

S5700 Rotor



**Used in the Beckman Coulter
Allegra® 25R and TJ-25 Centrifuges**



SAFETY NOTICE

This safety notice summarizes information basic to the safe use of the rotor described in this manual. The international symbol displayed above is a reminder to the user that all safety instructions should be read and understood before operation or maintenance of this equipment is attempted. When you see the symbol on other pages of this publication, pay special attention to the safety information presented. Observance of safety precautions will also help to avoid actions that could damage or adversely affect the performance of the rotor.



Handle body fluids with care because they can transmit disease. No known test offers complete assurance that such fluids are free of micro-organisms. Some of the most virulent—Hepatitis (B and C) viruses, HIV (I–V), atypical mycobacteria, and certain systemic fungi—further emphasize the need for aerosol protection. Handle other infectious samples according to good laboratory procedures and methods to prevent spread of disease. Because spills may generate aerosols, observe proper safety precautions for aerosol containment. Do not run toxic, pathogenic, or radioactive materials in this rotor without taking appropriate safety precautions. Biosafe containment should be used when Risk Group II materials (as identified in the *World Health Organization Laboratory Biosafety Manual*) are handled; materials of a higher group require more than one level of protection.



This rotor was developed, manufactured, and tested for safety and reliability as part of a Beckman Coulter centrifuge/rotor system. Its safety or reliability cannot be assured if used in a centrifuge not of Beckman Coulter's manufacture or in a Beckman Coulter centrifuge that has been modified without Beckman Coulter's approval.



Although rotor components and accessories made by other manufacturers may fit in the S5700 rotor, their safety in this rotor cannot be ascertained by Beckman Coulter. Use of other manufacturers' components or accessories in the S5700 rotor may void the rotor warranty and should be prohibited by your laboratory safety officer. Only the components and accessories listed in this publication should be used in this rotor.



Hook both buckets, loaded or empty, to the rotor for every run. Make sure that filled containers are loaded symmetrically into the rotor and that opposing labware is filled to the same level with liquid of the same density.



The rotor and accessories are not designed for use with materials capable of developing flammable or explosive vapors. Do not centrifuge such materials in nor handle or store them near the ultracentrifuge.



If disassembly reveals evidence of leakage, you should assume that some fluid escaped the rotor. Apply appropriate decontamination procedures to the centrifuge and accessories.

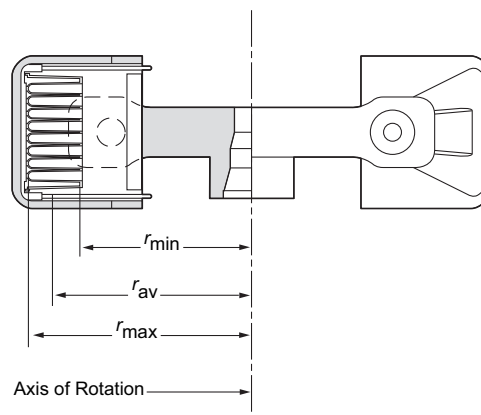


Never exceed the maximum rated speed of the rotor and labware in use. Refer to the section on RUN SPEEDS, and derate the run speed as appropriate.



Do not use sharp tools on the rotor that could cause scratches in the rotor surface. Corrosion begins in scratches and may open fissures in the rotor with continued use.

S5700 ROTOR



SPECIFICATIONS

Maximum speed	5 700 rpm
Critical speed range*	1200 to 1400 rpm
Density rating at maximum speed	1.2 g/mL
Relative Centrifugal Field [†] at maximum speed (deepwell plates)	
At r_{\max} (168.5 mm)	6 130 × g
At r_{av} (153.4 mm)	5 580 × g
At r_{\min} (138.6 mm)	5 040 × g
Conditions requiring speed reductions	see RUN SPEEDS
Maximum allowable imbalance of opposing loads	10 grams
Maximum load per bucket	590 grams
Number of buckets	2
Available labware	see Table 1
Approximate acceleration time to maximum	
speed (fully loaded)	47 sec
Approximate deceleration time from maximum	
speed (fully loaded)	49 sec
Weight of fully loaded rotor	7.9 kg (17.4 lb)
Rotor material	aluminum

* The critical speed range is the range of speeds over which the rotor shifts so as to rotate about its center of mass. Passing through the critical speed range is characterized by some vibration.

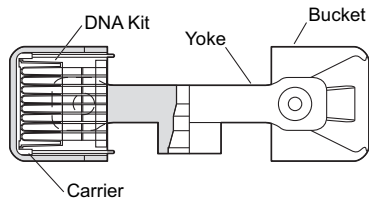
[†] Relative Centrifugal Field (RCF) is the ratio of the centrifugal acceleration at a specified radius and speed ($r\omega^2$) to the standard acceleration of gravity (g) according to the following formula:

$$\text{RCF} = \frac{r\omega^2}{g}$$

where r is the radius in millimeters, ω is the angular velocity in radians per second ($2\pi \text{ RPM} / 60$), and g is the standard acceleration of gravity (9807 mm/s^2). After substitution:

$$\text{RCF} = 1.12 r \left(\frac{\text{RPM}}{1000} \right)^2$$

DESCRIPTION



This rotor has been manufactured in a registered ISO 9001 or 13485 facility for use with the specified Beckman Coulter centrifuges.

The S5700, rated for 5 700 rpm, is a two-place swinging bucket rotor used in the Beckman Coulter Allegra® 25R and TJ-25 benchtop centrifuges.¹ Each rotor bucket carries a 96-well kit for high-throughput processing (such as a DNA or RNA kit). The buckets can also hold standard microplates used in the serial dilution of small liquid volumes—up to five stacked multiwell polypropylene plates (not to exceed 60.3 mm/2.72 in. deep), two stacked deep-well plates, or one square-well plate per bucket.

The rotor yoke is made of aluminum and is black-anodized for corrosion protection. Black-anodized aluminum buckets can be run by placing them over pivot pins on the arms of the yoke; they swing out to horizontal position during centrifugation. High-impact thermoplastic carriers facilitate loading and unloading of the buckets. When running polystyrene deepwell plates or microplates, a support pad (368957) should be used beneath the bottom plate to prevent breakage. A tie-down screw is used to secure the rotor to the drive shaft during centrifugation.

The centrifuge identifies rotor speed during the run by means of a magnetic speed sensor system in the centrifuge rotor chamber and magnets imbedded in the rotor. The overspeed system ensures that the rotor does not exceed its permitted speed.

Refer to the Warranty at the back of this manual for warranty information.

PREPARATION AND USE

Specific information about the S5700 rotor is given here. Information about the use and care of the centrifuge is contained in the centrifuge manual, which should be used together with this manual for complete rotor and centrifuge operation.

¹ This rotor can be used in TJ-25 centrifuges with serial numbers TJC00K00 and subsequent. Centrifuges with earlier serial numbers must be modified to enable identification of the rotor. Contact Beckman Coulter Field Service (1-800-742-2345 in the United States; worldwide offices are listed on the back cover of this manual) to have the update installed.

NOTE

Although rotor components and accessories made by other manufacturers may fit in the S5700 rotor, their safety in this rotor cannot be ascertained by Beckman Coulter. Use of other manufacturers' components or accessories in the S5700 rotor may void the rotor warranty and should be prohibited by your laboratory safety officer. Only the components and accessories listed in this publication should be used in this rotor.

PRERUN SAFETY CHECKS

Read the SAFETY NOTICE page at the front of this manual before using the rotor.

1. Make sure that the rotor and buckets are clean and show no signs of corrosion or cracking. If any evidence of damage is present, do not centrifuge the rotor.
2. Check the chemical compatibilities of all materials used. Refer to *Chemical Resistances* (publication IN-175).
3. Verify that the labware being used is listed in Table 1.

INSTALLING THE ROTOR YOKE

1. Before installing the yoke in the centrifuge, lightly lubricate the drive hole with a lubricant such as Anti-Seize (see instructions under MAINTENANCE).

**CAUTION**

Never drop the rotor yoke onto the centrifuge drive shaft. The drive shaft can be damaged if the rotor is forced sideways or dropped onto it.

2. Carefully lower the yoke straight down onto the centrifuge drive shaft. Be sure the yoke is properly seated on the shaft.
3. Fasten the tie-down screw (368245) onto the drive shaft. Use the T-handle rotor wrench (368246) to tighten the tie-down screw firmly on the shaft.

 **NOTE**

If the rotor yoke is left in the centrifuge between runs, before each run make sure it is properly seated on the drive shaft, and that the tie-down screw is tight.

LOADING THE BUCKETS

For runs at other than room temperature, refrigerate or warm the rotor and precool the centrifuge beforehand for fast equilibration.



WARNING

Handle body fluids with care because they can transmit disease. No known test offers complete assurance that such fluids are free of micro-organisms. Some of the most virulent—Hepatitis (B and C) viruses, HIV (I–V), atypical mycobacteria, and certain systemic fungi—further emphasize the need for aerosol protection. Handle other infectious samples according to good laboratory procedures and methods to prevent spread of disease. Because spills may generate aerosols, observe proper safety precautions for aerosol containment. Do not run toxic, pathogenic, or other hazardous materials in this rotor without taking all appropriate safety precautions. Biosafe containment should be used when Risk Group II materials (as identified in the World Health Organization *Laboratory Biosafety Manual*) are handled; materials of a higher group require more than one level of protection.

Symmetrical and Balanced Loading

To ensure optimal performance and stability, the rotor must be loaded symmetrically. Two factors affect symmetric loading:

- The buckets must be loaded symmetrically with respect to their pivotal axes.
- The rotor should be loaded symmetrically with respect to its center of rotation.

For best results, load opposing buckets with the same type of labware containing the same amounts of fluid of equal density. Additionally, opposing buckets or carriers and their contents should weigh approximately the same (within 10 grams). The rated maximum load for buckets is 590 grams each.

In multiwell plates, samples should be loaded into the wells symmetrically with respect to the pivotal axis of the carrier (the pivotal axis runs parallel to the crossbar), and opposing buckets should contain similar loads (see Figure 1).

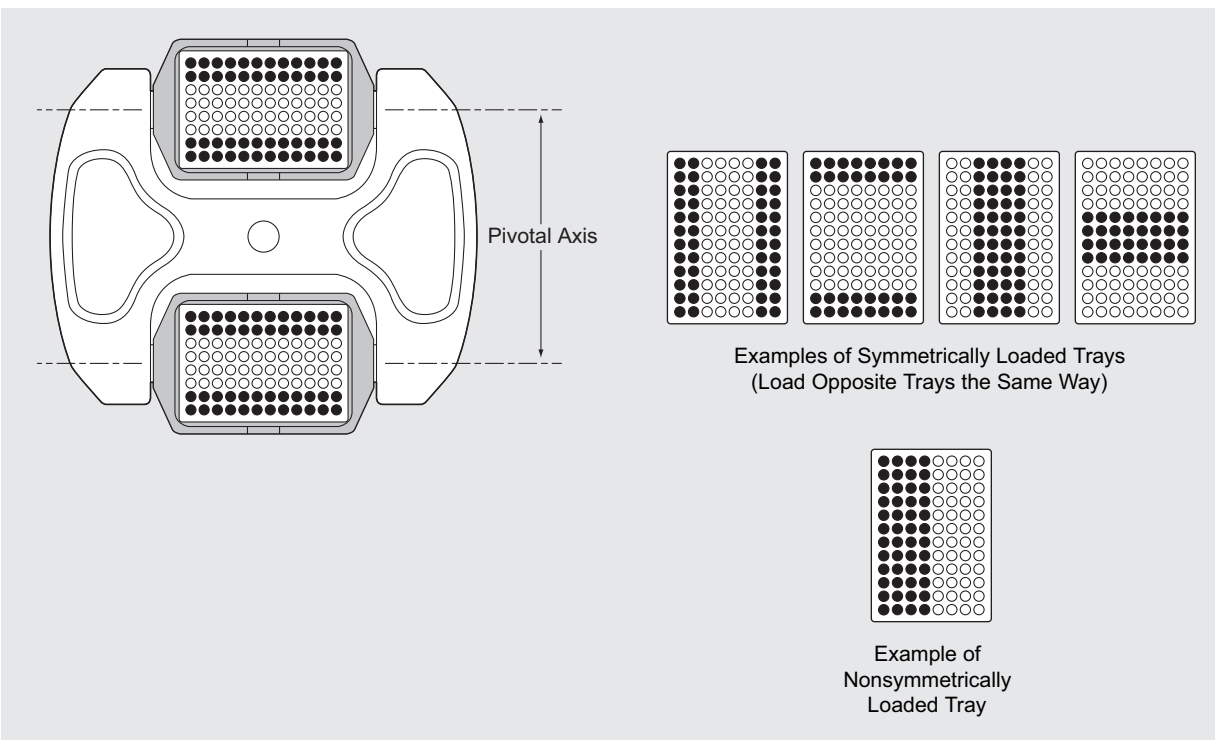


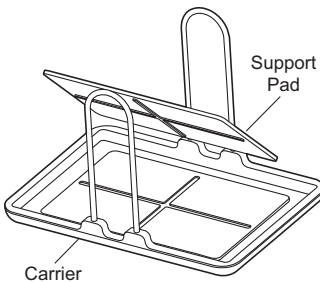
Figure 1. Symmetrical and Balanced Loading. Both positions must have a bucket attached for every run.

Using Buckets

You can load buckets before or after they are installed on the rotor yoke. In either case, we recommend filling the appropriate labware first and then loading the labware into the buckets to avoid tripping the imbalance detector.

NOTE

When using stacked microplates, place a support pad (369382) beneath the bottom plate to prevent breakage during centrifugation. Use the support pad beneath all polystyrene plates.



1. Insert the filled labware into the carrier. (See page 9 for labware information.) If using more than one plate per carrier, place a cap strip between the plates to prevent breakage during centrifugation.
2. Load the filled carriers into the buckets.
3. Attach each bucket to the yoke by aligning the grooves in the bucket sides with the pivot pins, then sliding the buckets down until the pivot pins are seated in the bucket pockets.
4. Gently swing the buckets to ensure that they are properly seated on the pivot pins.

OPERATION

Temperatures may vary slightly between centrifuges. If sample temperature is crucial, test temperature settings on your instrument using water samples. For runs at other than room temperature, refrigerate or warm the rotor beforehand for fast equilibration.

1. Refer to the instrument instruction manual for centrifuge operation.

NOTE

For sample temperatures between 4 and 23°C, set the centrifuge temperature 2°C below the required sample temperature. When performing consecutive runs longer than 5 minutes each at 4°C, you may need to reduce rotor speed.

2. See RUN SPEEDS, page 10, for information about speed limitations.

REMOVAL AND SAMPLE RECOVERY

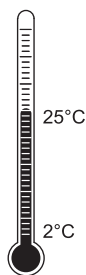


CAUTION

If disassembly reveals evidence of leakage, you should assume that some fluid escaped the rotor. Apply appropriate decontamination procedures to the centrifuge and accessories.

1. Remove the buckets from the centrifuge.
2. Remove the labware from the buckets.
3. If removing the rotor yoke, turn the T-handle wrench (368246) to the left (counterclockwise) to loosen the tie-down screw. Lift the yoke straight up and off the drive shaft.

LABWARE



Temperature Limits

- Beckman Coulter plastic labware has been centrifuge tested for use at temperatures between 2 and 25°C. For centrifugation at other temperatures, pretest containers under anticipated run conditions.
- If plastic containers are frozen before use, make sure that they are thawed to at least 2°C prior to centrifugation.

Labware

Use the labware listed in Table 1 in the buckets.

Table 1. Labware Used in the S5700 Rotor. High-throughput processing kits are available commercially; observe manufacturer's recommendations for speed and temperature limitations.

Description	Volume	Part Number	Accessory Description*	Part Number
multiwell polystyrene plate, 96-well, nonsterile	300 μ L/well	609844 (pkg/100)	cap strip, nonsterile [†]	267002 (pkg/12)
			cap strip, sterile [†]	267005 (pkg/12)
			aluminum foil lid [‡]	538619 (pkg/100)
deep-well polystyrene plate, 96-well, nonsterile (do not stack these plates)	1 mL/well	267001 (pkg/24)	cap strip, nonsterile [†]	267002 (pkg/12)
			cap strip, sterile [†]	267005 (pkg/12)
			aluminum foil lid [‡]	538619 (pkg/100)
deep-well polystyrene plate, 96-well, sterile (do not stack these plates)	1 mL/well	267004 (pkg/24)	cap strip, nonsterile [†]	267002 (pkg/12)
			cap strip, sterile [†]	267005 (pkg/12)
			aluminum foil lid [‡]	538619 (pkg/12)
deep-well polypropylene plate, 96-well, nonsterile	1 mL/well	267006 (pkg/24)	cap strip, nonsterile [†]	267002 (pkg/12)
			cap strip, sterile [†]	267005 (pkg/12)
			aluminum foil lid [‡]	538619 (pkg/100)
deep-well polypropylene plate, 96-well, sterile	1 mL/well	267007 (pkg/24)	cap strip, nonsterile [†]	267002 (pkg/102)
			cap strip, sterile [†]	267005 (pkg/12)
			aluminum foil lid [‡]	538619 (pkg/100)
square-well polypropylene plate	2 mL/well	140504 (pkg/24)	aluminum foil lid [‡] ***	538619 (pkg/100)

* When stacking multiwell plates, place a support pad (369382) beneath the bottom plate and a cap strip between the plates to prevent breakage during centrifugation. Also use the support pad beneath polystyrene plates.

[†] Caps are optional.

[‡] Requires 4-inch soft-rubber roller (538618) for installation.

*** Speed limited to 4600 RPM for this plate (RCF \leq 4000 x g).

RUN SPEEDS

The centrifugal force at a given radius in a rotor is a function of speed. Comparisons of forces between different rotors are made by comparing the rotors' relative centrifugal fields (rcf). When rotational speed is adjusted so that identical samples are subjected to the same rcf in two different rotors, the samples are subjected to the same force. The rcf at each speed is automatically calculated by the centri-

fuge software; if the rcf is entered, the centrifuge calculates the equivalent rpm (revolutions per minute).

If the weight of the load *in a bucket* exceeds 590 grams, or if the solution density is more than 1.2 g/mL are centrifuged, reduce the maximum allowable run speed according to the following equation:

$$\text{reduced maximum speed} = (5\,700 \text{ rpm}) \sqrt{\frac{590 \text{ grams}}{\text{heaviest load in grams}}}$$

Do not select rotational speeds in excess of 5 700 rpm.

CARE AND MAINTENANCE

MAINTENANCE

Do not use sharp tools on the rotor that could cause scratches in the rotor surface. Corrosion begins in scratches and may open fissures in the rotor with continued use.

- Periodically (at least monthly) inspect the rotor yoke and buckets, especially inside cavities, for rough spots or pitting, white powder deposits—frequently aluminum oxide—or heavy discoloration. If any of these signs are evident, do not run the rotor. Contact your Beckman Coulter representative for information about the Field Rotor Inspection Program and the rotor repair center.
- Before using the tie-down screw (368245), check it for damage such as distortion, splitting, or stripped threads. Replace it if it is damaged.
- Approximately once a week, and after cleaning and/or auto-claving, lubricate the rotor pin sockets (see Figure 2) with a lubricant such as Paint On Graphite Lubricant (977212). Allow the lubricant to dry for at least 5 minutes before installing the rotor in a centrifuge.

Store the rotor in a dry environment (not in the centrifuge). Refer to *Chemical Resistances* (publication IN-175) for the chemical compatibilities of rotor and accessory materials. Your Beckman Coulter representative provides contact with the Field Rotor Inspection Program and the rotor repair center.

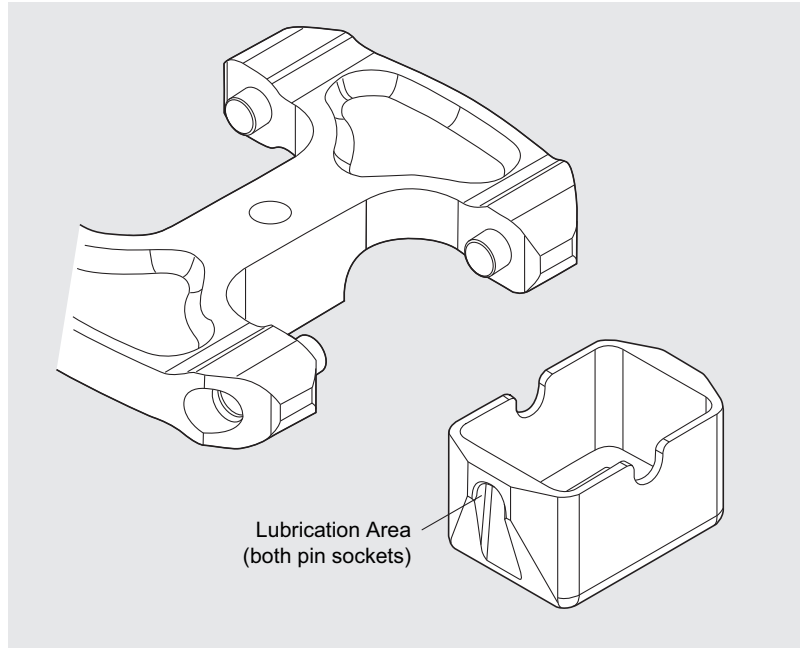


Figure 2. Lubrication Points

CLEANING

Wash rotor components immediately if salts or other corrosive materials are used or if spillage has occurred. Do not allow corrosive materials to dry on the rotor.

Under normal use, wash the rotor frequently (at least weekly) to prevent buildup of residues.

NOTE

Do not wash the rotor components in a dishwasher. Do not soak the rotor in detergent solution for long periods, such as overnight.



1. Wash the rotor yoke, buckets, and microplate carriers in a mild detergent, such as Beckman Solution 555™ (339555), that won't damage the rotor. The Rotor Cleaning Kit (339558) contains two plastic-coated brushes and two quarts of Solution 555 for use with rotors and accessories. Dilute the detergent 10 to 1 with water.
2. Thoroughly rinse the cleaned rotor components with distilled water.

3. Air-dry the rotor components upside down. *Do not use acetone to dry the rotor.*

Before reinstalling the rotor yoke, lightly lubricate the drive hole with Anti-Seize (961660) to prevent the rotor from sticking, as follows:

1. Apply the lubricant onto a swab.
2. Draw the coated swab through a paper towel to remove excess lubricant.
3. Lightly coat the inside of the drive hole with the lubricant remaining on the swab.

DECONTAMINATION



If aluminum rotor components become contaminated with radioactive material, decontaminate them using a solution that will not damage the anodized surfaces. Beckman Coulter has tested a number of solutions and found two that do not harm anodized aluminum: RadCon Surface Spray or IsoClean Solution (for soaking),² and Radiacwash.³

While Beckman Coulter has tested these materials and found that they do not damage components, no guarantee of decontamination is expressed or implied. Follow appropriate decontamination procedures as directed by your laboratory safety officer.

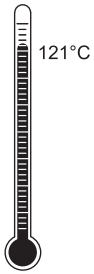


If the rotor or other components are contaminated with toxic or pathogenic materials, follow appropriate decontamination procedures as directed by your laboratory safety officer.

² In U.S.A., contact Nuclear Associates (New York); in Eastern Europe and Commonwealth States, contact Victoreen GmbH (Munich); in South Pacific, contact Gammasonics Pty, Ltd. (Australia); in Japan, contact Toyo Medic Co. Ltd. (Tokyo).

³ In U.S.A., contact Biodex Medical Systems (Shirley, NY); internationally, contact the U.S. office to find the dealer nearest you.

STERILIZATION AND DISINFECTION



- The rotor can be autoclaved at 121°C for up to an hour. Plastic parts can be autoclaved at 121°C for up to 30 minutes. Place the rotor yoke, buckets, and/or microplate carriers in the autoclave upside down.
- Ethanol (70%)⁴ or hydrogen peroxide (6%) may be used on all rotor components, including those made of plastic. Bleach (sodium hypochlorite) may be used, but may cause discoloration of anodized surfaces. Use the minimum immersion time for each solution, per laboratory standards.

While Beckman Coulter has tested these methods and found that they do not damage the rotor or components, no guarantee of sterility or disinfection is expressed or implied. When sterilization or disinfection is a concern, consult your laboratory safety officer regarding proper methods to use.

STORAGE

When it is not in use, store the rotor in a dry environment (not in the centrifuge).

⁴ Flammability hazard. Do not use in or near operating centrifuges.

RETURNING A ROTOR

Before returning a rotor or accessory for any reason, prior permission (a Returned Goods Authorization form) must be obtained from Beckman Coulter, Inc. This RGA form, which may be obtained from your local Beckman Coulter sales office, should contain the following information:

- rotor serial number,
- history of use (approximate frequency of use),
- reason for the return,
- original purchase order number, billing number, and shipping number, if possible,
- name and phone number of the person to be notified upon receipt of the rotor or accessory at the factory, and
- name and phone number of the person to be notified about repair costs, etc.

To protect our personnel, it is the customer's responsibility to ensure that the parts are free from pathogens and/or radioactivity. Sterilization and decontamination must be done before returning the parts. Smaller items (such as tubes, bottles, etc.) should be enclosed in a sealed plastic bag.

*All parts must be accompanied by a note, plainly visible on the outside of the box or bag, stating that they are safe to handle and that they are not contaminated with pathogens or radioactivity. **Failure to attach this notification will result in return or disposal of the items without review of the reported problem.***

Use the address label printed on the RGA form when mailing the rotor and/or accessories.

Customers located outside the United States should contact their local Beckman Coulter office.

SUPPLY LIST

NOTE

Publications referenced in this manual can be obtained by calling Beckman Coulter at 1-800-742-2345 in the United States, or by contacting your local Beckman Coulter office.

Contact Beckman Coulter Sales (1-800-742-2345 in the United States; worldwide offices are listed on the back cover of this manual) for detailed information on ordering parts and supplies. For your convenience, a partial list is given below.

REPLACEMENT ROTOR PARTS

S5700 rotor assembly	368954
Bucket (set of 2)	369330
Microplate carrier (set of 2)	368920
Tie-down screw	368245
T-handle rotor wrench	368246

OTHER

Labware	see Table 1
Support pad for microplates (set of 4).	369382
Rubber roller, 4-in., for sealing foil microplate lids	538618
Rotor Cleaning Kit	339558
Beckman Solution 555 (1 qt)	339555
Rotor cleaning brush	339379
Anti-Seize	961660
Paint On Graphite Lubricant (1/2 oz)	977212
Spinkote lubricant (2 oz)	306812

BENCHTOP ROTOR WARRANTY

Subject to the conditions specified below and the warranty clause of the Beckman Coulter, Inc., terms and conditions in effect at the time of sale, Beckman Coulter agrees to correct either by repair or, at its election, by replacement, any defects of material or workmanship which develop within seven (7) years after delivery of a benchtop centrifuge rotor to the original buyer by Beckman Coulter or by an authorized representative, provided that investigation and factory inspection by Beckman Coulter discloses that such defect developed under normal and proper use. Should a Beckman Coulter centrifuge be damaged due to a failure of a rotor covered by this warranty, Beckman Coulter will supply free of charge all centrifuge parts required for repair.

CONDITIONS

1. Except as otherwise specifically provided herein, this warranty covers the rotor only and Beckman Coulter shall not be liable for damage to accessories or ancillary supplies including but not limited to (i) tubes, (ii) tube caps, (iii) tube adapters, or (iv) tube contents.

2. This warranty is void if the rotor has been subjected to customer misuse such as operation or maintenance contrary to the instructions in the Beckman Coulter rotor or centrifuge manual.
3. This warranty is void if the rotor is operated with a rotor drive unit or in a centrifuge unmatched to the rotor characteristics or operated in a Beckman Coulter centrifuge that has been improperly disassembled, repaired, or modified.
4. Thermoplastic rotors or components used in some benchtop centrifuges are warranted for one (1) year from date of purchase.

DISCLAIMER

IT IS EXPRESSLY AGREED THAT THE ABOVE WARRANTY SHALL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND OF THE WARRANTY OF MERCHANTABILITY AND THAT NEITHER BECKMAN COULTER, INC. NOR ITS SUPPLIERS SHALL HAVE ANY LIABILITY FOR SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER ARISING OUT OF THE MANUFACTURE, USE, SALE, HANDLING, REPAIR, MAINTENANCE, OR REPLACEMENT OF THE PRODUCT.



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