets in two (2), three (3), four (4), or six (6) positions. The loaded buckets must be symmetrically positioned on the rotor as shown in figure 2-6 and empty buckets must be placed in the remaining positions.

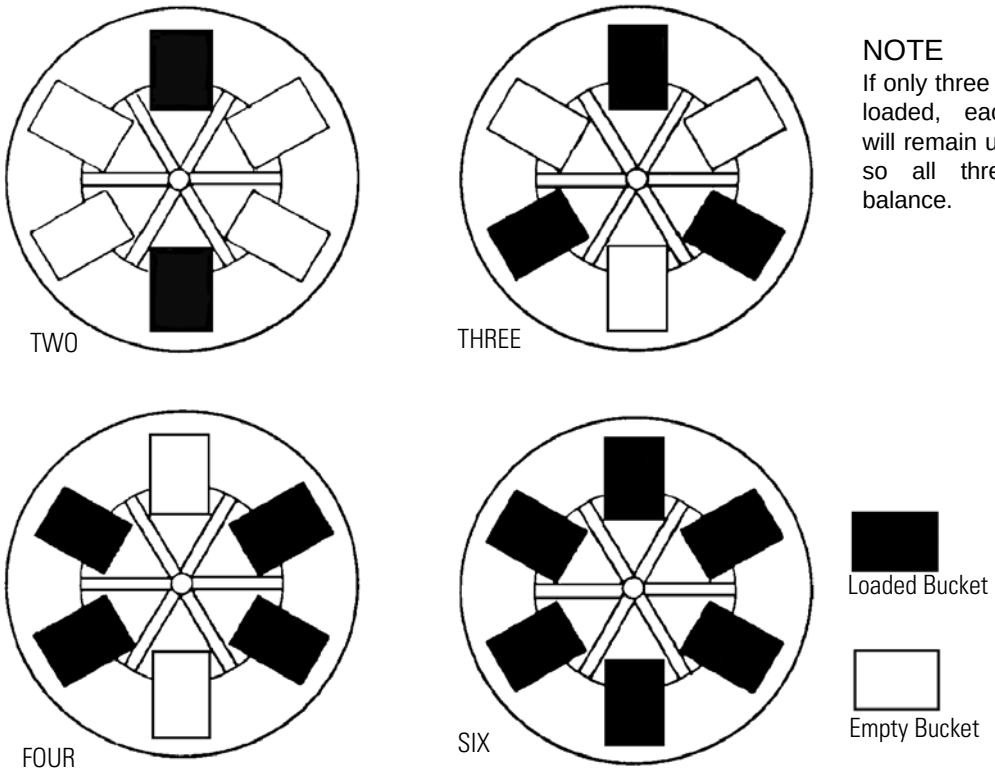


Figure 3-7. Compartment Loading and Balancing

Note Each bucket and its contents must be balanced with the opposing bucket to within 10 grams.

CAUTION Do not balance the load by placing liquid in the bucket around the outside of bottles, tubes, or blood bags. The liquid may exit the bucket during centrifugation causing deformation of the windshield due to the buildup of hydrostatic pressure.

2. Load the opposing buckets with the desired combination of tube(s) or bottle(s), adapter (if required) and sample or blood bag with sample and bucket liner or adapter. Opposing buckets must balance within 10 grams.

CAUTION When using plastic blood bags: Do not use rubber stoppers or similar objects to balance the rotor load. Damage to the centrifuge can result if the stopper exits the rotor bucket and becomes lodged between the rotor body and the windshield during centrifugation.

3. When using the rotor with blood bags to separate blood components:

It may be necessary to balance the loads of opposing buckets with rubber balancing discs because of unequal fills in individual bags. A set of six discs (catalog no. 00335) ranging in weight from 4 to 16 grams (approximate), is supplied with each rotor. These discs are soft and will not damage the blood bags.

H-6000A: We recommend the use of reducing adapters, Catalog No. 00511 or 00512, to improve the quality of the separation with 450 ml and 500 ml quantities of blood. Use of adapters will also lessen the chance of cracking and peeling of the label from the blood bag. If the label is damaged, the adhesive left on the blood bag may adhere to the rotor bucket and lift the bucket off of the rotor bolts when the bag is removed after centrifugation.

HBB-6: We recommend using adapters (Catalog No. 01094 or 01098), or bucket liners (Catalog No. 11751, divided, or 11756, undivided) to improve the quality of the separation of blood, and to simplify the bucket loading and unloading process.

HLR-6: We recommend the use of bucket liners (Catalog No. 11358) to improve the quality of the separation of blood, and to simplify the bucket loading and unloading process.

Contact the nearest Thermo Fisher Scientific office (see"Contact Information" on page D-1) or your local representative for Thermo Fisher Scientific products. Thermo Fisher Scientific product information is available on our internet web site at http://www.thermo.com.

Balancing Blood bags with rubber discs

When using the H-6000A, or HBB-6 rotors, it may be necessary to use rubber balancing discs to balance unequal weights in blood bags. Each rotor is supplied with a set of six (6) rubber balancing discs, ranging weight from four (4) grams to sixteen (16) grams.

Balance buckets using the rubber rotor balancing discs as follows:

1. Place a rotor bucket and a blood bag (side byside) on each side of a double-pan scale (see figure 1). If an adapter is used, place the adapter in the bucket.

Note If only one blood bag is to be processed, a bag of equal volume with water to act as a counterbalance weight in the oppossing bucket. Blood is more dense than water. If only one blood bag is to be processed, rubber balancing discs must be used.

2. Check that the load on either side of the scale is balanced within 10 grams. Place the balancing disc on the lighter side of the scale pan until the load is balanced within the 10 grams allowance.

Note Placing the rubber balancing disc(s) onto the scale pan rather than inside the bucket will make it easier to add or subtract discs until the proper balance (within 10 grams) is reached.

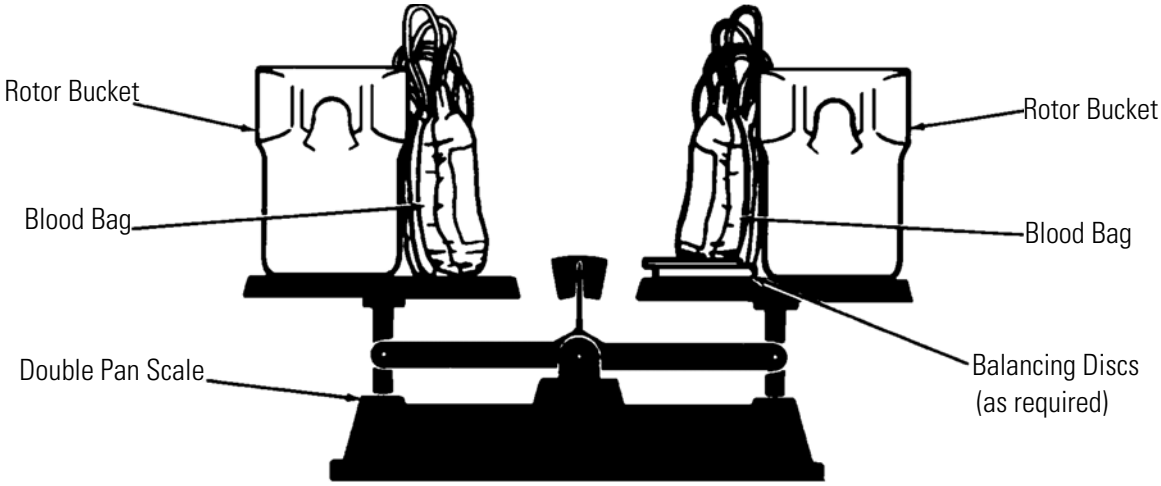


Figure 3-8. Balancing Blood Bags

3. After the load has been balanced, place the balancing disc(s) in the bottom of the bucket (or adapter if used), then insert the blood bag.

Blood Bag Set Packing and Loading (HBB-6 and HLR-6)

WARNING Always ensure that the blood bags, tabs, and tubing or satellite bags are properly secured inside each bucket to prevent them from becoming tangled around the rotor body during centrifugation. Failure to properly load blood bags in the rotor buckets can cause rotor failure. This could possible result in leakage or breakage of a blood bag(s) causing contamination of the blood product.

To prevent blood bags, tabs, tubing or satellite bags from becoming tangled around the rotor body or buckets, use one of the following procedures.[1] The procedures assume that the six rotor buckets are installed in the rotor so that they are fully seated on the bolts and swing freely.

[1]If additional protection is desired for containment of blood bag set components or contents (should leakage or breakage occur during centrifugation), we support the recommendation of the American Association of Blood Banks (AABB) to place each blood bag set in a separate plastic bag before insertion in the bucket liner or adapter

Note Always observe blood bag manufacturers' specified protocols and recommendations. Before using a new or untested type of blood bag or rotor/bucket/adapter, we recommend performing on-site validation and optimization to predetermine suitability with your particular applications and run parameters.

HBB-6 Rotor

We recommend using adapters (Catalog No. 01094 or 01098), or bucket liners (Catalog No. 11751, divided, or 11756, undivided) to improve the quality of the separation of blood, and to simplify the bucket loading and unloading process. We suggest the following procedures as ways to pack blood bag sets for the HBB-6 rotor.

1. Lay the blood bag set on a work surface. Place the whole blood unit label-down. Stack the satellite and additive bags nearby (if the bag set has any). Position the tubing out away from the bags. Using an elastic band, wrap and secure the administration tubing.

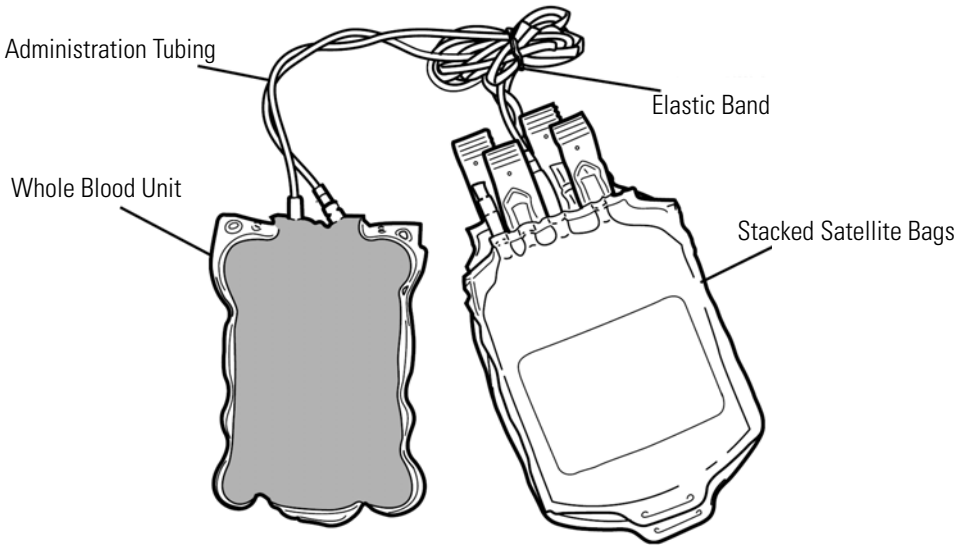
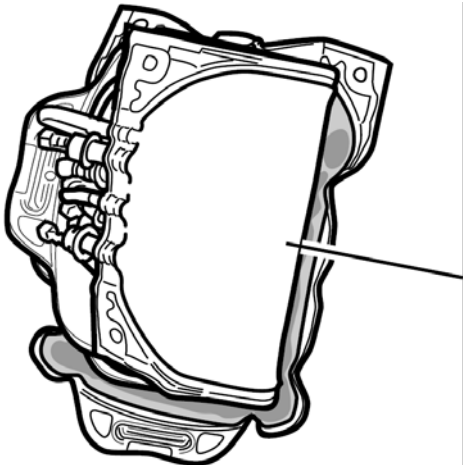


Figure 3-9. Blood Bag Set

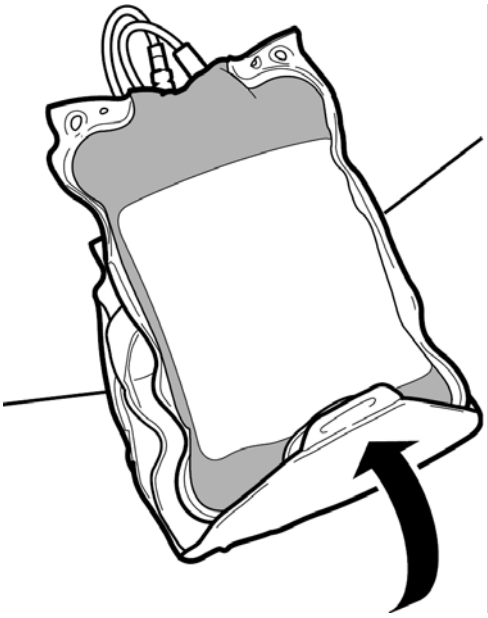
2. Assemble the blood bag set in one of two ways that follow:
    i. Recommended method: Place the bundled administration tubing in the center of the satellite bags. Fold the top third of the bags over to enclose the tubing, but so that the satellite bag portals and tabs do not extend beyond the bottom edges. Turn the folded bags sideways. Position them on top of the whole blood unit, so that the portals and tabs are on top (away from the whole blood unit).



Folded Bags
(place on top of the whole blood unit, with portals and tabs folded bags on top, away from the whole blood unit)

Figure 3-10. Folded Bags

ii. Alternate method (for bag sets with a semi-rigid satellite bag that is not intended for folding): Make sure the semi-rigid satellite bag is on the bottom of the satellite bag stack. Insert the bundled administration tubing in-between the satellite bags. Position the whole blood unit (label up) on top of the satellite bags. Offset higher than the satellite bags so that the satellite bag portals and tabs do not extend above the top of the whole blood unit. When inserting the bundled blood bag set into an adapter, the bottoms of the satellite bags must wrap around the whole blood unit from underneath.



Satellite Bags
(with semi-rigid bag on the bottom, shown with bottom edge wrapping up from underneath, for insertion into an adapter or liner)

Whole Blood Unit
(positioned on top of the satellite bags, so that satellite bag taps/portals do not extend above the top of the whole blood unit)

Figure 3-11. Satellite Bags

3. If using plastic bags, grasp the assembled blood bag set and place it upright into a plastic bag measuring approximately 230 x 460 mm (9 x 18 inches).

Note Place only one blood bag set in each plastic bag.

4. Grasp the blood bag set and place it upright into an adapter or bucket liner. After the bag set is fully seated, tuck any remaining protruding tubing in with the tubing bundle. Make sure that no portion of the plastic bag (if used) or blood bag set extends out over the edge of the adapter or

liner, so that the load will be within the bucket during centrifugation.

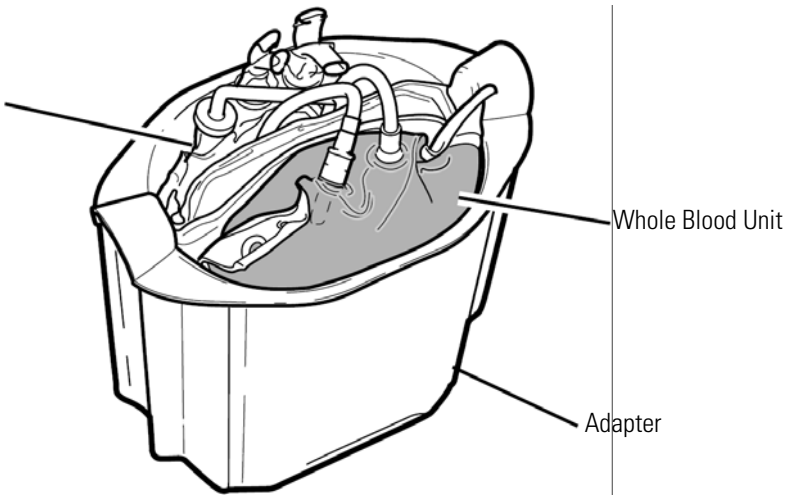


Figure 3-12. Satellite Bags

CAUTION Do not run only one blood bag set (single or double) using the divided bucket liner. Doing so will damage the liner and could cause leakage or breakage of blood bag(s) causing contamination of the blood product.

If using divided liners (for small volume blood bags), insert blood bag sets into the liners oriented so that satellite bags are against the divider with the whole blood units outward (packed bag sets will be positioned diagonally).

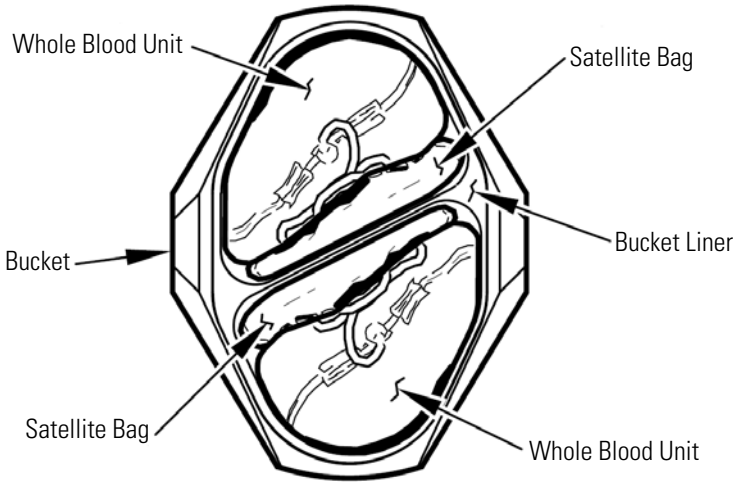


Figure 3-13. Loaded Bucket

5. Balance pairs of packed liners to within 10 grams by sliding rubber balancing discs (Catalog No. 00335 [set of 6], supplied) into the liners as required ("Rotor Loading and Balancing" on page 3-5). After balancing, packed liners should weigh no more than 1505 grams (Design Mass minus bucket weight), otherwise, the maximum allowable speed must be reduced ("Compartment Loads in Excess of Design Mass" on page 2-5).

6. Load the balanced pairs of packed liners into opposing buckets. Be sure no tabs or tubing are between the bucket and liner so that the liner seats correctly.

When using adapters or bucket liners, always follow the recommendations in this procedure. This prevents tubing and tabs from being forced out of the bucket, possibly getting caught on the rotor body or between the bucket and the adapter/liner during a run.

Note After a run, when removing an adapter or liner from a rotor bucket, hold the bucket firmly with one hand while lifting the adapter or liner to avoid pulling the bucket off of the bolts. When removing a blood bag set from an adapter or liner, hold the adapter or liner firmly with one hand while removing the blood bag set.

HLR-6 Rotor

We recommend the use of bucket liners (Catalog No. 11358) to improve the quality of the separation of blood and to simplify the bucket loading and unloading process. We suggest the following procedure[2] as one method to pack a blood bag set for the HLR-6 rotor.

1. Lay the blood bag set on a work surface. Place the whole blood unit label-down. Place the additive bag nearby, label-down. Stack the satellite bags, label-up, on top of the additive bag. The portals of the stacked bags are perpendicular to the portals of the whole blood unit, with administration tubing and filters out away from the bags.

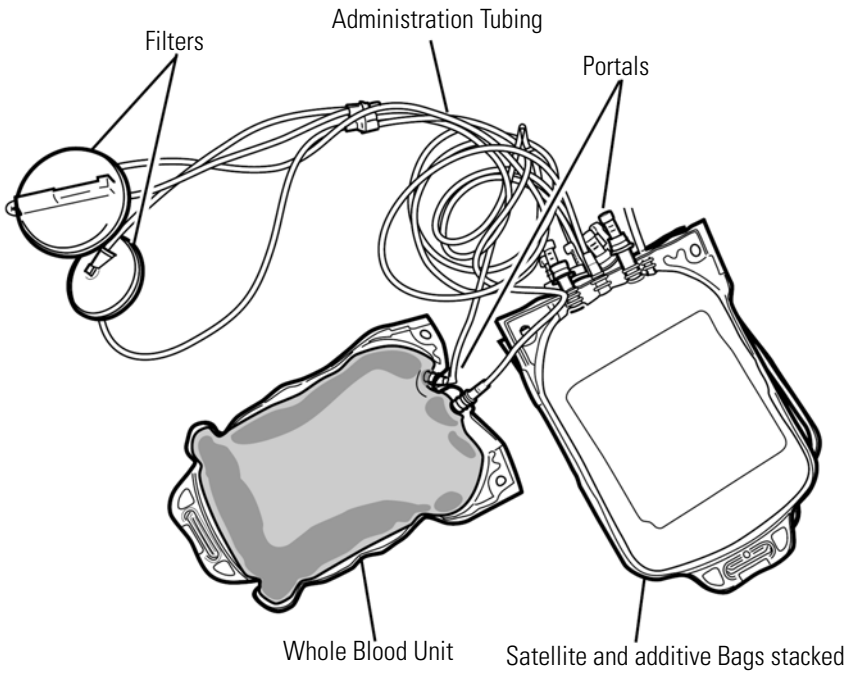


Figure 3-14. Blood Bag for HLR-6

2. Hold tubing leading from the whole blood bag to the filters at approximately 7.5-10 cm (3-4 inches) from the Y connector (legs of the Y pointing down). In the same hand, grasp the

[2]This procedure is based on loading Pall Leukotrap™ System blood bag sets, using the filter holders supplied with the HLR-6 rotor (filter holders Catalog No. 11360 are specifically designed to hold two Pall Leukotrap™ System filters: one Pall RCM1 and one Pall ATS LPL). Other blood bag sets (double, triple, or quad) may also be run in the HLR-6 rotor. Thermo Scientific recommends on-site validation and optimization to predetermine suitability. If running blood bags without in-line filters in the HLR-6 rotor, an empty filter holder must remain installed on each of the six buckets. If running smaller blood bag sets in the HLR-6 rotor, we recommend use of Blood Bag Inserts (Catalog No. 11365, 4/pkg.) to improve support.

segmented tubing from the satellite bags approximately 3-4 inches from the Y-connector (legs of Y pointing up). The Y-connectors should be positioned across the back of the hand.

3. Grasp the segmented tubing approximately 30 cm (12 inches) downstream of the RCM1 filter. Wrap the tubing around 3-4 fingers until it is approximately the same length as the satellite bag tubing.
4. Grasp all the remaining tubing and wrap in a downward motion toward the stacked bags. Place the coiled tubing in the upper portion of the stacked bags.

Note The Y-connectors should be positioned near the top of the bags.

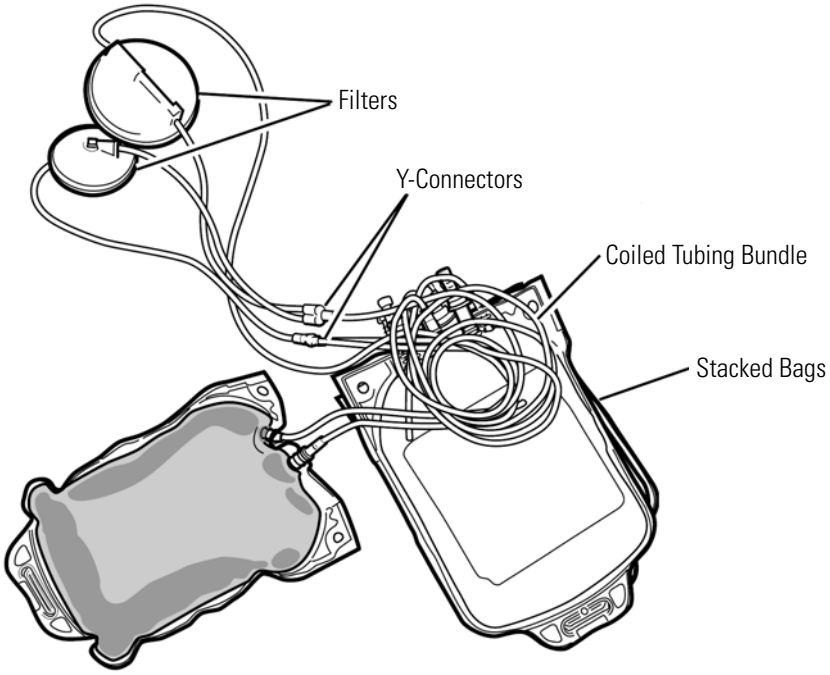


Figure 3-15. Filter Tubing Y-Connectors

5. Fold the bottom of the stacked additive and satellite bags over the coiled tubing so that the bottom of the bags extend just beyond the ports.

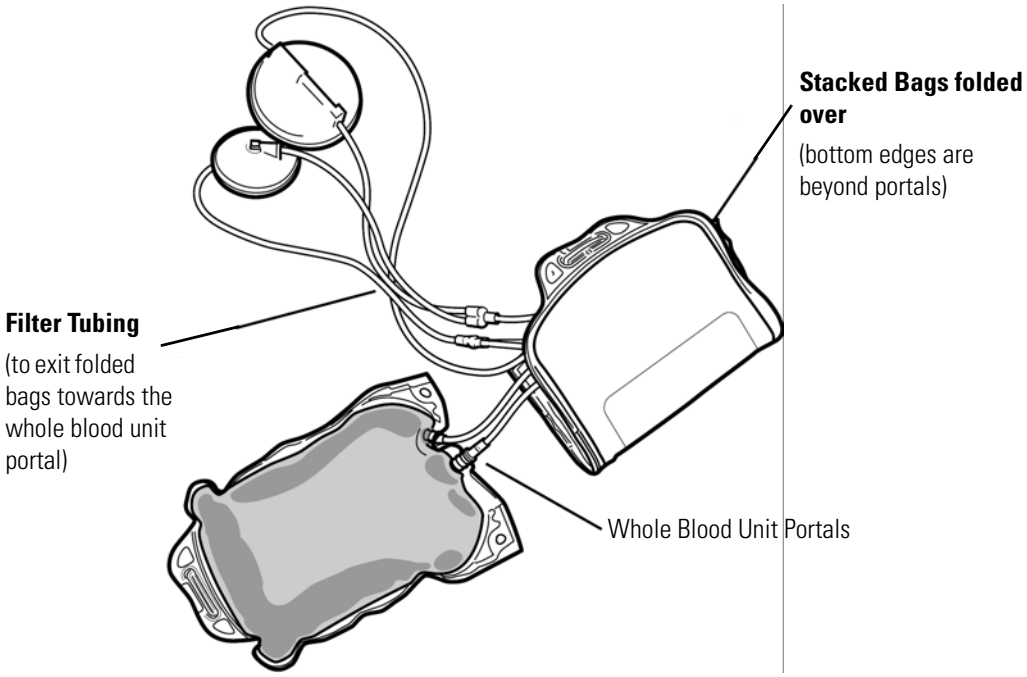


Figure 3-16. Folded Bags

6. Flip the folded bags over, on top of the whole blood unit. The portals of the folded bags should now be on the top of the bundled bag set, away from the whole blood unit, with filter tubing still exiting near the portals of the whole blood unit.

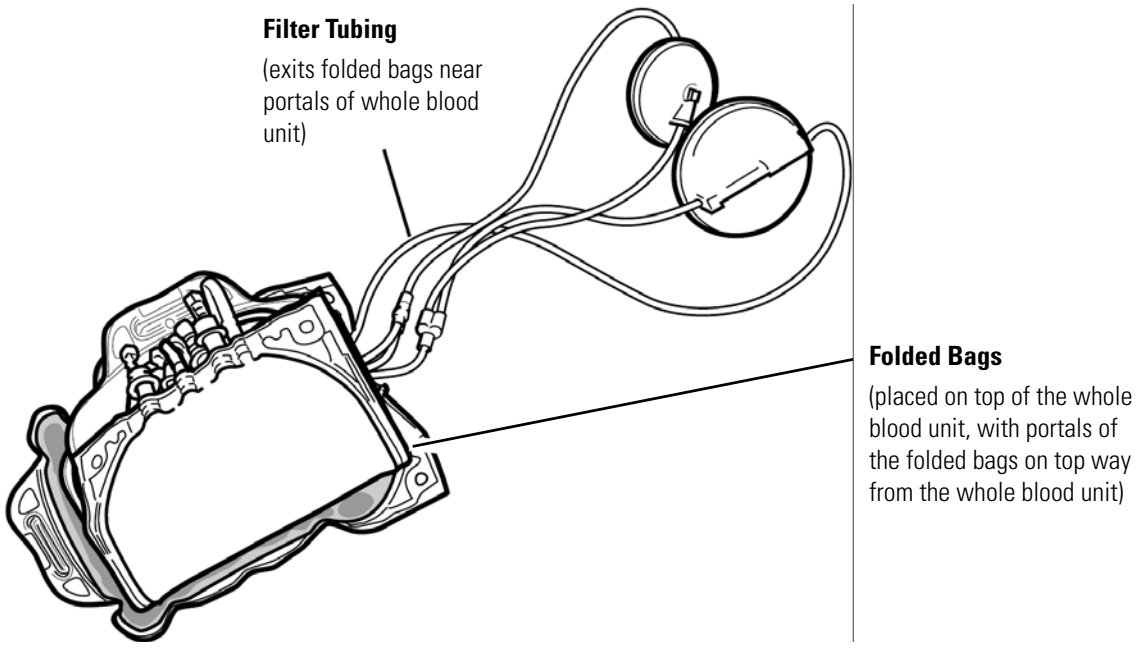


Figure 3-17. Folded Bags On Top Of Whole Blood Bag

7. Grasp the bundled blood bag set and turn the set so that the whole blood unit is upright. Insert the bundled set into a bucket liner. Position the filter tubing to drape over the side of the liner that is away from the angled bottom, so that the filters touch the work surface.

8. Gently agitate the bundled set prior to place it in bucket liner.

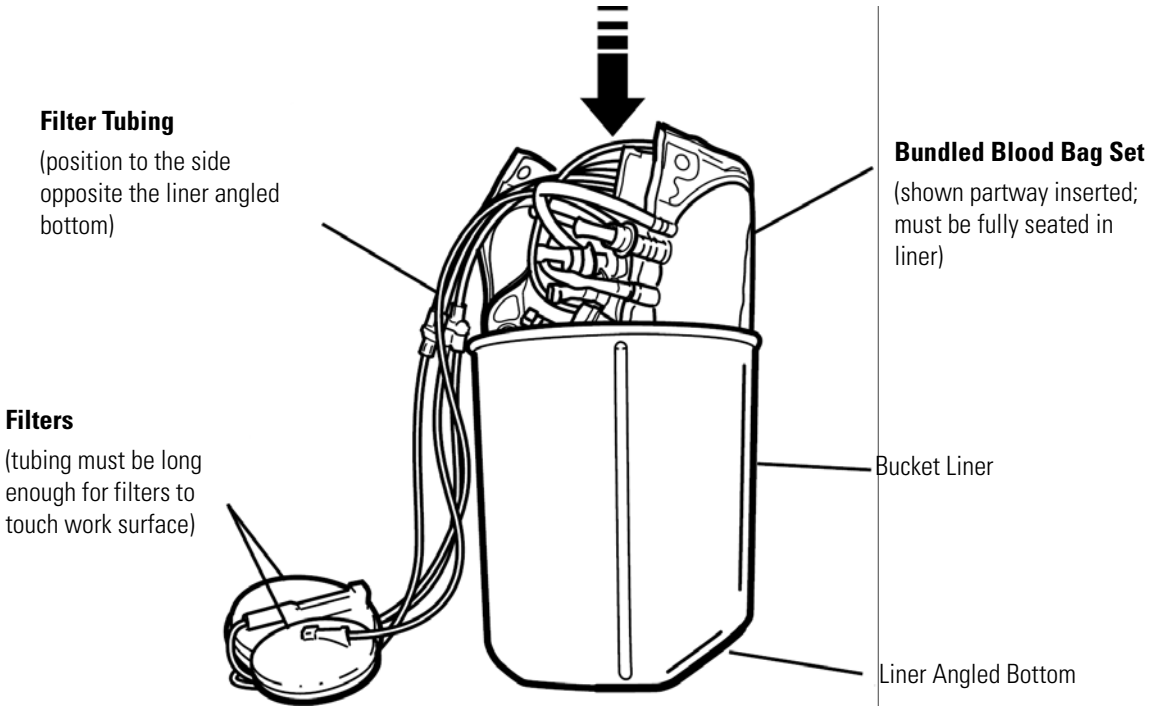


Figure 3-18. Place Blood Bag in Liner

9. Balance pairs of packed liners to within 10 grams by sliding rubber balancing discs (Catalog No. 00335 [set of 6], supplied) into the liners as required (see Rotor Loading and Balancing). After balancing, packed liners should weigh no more than 1005 grams (Design Mass minus bucket weight), otherwise, the maximum allowable speed must be reduced (see Compartment Loads in Excess of Design Mass).

10. Load the balanced pairs of packed liners into opposing buckets. Aligning the angled surface on the bottom of the liner with the angled surface in the bottom of the bucket. The angled bottoms are on the side opposite the filter holders. In the rotor, the angled bottoms are toward the rotor center. Insert the loaded liner into a bucket. Be sure the filter tubing is not between the bucket and liner so that the liner seats correctly.

Note This can be accomplished by a) loading the liner in the bucket outside the centrifuge and placing in-line filters into the Filter-Pak. Load the bucket into the rotor. OR b) loading directly into the bucket. The in-line filters can then be placed into the Filter-Pak.

CAUTION Each liner must be oriented properly so that it seats fully in the bucket. Failure to do so will damage the liner and could cause leakage or breakage of blood bag causing contamination of the blood product.

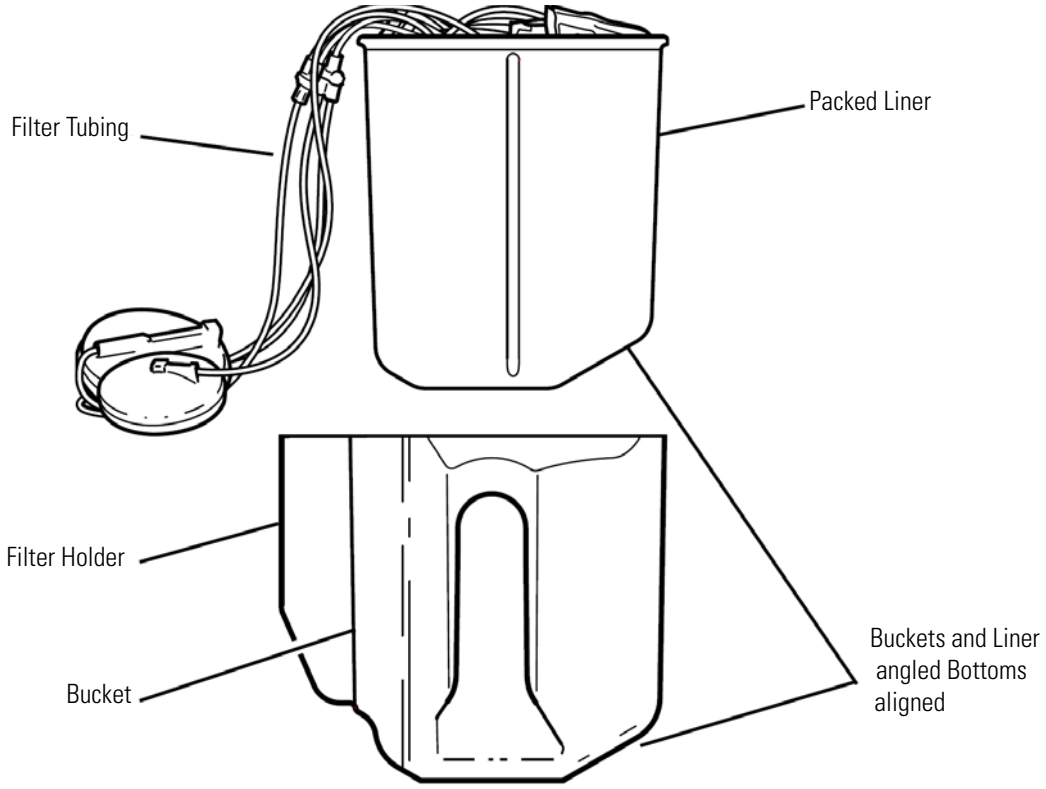


Figure 3-19. Place Liner In Rotor Bucket

The top lip of the bucket liner should not be more than 7 mm (1/4 inch) above the top surface of the bucket. If the liner extends higher, it is not properly seated. Remove the liner and check to make sure that the angled portions are aligned and that tubing is not caught.

CAUTION Each platelet filter must be oriented properly so that it seats fully in the filter holder. Failure to do so could damage the filter and/or filter holder.
As each filter is inserted, make sure that tubing is routed freely upward (as illustrated), not pinched between filters and filter holder. Misrouted tubing could potentially be cut or damaged during centrifugation.

11. Insert the ATS-LPL filter (smaller filter) into the filter holder. Therefore wrap the outlet tubing around the filter housing toward the inlet tubing port. Place inlet and outlet tubing into the bottom of the filter holder.

Note The filter must be vertical with the inlet port pointing up for proper placement.

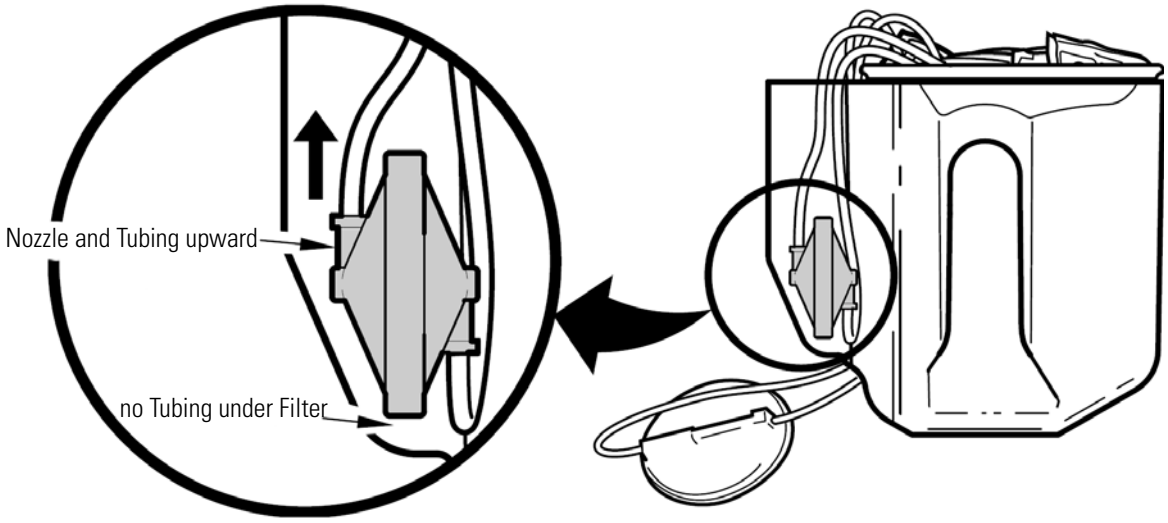


Figure 3-20. Place Small Filter In Filter Holder

12. Wrap the outlet tubing of the RCM-1 filter (larger filter) along the side of the outlet port (not over the housing). Place it on top of the ATS-LPL filter in the holder. The arrows on the filter housing must point down. Be sure the tubing is not pinched between between filters and holder.

13. Tuck any remaining tubing in between folded satellite bags and ensure proper clearance.

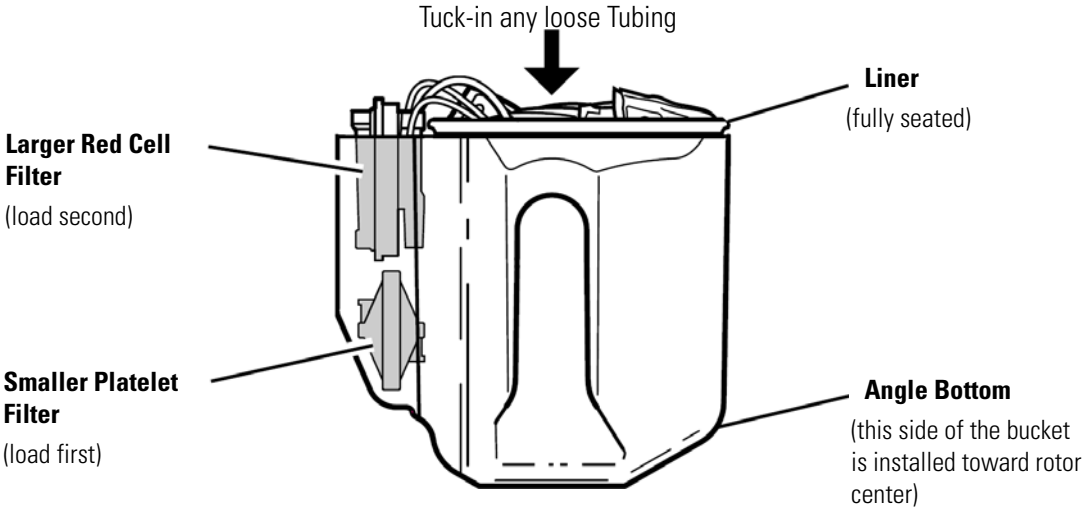


Figure 3-21. Place Larger Filter In Filter Holder

When using bucket liners, always follow the recommendations in this procedure so that, during a run, tubing and tabs will not be forced out of the bucket, possibly getting caught on the rotor body or between the bucket and the adapter/liner.

Note After a run, when removing a liner from a rotor bucket, hold the bucket firmly with one hand to avoid pulling the bucket off of the bolts. When removing a blood bag set from a liner, hold the liner firmly with one hand while removing the blood bag set.

Microplate Carrier Installation

These microplate carriers with pads are designed to hold microplates for processing small samples in an H6000A or HBB-6 Rotor. The microplate carriers will hold up to three standard microplates, or one deep-well microplate.

Note If using an RC-3C or RC-3C PLUS centrifuge-it may be possible, depending on the software revision installed, for the centrifuge to accept your rotor, but not display the correct relative centrifugal force (based on microplate carriers instead of buckets). Refer to "RCF-Values" on page A-1 for correct values when using microplate carriers.

CAUTION The rotor may be run using as few as two loaded microplate carriers. Be sure the microplate carriers are symmetrically positioned for proper balance. It is necessary to place empty microplate carriers or balanced buckets in all other positions. Do not attempt to operate the rotor with unequal masses in opposing rotor positions . To do so can cause imbalance to the rotor.
Never load more than three standard microplates or one deep-well microplate into a carrier.
Always use a neoprene pad (use catalog no. 11785 only) in the bottom of each carrier. The pads must be inserted into carriers with raised edges up, rounded edges down (against the microplate carrier). Exceeding the microplate carrier's microplate capacity, or running without a pad can cause the microplates to crack or break, resulting in loss of sample and possible damage to the rotor or centrifuge.

The carriers have been designed for the rotor compartment envelope given inFigure 2-3 on page 2-3. The maximum weight for the envelope, without the neoprene pad, is 400 grams.

To ensure no sample loss, install empty carriers in the rotor and check to be sure that they swing freely before loading any microplates.

To install each microplate carrier, tip the carrier slightly so that the angled slots are positioned vertically and the lower edge is toward the center of the rotor (see figure 2-9). Gently position each carrier on the bolts, then move each carrier to ensure that each swings freely and is properly seated.

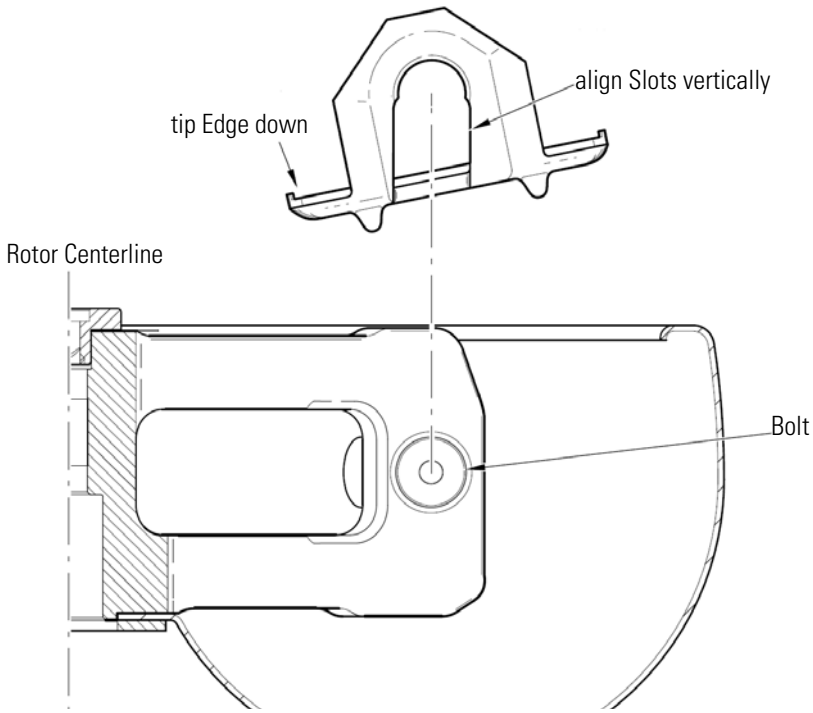


Figure 3-22. Microplate Carrier Installation

Note When properly installed, the microplate carrier will rest against the rotor body and will be tipped slightly inward (see figure 3-22). During centrifugation, carriers will swing out to a normal position.

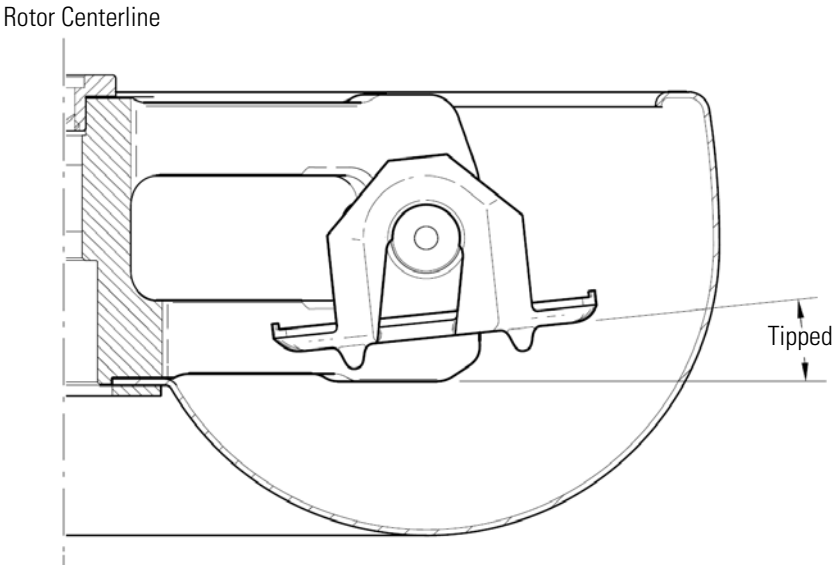


Figure 3-23. Properly Installed Carrier

OPERATION

This chapter contains the information necessary to prepare an H-6000A, HBB-6, or HLR-6 rotor for operation and includes important safety information.

Contents

Operation

CAUTION Operating the centrifuge with one or more buckets out of balance will cause undue wear on the centrifuge. Special attention should be given when balancing the rotor to ensure continued reliable performance of the centrifuge and rotor. Refer to "Rotor Loading and Balancing" on page 3-5 for instructions to properly load and balance the rotor.
Before each run, wipe the inside of the windshield to remove any liquid (for example, water, blood). Failure to remove liquids from the inside of the rotor windshield can cause it to become deformed because of the hydrostatic pressure built up during centrifugation.

Before operation, make sure you have read, understood, and considered the "Important Safety Information" on page iii.

To perform a run:

1. Before each run, make sure you have performed the "Prerun Safety Checks" on page 3-2.
2. Make sure that there are no loose objects inside the windshield like clips, tubing, tape, labels.
3. Before each run, wipe the inside of the windshield to remove any liquid (for example, water, blood).
4. Before each run, make sure all bolts and bucket surfaces which mate with bolts are clean and lubricated (use Rotor Cleaning Kit, Catalog No. 12259, included with rotor).
5. Install the buckets in the rotor, arranging them as shown in "Compartment Loading and Balancing" on page 3-6.
6. Be sure each bucket is properly seated. Before every run, check the position of each bucket in the rotor. Gently move each bucket in position to be sure that each is properly seated on the bolts and swings freely. Make this a routine check with each bucket before every run.
7. Place the rotor cover on the rotor. Position the cover knob over the rotor locking stud. (To remove the cover, simply lift it off of the rotor.)

Note Always observe blood bag manufacturers' specified protocols and recommendations. Before using a new or untested type of blood bag or rotor/bucket/adapter, we recommend performing on-site validation and optimization to predetermine suitability with your particular applications and run parameters.

8. Perform the run as explained in the centrifuge instruction manual.

Note There will be a short period of vibration of the rotor during acceleration as it passes through its critical speed ("Critical Speed" on page 2-3). This is a natural reaction and should cause no concern unless the vibration becomes excessive. In that event, stop the centrifuge immediately and rebalance the buckets.

At the end of the run, remove the sample from the centrifuge. If you wish to remove the rotor, but it cannot be lifted off of the drive spindle, we recommend the use of rotor extractor tool, Catalog No. 11445.

CAUTION When running blood bags, always observe the blood bag manufacturer's specified recommendations.
Before centrifugation, make sure that set speed is not higher than the maximum rated speed of the tubes, bottles, or blood bags used. Also, make sure that all tubes, bottles, or blood bags are loaded using an appropriate adapter to ensure proper support. When in doubt, we recommend pretesting before use by filling tubes or bottles with dummy loads, loading those into appropriate adapters, and running them to desired speed.
Opposing loads must be equal and balanced as described in "Rotor Loading and Balancing" on page 3-5.

Tube Breakage (H-6000A)

There are many factors which influence the maximum speed at which glass or plastic tubes can be run without breakage. These factors include the dimension, tolerance and quality of the tubes themselves as well as the volume of fluid in the tube and adapters within the rotor.

Even with pretesting, the possibility of tube breakage still exists because of the unobservable effect of repeated stress. If increased protection is desired, we recommend use of sealing bucket covers (catalog number 11776, 2/pkg), as well as controlled ventilation or isolation if running hazardous materials.

WARNING If tubes break that contain hazardous materials, the entire rotor load and centrifuge should be considered contaminated and treated as such. The tubes, rotor, adapters, buckets, and windshield should be decontaminated using appropriate decontamination procedure.

CARE and MAINTENANCE

This chapter provides instructions on how to clean, decontaminate, and maintain your H-6000A, HBB-6, or HLR-6 rotor. Always maintain the rotor in the recommended manner. Do not use rotors or buckets that show signs of corrosion or cracking.

Contents

Corrosion

CAUTION Do not expose aluminum rotor components to: strong acids, bases, or alkaline laboratory detergents, liquid chlorine bleach or salts (chlorides) of heavy metals such as cesium, lead, silver, or mercury. Use of these materials with aluminum can cause a chemical reaction that initiates corrosion.

Each rotor consists of a stainless steel rotor body, an aluminum alloy windshield and cover, and six aluminum alloy buckets. Although corrosion resistance is good, proper care will minimize the chance of corrosion. It prolongs the useful life of the rotor and will lessen the chance of rotor failure.

Corrosion commonly refers to chemical reactions at the surface (such as rusting and pitting) recognized by growing areas of visible deterioration. Stress corrosion attacks the inside of the metal. Barely detectable surface cracks grow inward, weakening the part without visible warning. Stress corrosion applies to most commonly used alloys, even the corrosion-resistant alloys have been found susceptible.

Stress corrosion is thought to be initiated by certain combinations of stress and chemical reactions. The most common chemical causing harmful effects is chloride, whether in a solution such as ammonium salts or as subtle a form as hand perspiration. If the rotor or buckets are not kept clean and chemicals remain on them, corrosion will result. Also, any moisture left on the rotor or buckets for an extended period of time can initiate corrosion. Therefore, it is important that rotor and buckets are thoroughly dried after use.

In general, conditions for corrosion are present in all rotor applications. Proper care and maintenance will minimize its effects.

Cleaning and Decontamination

These procedures are to be used for general cleaning purposes only. If the rotor or any of its parts are exposed to a contaminant, they must be decontaminated first, then washed to avoid exposure to hazardous materials.

WARNING Always be aware of the possibility of contamination when using radioactive, toxic, or pathogenic materials. Take all necessary precautions and use appropriate decontamination procedures if exposure occurs.

Cleaning

CAUTION (1) Do not use alkaline laboratory detergents on aluminum rotor parts, or corrosion could result.
(2) The rotor windshield assembly is dynamically balanced by affixing precise amounts of a grey, putty-like balancing compound inside the windshield. During cleaning, be careful not to remove the compound, or increased imbalance will result.

The rotor body, windshield, cover and buckets, as well as any filter holders, bucket covers or microplate carriers, should be cleaned with warm water and a mild soap or detergent once a week. It is particularly important to wash all parts after any spills have occurred. Most laboratory chemicals can be removed with a lukewarm 1% solution of a mild, non-alkaline detergent such as dishwashing liquid. Rinse the rotor body and buckets well, inside and out. Dry thoroughly with a soft absorbent cloth.

Clean, inspect, and relubricate the bolts and the bucket surfaces that mate with the bolts once a week.

Do not use strong laboratory detergents to clean the rotor surface. Use a soft bristle brush to loosen encrusted materials only if necessary. Be careful not to scratch the rotor surface.

Decontamination

CAUTION (1) Do not decontaminate the rotor's aluminum cover, buckets, or windshield using sodium hypochlorite solutions since these solutions cause discoloration, attack the anodized finish, and initiate corrosion. Use popular laboratory sanitizing wipes with very low concentrations of chlorine bleach (0.5%). Followed this by a thorough water rinse to have minimal short-term adverse effect. Long-term effect is unknown.
(2) Most commercially available radioactivity decontaminants are not compatible with aluminum.

The rotor body, windshield, cover and buckets, as well as any filter holders, bucket covers or microplate carriers, can be autoclaved at temperatures up to 121°C (250°F) at 15 psi for 15 minutes. Ethylene oxide, a 2% glutaraldehyde solution, or ultraviolet radiation are the recommended methods of sterilization.

Note If you decontaminate the rotor by autoclaving, be sure to remove any condensation that has formed inside the windshield.

For general radioactive decontamination, use a solution of equal parts of 70% ethanol, 10% SDS, and water. Follow this with ethanol rinses, then deionized water rinses, and dry with a soft absorbent cloth. Dispose of all wash solutions in proper radioactive waste containers.

Service Decontamination Policy

WARNING Because of the characteristics of the samples likely to be processed in this centrifuge, biological or radioactive contamination may occur. Always be aware of this possibility, and take normal precautions. Use appropriate decontamination procedures should exposure occur.

If a centrifuge or rotor that has been used with radioactive or pathogenic material requires servicing by Thermo Fisher Scientific personnel, either at the customer's laboratory or at a Thermo Fisher Scientific facility, comply with the following procedure to ensure the safety of all personnel:

9. Clean the equipment to be serviced of all encrusted material and decontaminate it (see Care and Maintenance section of centrifuge or rotor instruction manual) prior to servicing by the Thermo

Fisher Scientific representative or returning it to the Thermo Fisher Scientific facility. There must be no radioactivity detectable by survey equipment.

The Thermo Fisher Scientific Product Guide contains descriptions of commonly used decontamination methods and a chart showing method compatibility with various materials. The Care and Maintenance Section of the centrifuge or rotor instruction manual contains specific guidance about cleaning and decontamination methods appropriate for the product it describes.

Clean and decontaminate your centrifuge or rotor as follows:

For lowspeed floor model centrifuges:

a. Remove rotor from the rotor chamber.

b. Remove, wash, and decontaminate motor sealing gasket and pad.

c. Decontaminate door, rotor chamber, and drive using an appropriate method.

d. Remove all encrusted material from around the motor and drive assemblies.

For rotors

Remove tubes, bottles, and adapters from the rotor and decontaminate rotor using an appropriate method. If tubes or rotor caps are stuck in the rotor, or the rotor lid is stuck, notify Thermo Fisher Scientific representative. Be prepared with the name and nature of the sample so the Thermo Chemical Hazards Officer can decide whether to authorize the rotor's return to a Thermo Fisher Scientific facility.

Do not leave a loaded rotor locked inside a centrifuge that requires servicing. If, with a loaded rotor installed in the chamber, a centrifuge malfunction makes it so that the chamber door will not open by normal means, follow the Emergency Sample Recovery procedure found in your centrifuge operating instructions manual to gain access to the rotor.

10. Complete and attach Decontamination Information Certificate (in the back of your rotor or instrument manual) to the centrifuge or rotor before servicing.

Decontamination Information Certificates are included with this book. Additional certificates are available from the local Thermo Fisher Scientific Representative or Field Service Engineer. In the event these certificates are not available, a signed, written statement certifying that the unit has been properly decontaminated, identifying what the contaminants were and outlining the decontamination procedures used will be acceptable.

Note The Field Service Engineer will note on the Customer Service Repair Report if decontamination was required and, if so, what the contaminant was and what procedure was used. If no decontamination was required, it will be so stated.

If a centrifuge or rotor to be serviced does not have a Decontamination Information Certificate attached and, in Thermo Fisher Scientific's opinion presents a potential radioactive or biological hazard, the Thermo Fisher Scientific representative will not service the equipment until proper decontamination and certification is complete.

If the centrifuge or rotor must be returned to a Thermo Fisher Scientific facility:

1. Contact your Thermo Fisher Scientific representative to obtain an Equipment Return Decontamination Form. Be prepared with the name and serial number of the centrifuge or rotor and the repairs required.

2. Complete the Equipment Return Decontamination Form and returned it to Thermo Fisher Scientific. Upon receipt of a completed form, a Returned Material Authorization Number (RMA Number) will be issued to you.
3. With the RMA Number clearly marked on the outside of packaging, send the items to the address obtained from your Thermo Fisher Scientific representative.

If equipment is received at Thermo Fisher Scientific facilities without a valid RMA Number on the outside of the shipping container and a completed Equipment Return Decontamination Form on file, the equipment will be treated as a potential contamination hazard, and will not be serviced until decontamination certification has been completed. The sender will be contacted for instructions regarding disposition of the equipment in question. All disposition costs will be borne by the sender. If contaminated equipment is received at Thermo Fisher Scientific facilities, both the carrier and appropriate authorities shall be notified.

CAUTION Do not ship or transport a centrifuge with a rotor installed. If a centrifuge chamber door cannot be opened using conventional methods, refer to the Emergency Sample Recovery (mechanical override) instructions that are provided in your centrifuge operating manual.

RCF-Values

Speed (rpm)	H-6000A (round Bucket)		HBB-6 (angled oval bucket)		HLR-6 (offset oval bucket with filter holder)		Microplate Carrier (optional)
	$r_{max.}$ 26.06 cm	$r_{avg.}$ 12.03 cm	$r_{max.}$ 25.53cm	$r_{avg.}$ 11.30 cm	$r_{max.}$ 25.80 cm	$r_{avg.}$ 11.30 cm	$r_{max.}$ 18.53cm
500	73	34	71	32	72	32	52
1,000	291	134	285	126	288	126	207
1,500	655	302	642	284	648	284	467
2,000	1,164	538	1,141	505	1,153	505	830
2,500	1,819	840	1,782	789	1,801	789	1,296
3,000	2,620	1,209	2,567	1,136	2,594	1,136	1,867
3,500	3,566	1,646	3,493	1,546	3,530	1,546	2,541
4,000	4,657	2,150	4,563	2,020	4,611	2,020	3,319
4,500	5,895	2,721	5,775	2,556	5,836	2,556	4,200
5,000	7,277	3,359	7,129	3,156	7,205	3,156	5,186

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®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYRTHYLENE	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
Acetaldehyde		S	-	U	U	-	-	-	M	-	U	-	-	-	M	U	U	U	M	M	-	M	S	U	-	S	-	U
Acetone		M	S	U	U	S	U	M	S	S	U	U	S	U	S	U	U	U	S	S	U	U	S	M	M	S	U	U
Acetonitrile		S	S	U	-	S	M	S	-	S	S	U	S	U	M	U	U	-	S	M	U	U	S	S	S	S	U	U
Alconox®		U	U	S	-	S	S	S	-	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S	S	U
Allyl Alcohol		-	-	-	U	-	-	S	-	-	-	-	S	-	S	S	M	S	S	S	-	M	S	-	-	S	-	-
Aluminum Chloride		U	U	S	S	S	S	U	S	S	S	S	M	S	S	S	S	-	S	S	S	S	S	M	U	U	S	S
Formic Acid (100%)		-	S	M	U	-	-	U	-	-	-	-	U	-	S	M	U	U	S	S	-	U	S	-	U	S	-	U
Ammonium Acetate		S	S	U	-	S	S	S	-	S	S	S	S	S	S	S	U	-	S	S	S	S	S	S	S	S	S	S
Ammonium Carbonate		M	S	U	S	S	S	S	S	S	S	S	S	S	S	U	U	-	S	S	S	S	S	S	M	S	S	S
Ammonium Hydroxide (10%)		U	U	S	U	S	S	M	S	S	S	S	S	-	S	U	M	S	S	S	S	S	S	S	S	S	M	S
Ammonium Hydroxide (28%)		U	U	S	U	S	U	M	S	S	S	S	S	U	S	U	M	S	S	S	S	S	S	S	S	S	M	S
Ammonium Hydroxide (conc.)		U	U	U	U	S	U	M	S	-	S	-	S	U	S	U	U	S	S	S	-	M	S	S	S	S	-	U
Ammonium Phosphate		U	-	S	-	S	S	S	S	S	S	S	S	-	S	S	M	-	S	S	S	S	S	S	M	S	S	S
Ammonium Sulfate		U	M	S	-	S	S	U	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	U	S	S	U
Amyl Alcohol		S	-	M	U	-	-	S	S	-	M	-	S	-	M	S	S	S	S	M	-	-	-	U	-	S	-	M
Aniline		S	S	U	U	S	U	S	M	S	U	U	U	U	U	U	U	-	S	M	U	U	S	S	S	S	U	S
Sodium Hydroxide (<1%)		U	-	M	S	S	S	-	-	S	M	S	S	-	S	M	M	S	S	S	S	S	S	M	S	S	-	U
Sodium Hydroxide (10%)		U	-	M	U	-	-	U	-	M	M	S	S	U	S	U	U	S	S	S	S	S	S	M	S	S	-	U
Barium Salts		M	U	S	-	S	S	S	S	S	S	S	S	S	S	S	M	-	S	S	S	S	S	S	M	S	S	S
Benzene		S	S	U	U	S	U	M	U	S	U	U	S	U	U	U	M	U	M	U	U	U	S	U	U	S	U	S
Benzyl Alcohol		S	-	U	U	-	-	M	M	-	M	-	S	U	U	U	U	U	U	U	-	M	S	M	-	S	-	S
Boric Acid		U	S	S	M	S	S	U	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S

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®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
Cesium Acetate		M	-	S	-	S	S	S	-	S	S	S	S	-	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Bromide		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Chloride		M	S	S	U	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Formate		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Iodide		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Cesium Sulfate		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Chloroform		U	U	U	U	S	S	M	U	S	U	U	M	U	M	U	U	U	M	M	U	U	S	U	U	U	M	S
Chromic Acid (10%)		U	-	U	U	S	U	U	-	S	S	S	U	S	S	M	U	M	S	S	U	M	S	M	U	S	S	S
Chromic Acid (50%)		U	-	U	U	-	U	U	-	-	-	S	U	U	S	M	U	M	S	S	U	M	S	-	U	M	-	S
Cresol Mixture		S	S	U	-	-	-	S	-	S	U	U	U	U	U	U	-	-	U	U	-	U	S	S	S	S	U	S
Cyclohexane		S	S	S	-	S	S	S	U	S	U	S	S	U	U	U	M	S	M	U	M	M	S	U	M	M	U	S
Deoxycholate		S	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	S	S	S	S
Distilled Water		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Dextran		M	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Diethyl Ether		S	S	U	U	S	S	S	U	S	U	U	S	U	U	U	U	U	U	U	U	U	S	S	S	S	M	U
Diethyl Ketone		S	-	U	U	-	-	M	-	S	U	-	S	-	M	U	U	U	M	M	-	U	S	-	-	S	U	U
Diethylpyrocarbonate		S	S	U	-	S	S	S	-	S	S	U	S	U	S	U	-	-	S	S	S	M	S	S	S	S	S	S
Dimethylsulfoxide		S	S	U	U	S	S	S	-	S	U	S	S	U	S	U	U	-	S	S	U	U	S	S	S	S	U	U
Dioxane		M	S	U	U	S	S	M	M	S	U	U	S	U	M	U	U	-	M	M	M	U	S	S	S	S	U	U
Ferric Chloride		U	U	S	-	-	-	M	S	-	M	-	S	-	S	-	-	-	S	S	-	-	-	M	U	S	-	S
Acetic Acid (Glacial)		S	S	U	U	S	S	U	M	S	U	S	U	U	U	U	U	M	S	U	M	U	S	U	U	S	-	U
Acetic Acid (5%)		S	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S	S	S	S	S	M	S	S	M	S	S	M
Acetic Acid (60%)		S	S	U	U	S	S	U	-	S	M	S	U	U	M	U	S	M	S	M	S	M	S	M	U	S	M	U
Ethyl Acetate		M	M	U	U	S	S	M	M	S	S	U	S	U	M	U	U	-	S	S	U	U	S	M	M	S	U	U
Ethyl Alcohol (50%)		S	S	S	S	S	S	M	S	S	S	S	S	U	S	U	S	S	S	S	S	S	S	S	M	S	M	U
Ethyl Alcohol (95%)		S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	-	S	S	S	M	S	S	S	U	S	M	U
Ethylene Dichloride		S	-	U	U	-	-	S	M	-	U	U	S	U	U	U	U	U	U	U	-	U	S	U	-	S	-	S
Ethylene Glycol		S	S	S	S	S	S	S	S	S	S	S	S	-	S	U	S	S	S	S	S	S	S	S	M	S	M	S
Ethylene Oxide Vapor		S	-	U	-	-	U	-	-	S	U	-	S	-	S	M	-	-	S	S	S	U	S	U	S	S	S	U
Ficoll-Hypaque®		M	S	S	-	S	S	S	-	S	S	S	S	-	S	S	-	S	S	S	S	S	S	S	M	S	S	S

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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	S	U	S	S	U	S	U	M	S	S	S	S	S	S	S	M	M	M	S
Iodoacetic Acid		S	S	M	-	S	S	S	-	S	M	S	S	M	S	S	-	M	S	S	S	S	S	M	S	S	M	M
Potassium Bromide		U	S	S	-	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	M	S	S	S
Potassium Carbonate		M	U	S	S	S	S	S	-	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S
Potassium Chloride		U	S	S	-	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	S	U	S	S	S
Potassium Hydroxide (5%)		U	U	S	S	S	S	M	-	S	S	S	S	-	S	U	S	S	S	S	S	S	S	M	U	M	S	U
Potassium Hydroxide (conc.)		U	U	M	U	-	-	M	-	M	S	S	-	U	M	U	U	U	S	M	-	M	U	-	U	U	-	U
Potassium Permanganate		S	S	S	-	S	S	S	-	S	S	S	U	S	S	S	M	-	S	M	S	U	S	S	M	S	U	S
Calcium Chloride		M	U	S	S	S	S	S	S	S	S	S	S	S	S	M	S	-	S	S	S	S	S	S	M	S	S	S
Calcium Hypochlorite		M	-	U	-	S	M	M	S	-	M	-	S	-	S	M	S	-	S	S	S	M	S	M	U	S	-	S
Kerosene		S	S	S	-	S	S	S	U	S	M	U	S	U	M	M	S	-	M	M	M	S	S	U	S	S	U	S
Sodium Chloride (10%)		S	-	S	S	S	S	S	S	-	-	-	S	S	S	S	S	-	S	S	S	S	-	S	S	M	-	S
Sodium Chloride (sat'd)		U	-	S	U	S	S	S	-	-	-	-	S	S	S	S	S	-	S	S	-	S	-	S	S	M	-	S
Carbon Tetrachloride		U	U	M	S	S	U	M	U	S	U	U	S	U	M	U	S	S	M	M	S	M	M	M	M	U	S	S
Aqua Regia		U	-	U	U	-	-	U	-	-	-	-	-	U	U	U	U	U	U	U	-	-	-	-	-	S	-	M
Solution 555 (20%)		S	S	S	-	-	-	S	-	S	S	S	S	S	S	S	-	-	S	S	S	-	S	S	S	S	S	S
Magnesium Chloride		M	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Mercaptoacetic Acid		U	S	U	-	S	M	S	-	S	M	S	U	U	U	U	-	S	U	U	S	M	S	U	S	S	S	S
Methyl Alcohol		S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	M	S	S	S	S	S	S	S	M	S	M	U
Methylene Chloride		U	U	U	U	M	S	S	U	S	U	U	S	U	U	U	U	U	M	U	U	U	S	S	M	U	S	U

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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
Sodium Borate		M	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	-	S	S	S	S	S	S	M	S	S	S
Sodium Bromide		U	S	S	-	S	S	S	-	S	S	S	S	S	S	S	S	-	S	S	S	S	S	S	M	S	S	S
Sodium Carbonate (2%)		M	U	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S
Sodium Dodecyl Sulfate		S	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S
Sodium Hypochlorite (5%)		U	U	M	S	S	M	U	S	S	M	S	S	S	M	S	S	S	S	M	S	S	S	M	U	S	M	S
Sodium Iodide		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Sodium Nitrate		S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	U	S	S	S	S
Sodium Sulfate		U	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Sodium Sulfide		S	-	S	S	-	-	-	S	-	-	-	S	S	S	U	U	-	-	S	-	-	-	S	S	M	-	S
Sodium Sulfite		S	S	S	-	S	S	S	S	M	S	S	S	S	S	S	M	-	S	S	S	S	S	S	S	S	S	S
Nickel Salts		U	S	S	S	S	S	-	S	S	S	-	-	S	S	S	S	-	S	S	S	S	S	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	U	S	U	M	U	U	S	U	U	U	M	S
Phosphoric Acid (10%)		U	U	M	S	S	S	U	S	S	S	S	U	-	S	S	S	S	S	S	S	S	S	U	M	U	S	S
Phosphoric Acid (conc.)		U	U	M	M	-	-	U	S	-	M	S	U	U	M	M	S	S	S	M	S	M	S	U	M	U	-	S
Physiologic Media (Serum, Urine)		M	S	S	S	-	-	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Picric Acid		S	S	U	-	S	M	S	S	S	M	S	U	S	S	S	U	S	S	S	S	U	S	U	M	S	M	S

CHEMICAL	MATERIAL	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	POLYURETHANE ROTOR PAINT	COMPOSITE Carbon Fiber/Epoxy	DELRIN®	ETHYLENE PROPYLENE	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR®, CLEARCRIMP®CCCLEARCRIMP®	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYTHERMIDE	POLYRTHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON®
Pyridine (50%)		U	S	U	U	S	U	U	-	U	S	S	U	U	M	U	U	-	U	S	M	U	S	S	U	U	U	U
Rubidium Bromide		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Rubidium Chloride		M	S	S	-	S	S	S	-	S	S	S	S	S	S	S	-	-	S	S	S	S	S	S	M	S	S	S
Sucrose		M	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sucrose, Alkaline		M	S	S	-	S	S	S	-	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	M	S	S	S
Sulfosalicylic Acid		U	U	S	S	S	S	S	-	S	S	S	U	S	S	S	-	S	S	S	-	S	S	S	U	S	S	S
Nitric Acid (10%)		U	S	U	S	S	U	U	-	S	U	S	U	-	S	S	S	S	S	S	S	S	S	M	S	S	S	S
Nitric Acid (50%)		U	S	U	M	S	U	U	-	S	U	S	U	U	M	M	U	M	M	M	S	S	S	U	S	S	M	S
Nitric Acid (95%)		U	-	U	U	-	U	U	-	-	U	U	U	U	M	U	U	U	U	M	U	U	S	U	S	S	-	S
Hydrochloric Acid (10%)		U	U	M	S	S	S	U	-	S	S	S	U	U	S	U	S	S	S	S	S	S	S	S	U	M	S	S
Hydrochloric Acid (50%)		U	U	U	U	S	U	U	-	S	M	S	U	U	M	U	U	S	S	S	S	M	S	M	U	U	M	M
Sulfuric Acid (10%)		M	U	U	S	S	U	U	-	S	S	M	U	S	S	S	S	S	S	S	S	S	S	U	U	U	S	S
Sulfuric Acid (50%)		M	U	U	U	S	U	U	-	S	S	M	U	U	S	U	U	M	S	S	S	S	S	U	U	U	M	S
Sulfuric Acid (conc.)		M	U	U	U	-	U	U	M	-	-	M	U	U	S	U	U	U	M	S	U	M	S	U	U	U	-	S
Stearic Acid		S	-	S	-	-	-	S	M	S	S	S	S	-	S	S	S	S	S	S	S	S	S	M	M	S	S	S
Tetrahydrofuran		S	S	U	U	S	U	U	M	S	U	U	S	U	U	U	-	M	U	U	U	U	S	U	S	S	U	U
Toluene		S	S	U	U	S	S	M	U	S	U	U	S	U	U	U	S	U	M	U	U	U	S	U	S	U	U	M
Trichloroacetic Acid		U	U	U	-	S	S	U	M	S	U	S	U	U	S	M	-	M	S	S	U	U	S	U	U	U	M	U
Trichloroethane		S	-	U	-	-	-	M	U	-	U	-	S	U	U	U	U	U	U	U	U	U	S	U	-	S	-	S
Trichloroethylene		-	-	U	U	-	-	-	U	-	U	-	S	U	U	U	U	U	U	U	U	U	S	U	-	U	-	S
Trisodium Phosphate		-	-	-	S	-	-	M	-	-	-	-	-	-	S	-	-	S	S	S	-	-	S	-	-	S	-	S
Tris Buffer (neutral pH)		U	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Triton X-100®		S	S	S	-	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Urea		S	-	U	S	S	S	S	-	-	-	-	S	S	S	M	S	S	S	S	-	S	S	S	M	S	-	S
Hydrogen Peroxide (10%)		U	U	M	S	S	U	U	-	S	S	S	U	S	S	S	M	U	S	S	S	S	S	S	M	S	U	S
Hydrogen Peroxide (3%)		S	M	S	S	S	-	S	-	S	S	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S
Xylene		S	S	U	S	S	S	M	U	S	U	U	U	U	U	U	M	U	M	U	U	U	S	U	M	S	U	S
Zinc Chloride		U	U	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S
Zinc Sulfate		U	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Citric Acid (10%)		M	S	S	M	S	S	M	S	S	S	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S

*Polyethyleneterephthalate

Key

S Satisfactory

M = Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use.

U Unsatisfactory, not recommended.

-- Performance unknown; suggest testing, using sample to avoid loss of valuable material.

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

Warranty

Thermo Fisher Scientific Products makes no warranty of any kind, expressed or implied, except as stated in this warranty policy.

Each Thermo Scientific H-6000A, HBB-6, or HLR-6 Rotor is warranted against defects in material and workmanship, subject to the conditions stated below and in the Thermo Fisher Scientific terms and conditions of sale in effect at the time of sale, for seven (7) years at any speed up to 5000 rpm (properly reduced for certain fluid densities, fluid gradients, tube assemblies, and adapters as described in these operating instructions).

Conditions

a. This warranty is valid for seven (7) years from the date of shipment to the original buyer by Thermo or an authorized Thermo Representative.

b. This warranty extends only to the original Buyer and may not be assigned or extended to a third person without the written consent of Thermo.

c. This warranty covers the rotor and its buckets only and Thermo Fisher Scientific shall not be liable for damage to accessories or ancillary supplies including but not limited to (i) blood bags, (ii) tubing/filters, (iii) bottles, (iv) caps/covers, (v) bucket liners/adapters, or (vi) blood bag/bottle contents.

d. This warranty is void if the rotor is (i) operated or maintained in a manner contrary to the instructions in the manual for the rotor or centrifuge in use, or (ii) used in a Thermo Scientific Centrifuge that has been modified without the written permission of Thermo.

e. Should a Thermo Scientific Centrifuge be damaged due to the failure of a rotor covered by this warranty, Thermo Fisher Scientific will supply, free of charge (i) all centrifuge parts required for repair and (ii) if the centrifuge is currently covered by a Thermo Fisher Scientific warranty or service agreement, all labor necessary for repair of the centrifuge.

The foregoing obligations are in lieu of all other obligations and liabilities including negligence and all warranties, of merchantability or otherwise, expressed or implied in fact or by law, and state our entire and exclusive liability and buyer's exclusive remedy for any claim or damages in connection with the sale or furnishing of goods or parts, their design, suitability for use, installation or operation. Thermo Fisher Scientific will in no event be liable for any special or consequential damages whatsoever, and our liability under no circumstances will exceed the contract price for the goods for which liability is claimed.

Terms may vary by country. Please contact your local sales office for further information.

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