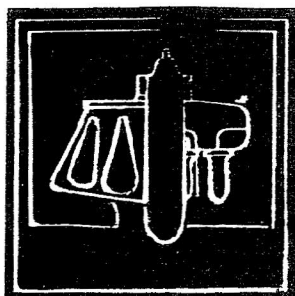


**CARE AND MAINTENANCE**

*This section provides information on the care of rotors and accessories. Included is a table of some common operator problems with suggestions for their solution. Rotors and accessories should be kept in optimal condition, thus minimizing the chances of a rotor or tube failure. In addition to these instructions, observe procedures and precautions provided in rotor instruction bulletins. Appendix A of this manual provides a listing of the chemical resistances of rotor and accessory materials to various acids, bases, salts, and solvents.*

**ROTOR CARE**

Rotor maintenance involves not only careful operating procedures but also careful attention to:

- Regular cleaning, decontamination, and/or sterilization as required,
- Frequent inspection,
- Prevention of corrosion, and
- Regular and proper lubrication.

Do not use sharp tools on a rotor, as the surface can get scratched. Corrosion begins in scratches and may open fissures in the rotor with increased use. The corrosion process accelerates with the stresses produced by speed. The potential for damage from corrosion is greatest in aluminum rotors and components.

※ **NOTE** ※ Wash *only* the buckets of swinging bucket rotors—the components of the hanger mechanism in the rotor body are difficult to dry and can rust. If necessary, wipe off the rotor body with a damp cloth.

Normally, rotors in frequent use should be washed about once a week. Wash the rotor immediately, however, if salt solutions or other corrosive materials have been run, or if spillage has occurred. Do NOT allow corrosive materials to dry on the rotor.


Most laboratory detergents are too harsh for aluminum rotors. Therefore, be sure to use a mild detergent, such as Beckman Solution 555 diluted 5 or 10 to 1 with water, and brushes that will not scratch the rotor. (The Rotor Cleaning Kit, part number 339558, contains two quarts of Solution 555 and two brushes.) Rinse the cleaned rotor with distilled water and air-dry the body or buckets upside-down.

Remove O-rings for cleaning, using plastic or wooden tools—*do not use metal tools*. Wipe clean the O-rings or gaskets regularly (lubricate after cleaning). Replace them about twice a year or as required.

Clean all surfaces in contact with O-rings often. Routinely clean the threads of the rotor (lid, handle, buckets, cavities, etc.) with a brush and a small amount of concentrated detergent, then rinse, and dry well. Lubricate the threads as directed below.

#### DECONTAMINATION

Rotors contaminated with radioactive or pathogenic materials must be decontaminated following appropriate laboratory safety guidelines and/or other regulations. Consult Appendix A to select a solvent that will not damage the rotor.

 **CAUTION** Strong bases and/or high-pH solutions can damage aluminum rotors and components.

Aluminum rotors contaminated with radioactive materials must be decontaminated using a solution that will not damage the anodized surface. Beckman has tested a number of solutions and found two which, in its limited testing program, do not harm anodized aluminum: RAD-CON (Nuclear Associates, Carle Place, New York 11514) and RADIACWASH (Atomic Products Corp., Center Moriches, New York 11934). Beckman does not, however, warrant the performance of these products with respect to their ability to decontaminate the rotor.

#### STERILIZATION AND DISINFECTION

Rotors, including O-rings and gaskets, can be autoclaved at 121°C for up to one hour. Remove the lid, bucket caps, or rotor plugs and place the rotor in the autoclave upside-down. (O-rings and gaskets can be left in place on the rotor.) Ethanol (70%)<sup>1</sup> is compatible with all rotor materials and can be used in disinfecting the rotor.

While Beckman 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.

<sup>1</sup> Flammability hazard. Do not use in or near operating centrifuges.

## CHEMICAL RESISTANCES OF BOTTLE-AND-CAP

The bottles are made of polyallomer, the caps of anodized aluminum. Polyallomer is chemically resistant to some chemicals which attack aluminum, and aluminum is resistant to some chemicals which attack polyallomer. Since the cap must always be used with the bottle, the most useful list of chemical resistances will be that of the combination -- that is, of bottle-and-cap together. This list is given below.

The interior surfaces of the bottle are essentially non-wettable.

S = Satisfactory resistance

U = Unsatisfactory resistance

F = Fair resistance

Acetic acid, glacial, 99%	U	Glycerophosphate, pH 9.6	S
Acetone	S	Hydrochloric acid, concentrated	U
Ammonium hydroxide, 28%	S	Hydrogen peroxide, 10%	U
Ammonium persulfate, pH 3.25	S	Isopropyl alcohol	S
Benzaldehyde	S	Methanol	S
Benzene	U	Methyl cellosolve	S
Carbon tetrachloride	U	Methyl ethyl ketone	S
Chloroform	U	Nitric acid, 70%	U
Cyclohexane	U	Petroleum ether	U
Diethyl ether	U	Phenol	S
1-4 dioxane	S	Phosphate, pH 7.6	S
Ethanol	S	Sodium citrate, pH 4.25	S
Ethyl acetate	F	Sodium hydroxide, 50%	U
Ethylene chloride	F	Toluene	U
Ethylene glycol	S	Tris glycine, pH 8.3	S
Formaldehyde	S	Tris hydrogen chloride, pH 6.73	S

**CAUTION** Do not use biologically active materials whose pH is below 3 or above 10.

## ROTOR AUTOCLAVING

Both aluminum and titanium rotors, including buckets and caps, may be autoclaved at temperatures up to 125°C. Ethylene oxide or ultraviolet radiation may also be used for sterilizing rotors and is the preferred method for the SW 50L, SW 40 Ti, SW 27, and Type 65. Ethylene oxide must be used for the SW 56 Ti.

## ROTOR CLEANING

### Aluminum Rotors

Handle rotors carefully. Corrosion can begin in scratches on the finish and open fissures in the metal that will gradually weaken the rotor. Routinely rinse the rotor, buckets and caps with warm distilled water at the end of the day, then dry thoroughly with compressed air or a hot air dryer.

If corrosive or caustic materials have been run, wash the rotor (and buckets and caps) immediately after the run with a 1% solution of a mild, lukewarm, non-alkaline detergent such as Ivory Liquid, made by Procter & Gamble, Cincinnati, Ohio. (Most laboratory detergents are too strong for anodized finishes.) Use a test-tube brush on rotor holes if necessary, but do not permit the wire tip to scratch cavity surfaces. Rinse immediately in distilled water and dry thoroughly. If hinge-pins must be washed, dry them thoroughly immediately after washing to prevent rust. Store rotors in a non-caustic atmosphere, with lids removed.

### Titanium Rotors

Although titanium rotors are more corrosion-resistant than aluminum rotors, they should be washed at the end of the day in lukewarm water or a 1% solution of a mild detergent such as Ivory Liquid. A test-tube brush may be used on rotor holes. If caustic materials have been run, or if salt solutions have spilled on rotor or lid surfaces, wash them off immediately after the run. Rinse and dry thoroughly. Store with lid removed.

## ROTOR LUBRICATION

Occasionally apply a thin film of all-purpose lubricant such as Spinkote or Lubriplate (both available from Spingo Division) to aluminum-to-aluminum threads in the rotor assembly. This includes hinge-pins, bucket caps, rotor stud and handle, and the SW 39L rotor support ring around the hollow-stem handle.

**NOTE:** Failure to keep these threads lubricated can result in frozen or stripped threads, with permanent damage to the rotor.

Keep hinge-pins coated with lubricant to prevent corrosion. Lubrication is particularly important in high-performance rotors, such as the Type 65, 60 Ti, 50.1 and 42. (See individual rotor instructions.)

## ROTOR INSPECTION

After every 100 hours of operation, inspect rotors for incipient stress cracking, especially inside the cavities. This may take the form of a depression before the crack itself becomes visible. If depressions, heavy discoloration or any other sign of corrosion is evident, do not run the rotor. Show it to your Field Service Engineer, or send it to Spingo Division for inspection.

