

# Instructions For Use

## **FA4x8.2P Fixed-Angle Rotor**

For Use in Beckman Coulter  
Microfuge 20 Series Centrifuges



PN B33057AA  
June 2013



Beckman Coulter, Inc.  
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Brea, CA 92821 U.S.A.



**FA4x8.2P Fixed-Angle Rotor**

B33057AA (June 2013)

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# Safety Notice

Read all product manuals and consult with Beckman Coulter-trained personnel before attempting to use this equipment. Do not attempt to perform any procedure before carefully reading all instructions. Always follow product labeling and manufacturer's recommendations. If in doubt as to how to proceed in any situation, contact your Beckman Coulter Representative.

## Alerts for Warning, Caution, and Note

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**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION** indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

**NOTE** NOTE is used to call attention to notable information that should be followed during installation, use, or servicing of this equipment.

## Safety Information for the FA4x8.2P Rotor

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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.

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

These rotors were developed, manufactured, and tested for safety and reliability as part of a Beckman Coulter centrifuge/rotor system. Their safety or reliability cannot be assured if used in a non-Beckman Coulter centrifuge, in a Beckman Coulter centrifuge not specified for use with the rotors, or in a Beckman Coulter centrifuge that has been modified without Beckman Coulter's approval.

## Safety Notice

Safety Information for the FA4x8.2P Rotor

Although rotor components and accessories made by other manufacturers may fit in the FA4x8.2P rotor, their safety in this rotor cannot be ascertained by Beckman Coulter. Use of other manufacturers' components or accessories in the FA4x8.2P 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.

Make sure that filled containers are loaded symmetrically into the rotor and that opposing tubes are filled to the same level with liquid of the same density.

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](#).

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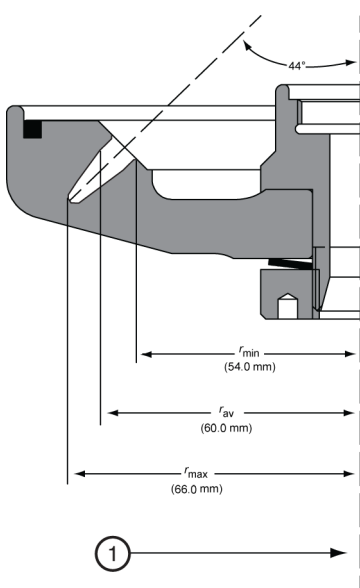
Benchtop Rotor Warranty

Related Documents



# FA4x8.2P Fixed-Angle Rotor

## Specifications for the FA4x8.2P Rotor



1. Axis of Rotation

Maximum speed 15,000 RPM

Density rating at maximum speed 1.2 g/mL

Critical speed range<sup>a</sup> 2200 RPM

Relative Centrifugal Field<sup>b</sup> at maximum speed

Cell hole 1 & 8 at  $r_{max}$  (66.0 mm)  $16,602 \times g$

Cell hole 2 & 7 at  $r_{max}$  (63.0 mm)  $15,847 \times g$

Cell hole 3 & 6 at  $r_{max}$  (60.0 mm)  $15,093 \times g$

Cell hole 4 & 5 at  $r_{max}$  (59.0 mm)  $14,841 \times g$

Conditions requiring speed reductions see [Run Speeds](#)

Maximum imbalance of opposing loads 2 grams

Number of tube cavities 32

Nominal tube capacity (largest tube) 200  $\mu$ L

Nominal rotor capacity 3.2 mL

Approximate acceleration time to maximum speed  
(fully loaded) 11 sec

Approximate deceleration time from maximum speed  
(fully loaded) 13 sec

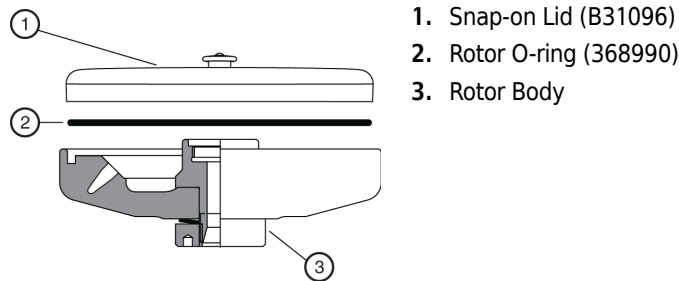
Weight of fully loaded rotor 0.38 kg (0.84 lb)

Rotor material polysulfone

- a. 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.
- b. 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:  $RCF = r\omega^2/g$  — where  $r$  is the radius in millimeters,  $\omega$  is the angular velocity in radians per second ( $2\pi \text{ RPM}/60$ ), and  $g$  is the standard acceleration of gravity ( $9807 \text{ mm/s}^2$ ). After substitution:  $RCF = 1.12r (\text{RPM}/1000)^2$

## Description

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The Beckman Coulter FA4x8.2P rotor has been manufactured in a facility that maintains certifications to ISO 9001:2008 or ISO 13485:2003. It is for use with the Microfuge 20 series Beckman Coulter centrifuges.

The F8x8.2P, rated for 15,000 RPM, is a fixed-angle rotor with a tube angle of 45 degrees from the axis of rotation. The rotor can centrifuge up to four eight-tube PCR strips.

The rotor is made of high-impact thermoplastic. The polyphenylsulfone snap-on lid will contain most liquids and broken tube particles, reducing the need to clean the centrifuge chamber, and allowing you to take appropriate precautions before opening the lid in the event of spillage. A tie-down screw is used to secure the rotor to the drive shaft during centrifugation.

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

## Preparation and Use

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*Specific information about the FA4x8.2P rotor is given here. Information about the centrifuges is contained in the Microfuge 20 series centrifuge manual, which should be used together with this manual for complete centrifuge, rotor, and accessory operation.*

**NOTE** Although rotor components and accessories made by other manufacturers may fit in the FA4x8.2P rotor, their safety in this rotor cannot be ascertained by Beckman Coulter. Use of other manufacturers' components or accessories in this 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](#) section at the front of this manual before using the rotor.

- 1 Make sure that the rotor, lid, and all tubes and accessories are clean and show no signs of corrosion or cracking.
- 2 If fluid containment is required, use capped tubes.



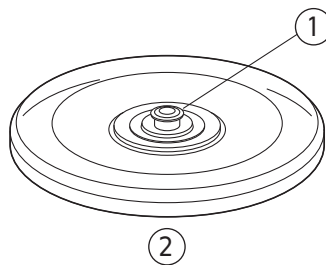
All containers carrying physiological fluids should be capped, and not overfilled, to prevent leakage.

- 3 Check the chemical compatibilities of all materials used (refer to *Chemical Resistances*, publication IN-175).

## Rotor Preparation

*For runs at other than room temperature, refrigerate or warm the rotor before the run for fast equilibration.*

- 1 Be sure that the metal threads in the rotor are clean and lightly but evenly coated with Spinkote lubricant (306812).
- 2 Load the filled containers symmetrically into the rotor (see [Tubes](#), page 5 for tube information).  
If fewer than 4 PCR tube strips or 32 individual tubes are being run, they must be arranged symmetrically in the rotor.  
*Opposing tubes must be filled to the same level with liquid of the same density.*
- 3 Pull up on the snap-on lock and set the lid in place on the rotor. Release the lock, then make sure that the lid is firmly in place.  
Press down on the lock to ensure engagement.



1. Snap-on Lock
2. Snap-on Lid

## Operation

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Precool the rotor in the centrifuge or in a refrigerator before use—especially before short runs—to ensure that the rotor reaches the set temperature. A suggested precooling cycle is a minimum of 30 minutes at 2000 RPM with the desired set temperature.

**NOTE** 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 Ensure that the rotor tie-down screw (369554) is in good condition and the threads are free of foreign matter.



**Do not drop the rotor onto the drive shaft. The shaft can be bent or damaged if the rotor is forced sideways or dropped onto the shaft.**

- 2 Center the rotor over the drive shaft and carefully lower it straight down.

- 3 Secure the rotor to the drive shaft with the tie-down screw.  
Tighten the screw by turning it to the right (clockwise) with the T-handle rotor wrench (361371).

- 4 Refer to the instrument instruction manual for centrifuge operation.  
See [Run Speeds](#), page 5, for information about speed limitations.

## Removal and Sample Recovery

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

**If Using Snap-on Lid B31096:**

- 1 Using the T-handle rotor wrench, turn the tie-down screw to the left (counterclockwise) to release the rotor.

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2 Remove the rotor by lifting it straight up and off the drive shaft.

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3 Pull up on the snap-on lock to remove the lid and remove tubes from the rotor.  
You can leave the rotor in the centrifuge for subsequent runs.

**NOTE** If the rotor is left in the centrifuge between runs, make sure it is seated on the drive shaft and the tie-down screw is tight before each run. Approximately every 20 runs, or once a day, loosen the tie-down screw and retighten it to ensure proper connection between the rotor and the shaft.

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#### If Using Screw-on Lid B31097:

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1 Using the T-handle rotor wrench, turn the tie-down screw to the left (counterclockwise) to release the rotor.

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2 Remove the rotor by lifting it straight up and off the drive shaft.

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3 Remove the rotor lid by unscrewing it counterclockwise and remove the tubes.

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## Tubes

The FA4x8.2P rotor holds up to four strips of eight 200- $\mu$ L PCR tubes.

Refer to *Chemical Resistances* (IN-175) for information on the chemical compatibilities of labware materials.

### Temperature Limits

- Plastic containers have 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 before centrifugation.

## Run Speeds

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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 centrifuge software; if the RCF is entered, the centrifuge calculates the equivalent revolutions per minute (RPM).

The maximum run speed listed in the rotor specifications is for operation when all conditions are within the standard specifications. Speeds must be reduced under the following circumstances:

1. If nonprecipitating solutions more dense than 1.2 g/mL are centrifuged, the maximum allowable run speed must be reduced according to the following equation:

$$\text{reduced maximum speed} = (15,000 \text{ RPM}) \sqrt{\frac{1.2 \text{ g/mL}}{\rho}}$$

where  $\rho$  is the density of the tube contents. This speed reduction will protect the rotor from excessive stresses due to the added tube load. *Note, however, that the use of this formula may still produce maximum speed figures that are higher than the limitations imposed by the use of certain tubes or adapters.* In such cases, use the lower of the two figures.

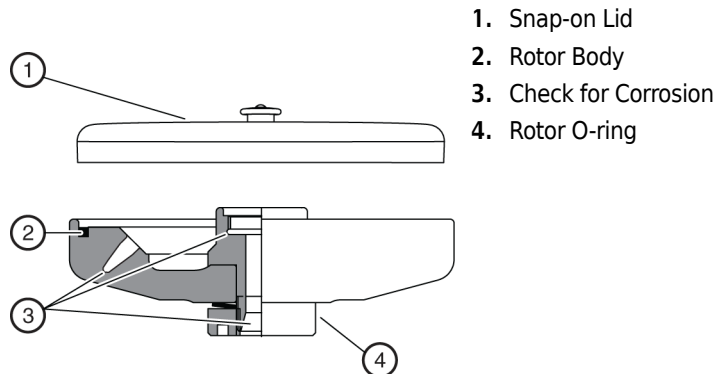
2. Further speed limits must be imposed when self-forming-gradient salts are centrifuged, as the equation does not predict concentration limits/speeds that are required to avoid precipitation of salt crystals.

## Care and Maintenance

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### Maintenance

*Do not use sharp tools on the rotor, as they can scratch the rotor surface. Corrosion begins in scratches and may open fissures in the rotor with continued use.*



- 1 Periodically (at least monthly) inspect the rotor, especially inside cavities, for damage. If damage is evident, do not run the rotor. Contact your Beckman Coulter representative for information about the Field Rotor Inspection Program and the rotor repair center.
- 2 Before using the tie-down screw (369554), check it for damage such as stripped threads. Replace it if it is damaged.

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- 3 Check the rotor O-ring (368896) and lid O-ring (B31099) for nicks, abrasions, or other damage and replace damaged components before using the rotor.  
Do not use a rotor with damaged components.  
Apply a thin, even coat of silicone vacuum grease (335148) to the O-ring, then replace it in the groove in the outer rim of the rotor.
  - 4 Regularly apply a thin, even coat of Spinkote lubricant (306812) to the rotor drive hole to prevent rotor sticking.
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Refer to *Chemical Resistances* for the chemical compatibilities of rotor and accessory materials. Contact your Beckman Coulter Representative for information about the Field Rotor Inspection Program and the rotor repair center.

## Cleaning

*Wash the rotor and 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. If the rotor is left in the centrifuge for long periods of time, remove it at least once a month for cleaning and lubrication.

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- 1 Remove the O-ring and wash the rotor, lid, and O-ring in a mild detergent, such as Solution 555 (339555), that won't damage the rotor.  
Dilute the detergent with water (10 parts water to 1 part detergent).  
The Rotor Cleaning Kit (339558) contains two plastic-coated brushes and two quarts of Solution 555 for use with rotors and accessories.  
**NOTE** Do not wash the rotor components or accessories in a dishwasher. Do not soak components in detergent solution for long periods of time, such as overnight.
  - 2 Thoroughly rinse the cleaned rotor and components with distilled water.
  - 3 Air-dry the rotor and lid upside down.  
*Do not use acetone to dry the rotor.*
  - 4 Lightly but evenly lubricate the rotor drive-hole threads with Spinkote (306812).
  - 5 Apply a thin, even coat of silicone vacuum grease (335148) to the O-ring, then replace it in the groove in the outer rim of the rotor.
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- 6 Clean metal threads every 6 months, or as necessary.
  - Use a brush and concentrated Solution 555.
  - Rinse and dry thoroughly, then lubricate lightly but evenly with Spinkote to coat all threads.

## Decontamination



If the rotor (and/or accessories) becomes contaminated with toxic, pathogenic, or radioactive materials, follow appropriate decontamination procedures as outlined by your laboratory safety officer. Check *Chemical Resistances* (IN-175) to be sure the decontamination method will not damage any part of the rotor.

## Sterilization and Disinfection

- The rotor and all rotor components can be autoclaved at 118°C for up to 30 minutes. Remove the lid from the rotor and place the rotor, lid, and O-ring in the autoclave upside down
- The rotor lid can be autoclaved at 115°C to 118°C for up to 40 minutes. Remove the O-ring from the lid and place the lid and O-ring in the autoclave.
- Ethanol (70%) or hydrogen peroxide (6%) may be used on all rotor components, including those made of plastic. Bleach (sodium hypochlorite) may be used on the rotor body, but may cause discoloration of anodized surfaces. Do not use bleach on plastic rotor components. Use the minimum immersion time for each solution, per laboratory standards.



**Ethanol is a flammability hazard. Do not use it in or near operating centrifuges.**

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 the rotor is not in use, store it in a dry environment (not in the centrifuge) with the rotor lid removed to allow air circulation so moisture will not collect in the tube cavities.

## Returning a Rotor

Before returning a rotor or accessory for any reason, prior permission must be obtained from Beckman Coulter, Inc. The authorization form may be obtained from your local Beckman Coulter sales office. The form, entitled *Returned Material Authorization* (RMA) for United States returns or *Returned Goods Authorization* (RGA) for international returns, should contain the following information:

- rotor type and 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 email address of the person to be notified upon receipt of the rotor or accessory at the factory,
- name and email address of the person to be notified about repair costs, etc.

To protect our personnel, it is the customer's responsibility to ensure that all 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/RMA form when mailing the rotor and/or accessories.

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

## Supply List

Call Beckman Coulter Customer Service at 1-800-742-2345 (U.S.A. or Canada) or contact your local Beckman Coulter Representative for detailed information on ordering parts and supplies. For your convenience, a partial list is given below.

### Replacement Rotor Parts

Description	Part Number
FA4x8.2P rotor assembly	B30159
Lid assembly (polycarbonate, snap-on)	B31096
Lid assembly, (aluminum, screw-on)	B31097
Rotor O-ring	368896
Tie-down screw	369554
T-handle wrench	361371

## Supplies

**NOTE** For MSDS information, go to the Beckman Coulter website at [www.beckmancoulter.com](http://www.beckmancoulter.com).

Description	Part Number
Spinkote lubricant (2 oz)	306812
Silicone vacuum grease (1 oz)	335148
Rotor Cleaning Kit	339558
Solution 555 (1 qt)	339555



# Beckman Coulter, Inc.

## 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 one (1) year 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**

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.

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.

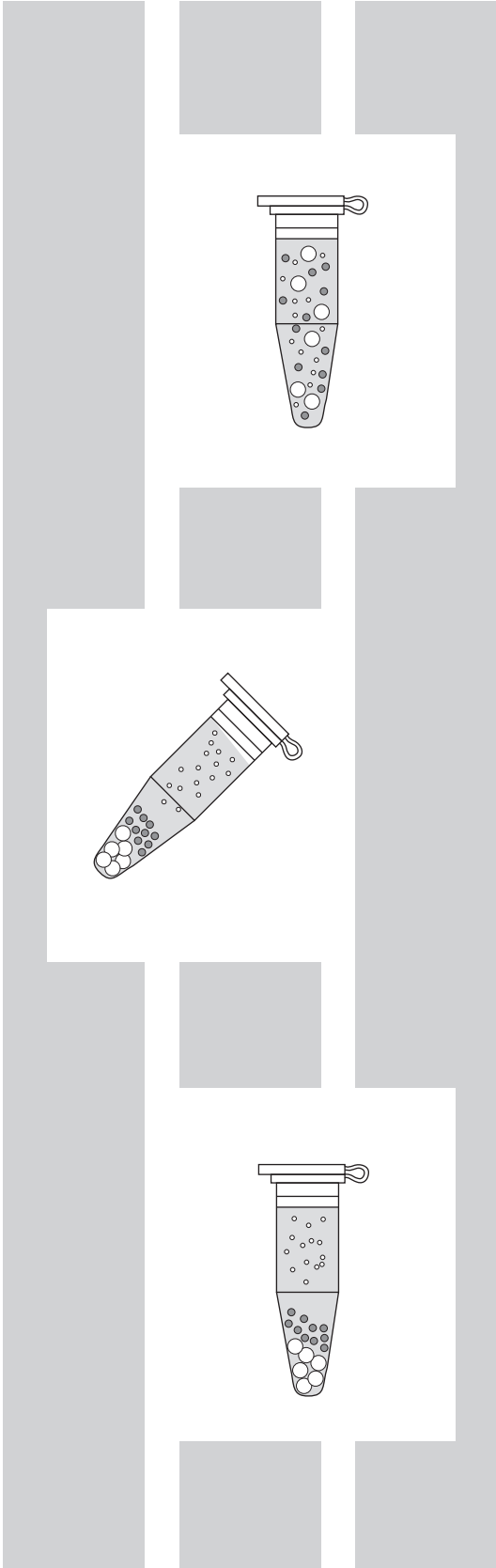
This warranty is void if the rotor is operated with a rotor drive unit or in a centrifuge unmatched to the rotor characteristics or operated in a Beckman Coulter centrifuge that has been improperly disassembled, repaired, or modified.

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.





## Related Documents

### **Microfuge 20 Series Centrifuges (B29070)**

- Safety
- Introduction
- Description
- Operation
- Troubleshooting
- Care and Maintenance
- Installation

Available in hard copy or electronic pdf by request.

### **Chemical Resistances for Beckman Coulter Centrifugation Products (IN-175)**

Available in hard copy or electronic pdf by request.

Available at [www.beckmancoulter.com](http://www.beckmancoulter.com)

[www.beckmancoulter.com](http://www.beckmancoulter.com)

