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SF-240

Swinging Bucket rotor

INSTRUCTION
AND
SERVICE MANUAL

To ensure proper operation of the centrifuge, be sure to read this manual carefully before operating it.
Also, keep this manual handy so that you can refer to it at any time.

NOTE

■The products being indicated in this Instruction Manual are designed for operators with expert knowledge and are intended only to be used by such qualified operators observing the indicated precautions for respective purposes. For persons lacking necessary expert knowledge, these products may be difficult to use properly and may even pose a danger to use. When the aforesaid persons lacking the necessary expert knowledge are using these products, do so under appropriate supervision and guidance of a qualified operator possessing the necessary expert knowledge.

■Do not distribute this manual within the U.S.A., Mexico, Canada and Australia as the products advertised in the manual shall not be distributed in these countries.

For information added or modified after December 2005, please contact your local dealer.

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[13 Pages]
FY2123006

Safety Instructions

The centrifuge and the manual indicate important information in order to ensure safe operation of the centrifuge and to prevent physical injuries and property damages. Be sure to understand the meanings of the following indications and follow the instructions.

1. Explanation of indication

Indication	Meaning
⚠ **WARNING**	It is a possibility of serious accident resulting in death or serious injury.
⚠ **CAUTION**	It is a possibility of accident resulting in slight or non-fatal injury or property damage.

■ "Serious injury" is defined as injuries such as loss of eyesight, burn (high/low temperature), electric shock, bone fracture, poisoning causing aftereffects, or any other injuries requiring long-term medical treatment at hospital.

■ "Non-fatal injury" is defined as burns, electric shock, or any other injuries which do not require long-term medical treatment at hospital. "Property damage" is defined as expansion damage related to damage to equipment or other property.

2. Explanation of pictorial marks

Pictorial marks	Meaning
	Indicates prohibition (things you must not do). Details are shown near the mark, using illustration or sentences.
	Indicates requirements (things you have to do). Details are shown near the mark, using illustration or sentences.

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General Notes　Be sure to follow them.

Since large electrical and mechanical energies are present on the centrifuge and rotor, reasonable care is required for their handling.
Otherwise, failure may occur resulting in property damages or fatal physical injuries.
In order to prevent them from happening, be sure to follow the instruction given below.

⚠WARNING

（1）Maximum load

Do not exceed the maximum load of rotor and bucket.
The rotor or bucket used beyond the allowable load level can be damaged, thereby causing an accident.

（2）Maximum speed

Keep the rotor and bucket speed below the maximum speed.
Excessive speed may cause damage to the rotor, bucket and the centrifuge. The maximum speed depends on the rotor and bucket strength.

（3）Modification and unspecified parts

Do not modify, nor use unspecified parts.
Unauthorized retrofit of the centrifuge, rotor or bucket, or use of unauthorized parts for them can result in accidents.

（4）Hazardous material

Do not put any hazardous material (explosive, chemically active, organic, or radiation containing material, or material contaminated by pathogenic microorganisms) as a sample of the centrifuge and do not place it closer than 30 cm to avoid a secondary accident should the centrifuge accidentally rotate and contact the material.

（5）Lid

Do not open the lid when the rotor is spinning.
Physical contact with the spinning rotor or bucket may cause serious injury.

（6）Sterilization

Ensure that the rotor or bucket may not be heated beyond 100 ℃.
It is prohibited to implement the autoclave or dry disinfection for the rotor or bucket, otherwise they can be damaged and, as the result, accidents.

（7）Rotor and drive shaft during rotation

Do not touch rotor and drive shaft during the rotation.
Physical contact with the spinning rotor or drive shaft may cause serious injury.

（8）Damaged, corroded, rusted or deformed

Discontinue use of the equipment when its rotor or the buckets found to have been damaged, corroded, rusted or deformed.
Otherwise failure may occur.

（9）Lifetime of rotors

Use of rotors beyond the lifetime may lead to breakage of the rotor.
If the rotor is used continuously even after the lifetime of the rotor has expired, should the rotor get damaged an accident may occur.

⚠ CAUTION

（１）Toxic or radioactive substances etc.

When centrifuging of substances contaminated with pathogenic bacteria, or toxic or radioactive substances, always use containers that are pathogenic bacteria, toxic substance or radiation proof.
Otherwise, infections, intoxication or radioactive exposure accidents may occur.

（２）Fasten a rotor

Push the rotor into the drive shaft until a "click" sound occurs.
If not positively held in place, the rotor or centrifuge can be damaged, thereby causing accidents.

（３）Bucket

The same type buckets must be provided to every rotor yoke.
If not positively held in place, the rotor or centrifuge can be damaged, thereby causing accidents.

（４）Tube

Use the same type of tubes.
The wrong arrangement will cause imbalance and resulting in damage to rotor, bucket or the centrifuge, thereby causing accidents.

（５）Balance of sample

Keep the load (of the sample, bucket, etc.) balanced.
If an appropriate balance is not provided, unexpected accidents can result from a damaged rotor or centrifuge.

（６）Cushion

Replace the cushion when the glass or plastic tube is cracked.
If the cushion with glass fragment cut to it is used, the tube is easily cracked.

（７）Cleaning

Do not use detergents exceeding the range of pH 5-8 or chlorine detergents for washing purposes.
Corrosion may damage the rotor and bucket resulting in damage to the centrifuge.

（８）Buckets swing up

Be careful not to exhaust any grease in the bucket groove.
If the buckets are not swung up smoothly, accidents can result from a dameged rotor or centrifuge.

NOTE　Regarding other precautions, observe those that appear in the instruction manuals for the respective centrifuge models.

Usable Centrifuge

⚠WARNING

（1） Do not use any rotors other than those specified in (2) below.
If centrifuges other than those specified are used, the rotors and buckets may be broken, resulting in a serious accident.

（2） The centrifuges that can mount as of November 2005 are as follows:
This information is subject to addition or change.
For information after December 2005, please contact your local dealer.

Model
3740, 6200

When installing a centrifuge, always read the Instruction Manual for that centrifuge.

Lifetime of rotors

⚠WARNING

Use of rotors beyond the lifetime may lead to breakage of the rotor.
If the rotor is used continuously even after the lifetime of rotors has expired, should the rotor get damaged, the main unit of the centrifuge suddenly may start to rotate; this could result in an accident causing injury or death.

Lifetime of rotors is 7 years after the delivery.

When 7 years have passed after the delivery, discontinue operation of the centrifuge to replace the rotor with a new one.
Earlier replacement, however, is required if any corrosion, lowered strength, flaw or deform due to incorrect operation is detected on the rotor.
In such case, contact your local dealer and be sure to have the rotor checked before reusing it.

Section 1 Mounting the Rotor

1－1. Mounting the Rotor

⚠CAUTION

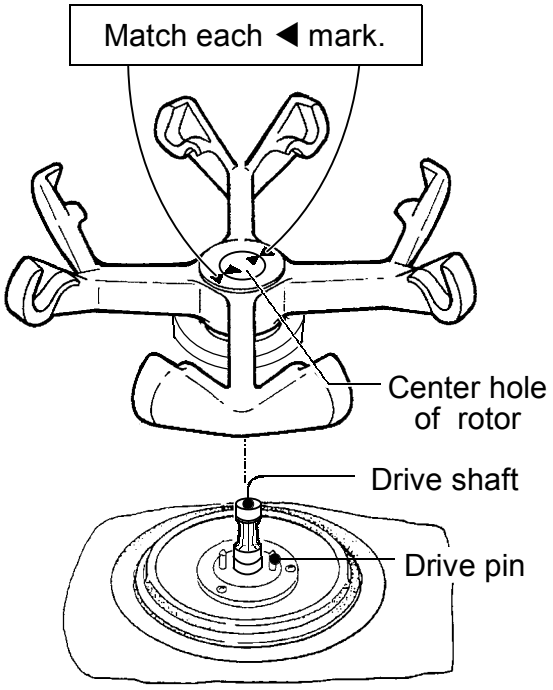
Securely push in the rotor to the bottom of the drive shaft until you hear the sound of "click".
If you rotate the shaft without pushing it in completely, a strong vibration occurs, causing the rotor to touch the chamber.

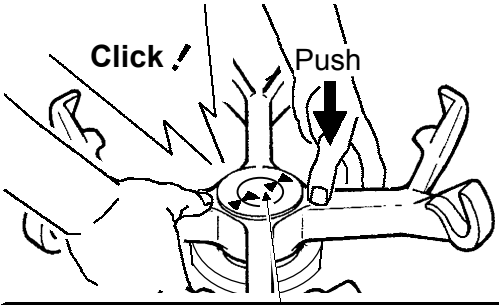
This rotor is mountable with a single motion.

Mounting the rotor

1. Align the ◀ mark of the rotor yoke to the drive pins. Push the rotor into the drive shaft until the drive shaft gives a click sound.

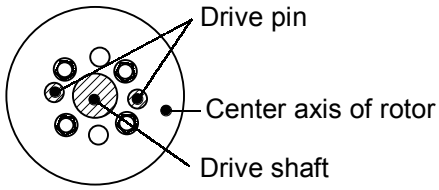
2. After mounting the rotor, the end of the drive shaft is same height with center axis of the rotor.





If you have securely pushed it in, the end of the drive shaft is same the height of rotor.

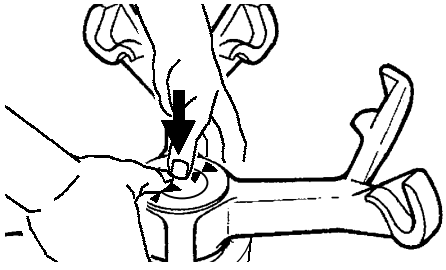
When the end of the drive shaft with ◀ mark and center axis of rotor with ◀ mark is not matched, drive pin is not aligned with the pinhole of the rotor bottom.
In such a case, reinstall the rotor.



Remove the rotor

1. Remove the bucket from the rotor.
2. Press the head of the drive shaft in the center of the rotor with both thumbs. Then, pull the rotor straight upward, and you can remove the rotor.

Note : If you pull up aslant, the rotor will hit against other parts and cannot be removed smoothly.

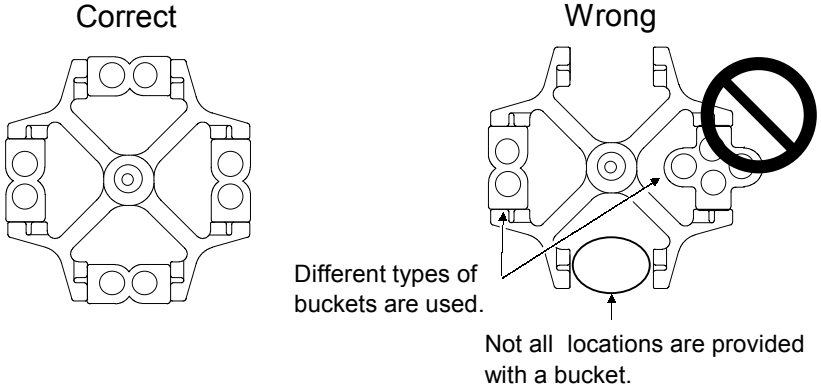


1－2. Cautions on Use of the Rotor

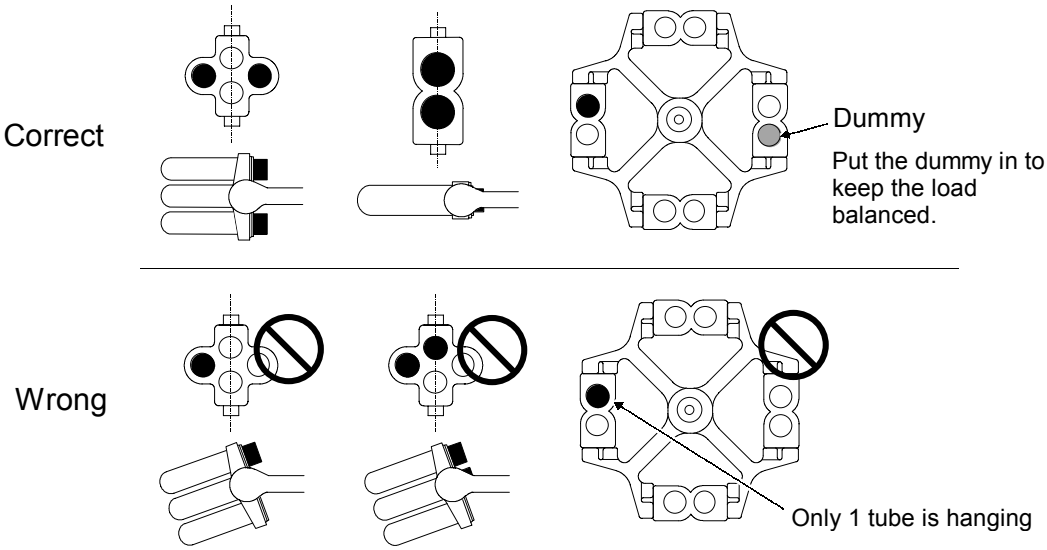
[1] Setting Buckets

⚠CAUTION

The same type buckets must be provided to every (4places) rotor yoke.
If not positively held in place, the rotor or centrifuge can be damaged, thereby causing accidents.



[2] Tube distribution method



⚠CAUTION

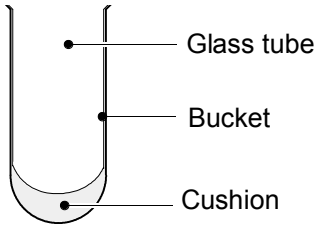
■ **Distribute the tubes symmetrically about the center of the bucket.**

- Appropriate balance is lost and violent vibrations can result if tubes are incorrectly arranged. And, unexpected accidents can result from such violent vibrations.
- The settling chamber may be tilted since the tubes can't be maintained horizontal during rotation.
- When you don't have enough number of tubes, dummy tubes shall be used to maintain symmetry of the both sides.

■ **Keep the load balanced symmetrically within 10 gram.**

［3］ Cushions / Adapter

When glass tubes are used, be sure to use the cushion to avoid damage.
Insert the cushion into the tube rack so that its concave side faces upward.
If a glass tube is damaged, replace the cushion.
If broken pieces of the glass tube are contained in the cushion, the glass tube will be broken again.



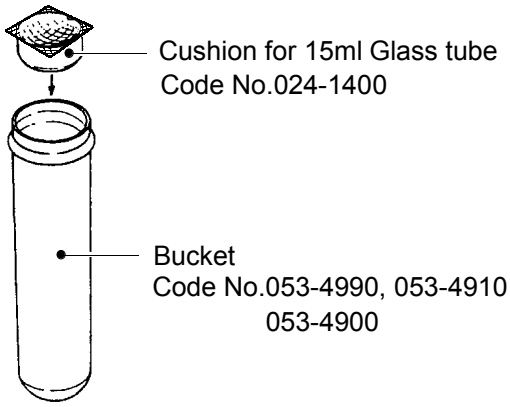
Do not insert the cushion upside down or in a slanted position, otherwise, the glass tube may be damaged or you may not be able to remove it.

（1） Cushion for 15ml and 50ml Glass tubes

How to place 15ml cushion

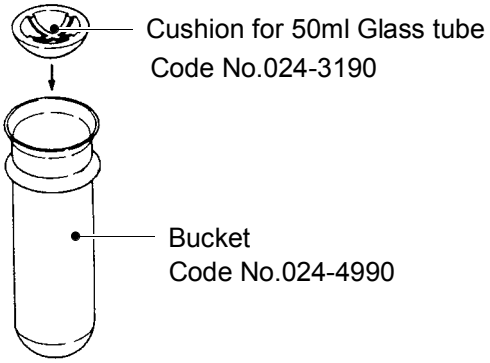
① Place a cushion in the bucket with the concave surface facing upward.

② Fully insert the cushion to the bottom of the hole using a glass tube.
(the edges of the cushion bend to prevent it from coming out.)



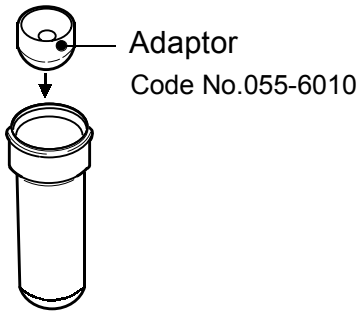
How to place 50ml cushion

Place a cushion in the bucket with the concave surface facing upward.

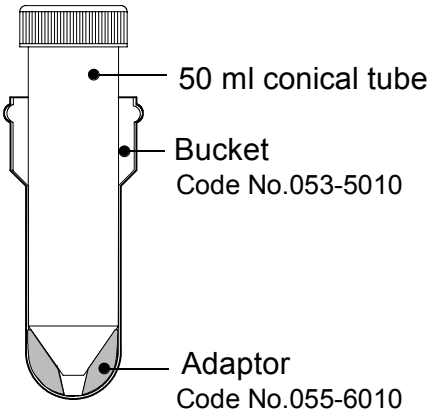


（2） Adapter for 15 ml / 50 ml conical tubes

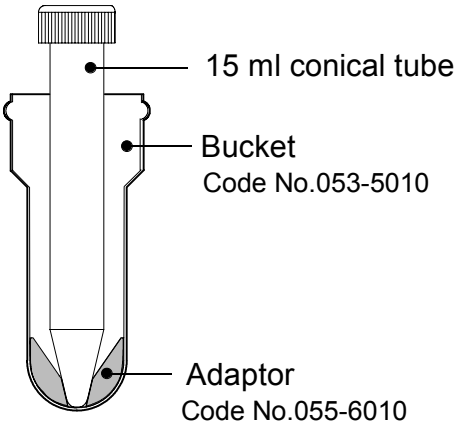
When using the bucket (code No. 053-5010) commonly for both a 50 ml and a 15 ml conical tube, an optional adapter (code No. 055-6010) must be used.



50ml conical tube

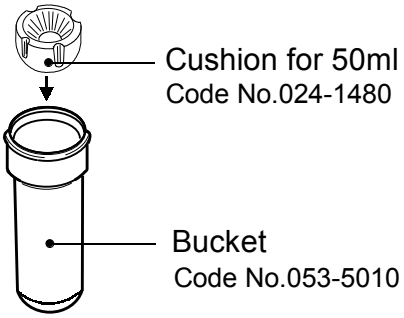


15ml conical tube



（3） Cushion for 50 ml conical tube

The cushion (Code No.024-1480) is fitted to the bucket (Code No.053-5010) and is exclusively used for the 50ml conical tube (culture tube).

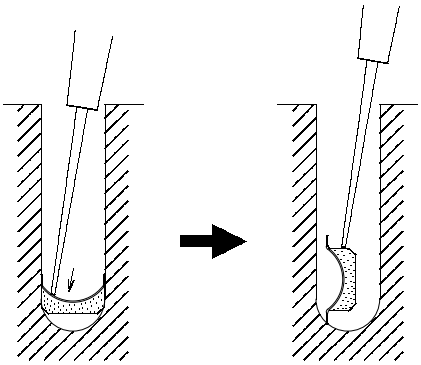


（4） How to remove cushion

① Stick the cushion with an eyeleteer or a pair of pointed tweezers.

② Raise the cushion perpendicularly on the bucket bottom.

③ Stick the side of the cushion to take it out.



[4] Cleaning

⚠CAUTION

Do not use detergents exceeding a pH range of 5 - 8, or chlorinated detergents normally used for washing.
Corrosion may damage the rotor, bucket, or tube rack, resulting in damage to the centrifuge.

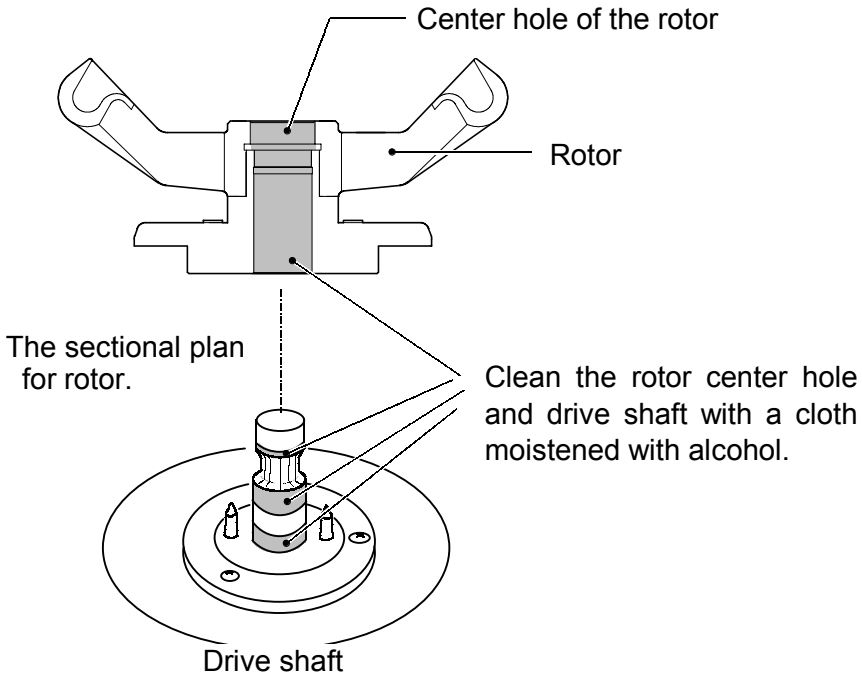
(1) Bucket and rotor are removed from a centrifuge.
(2) Wash the bucket and the rotor with the neutral detergent and warm water and rinse with the distilled water.
(3) Dry the inside before you operate the centrifuge.
If water has accumulated inside the rotor, place the rotor with its bottom side up and dry it completely.

[5] Dismounting and mounting of rotor

When the rotor does not slide smoothly at the times of dismounting and mounting, clean the rotor center hole and the drive shaft with a cloth wetted with rubbing alcohol

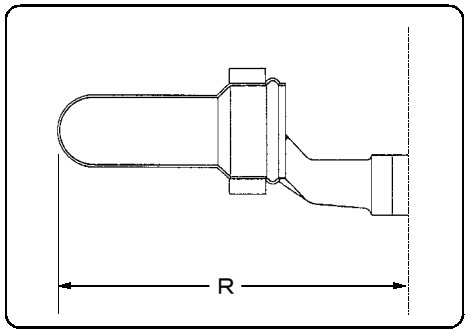
⊘

Do not use a lubricant; it may be mixed into a sample during centrifuging.



Section 2 Specification

2－1. SF-240 Swinging Bucket Rotor



Maximum Weight	1.6 kg

（1）Max. speed, Max. RCF and Refrigeration characteristics

Model	Maximum Speed rpm	Maximum R C F × g	Refrigeration characteristics At 25℃ of ambient temperature.
3740 6200	4,000	2,610	The temperature of a sample can be cooled down to 4℃ at least at maximum speed.

（2）Indication of Centrifugal Force

The centrifugal force at each speed being indicated by the centrifuge is based on the following condition:

R : A maximum radius of 14.4 cm.
The radius of Code No.053-4900 bucket.

In case of conditions other than the above, substitute the actual values for the "speed" and "radius" in the following formula to calculate the centrifugal force:

$$\text{Centrifugal force RCF}(\times g) = 11.18 \times \left(\frac{\text{Speed N (rpm)}}{1000}\right)^2 \times \text{Rotation Radius R(cm)}$$

(3) Specification

Nominal Capacity ml	Number of Tube	Tubes Material *1	Tube Sizes Dia. × Length mm	Form *2	Tubes Code No.	Allowable Speed rpm	RCF × g	Bucket Code No.	Tube rack / Adaptor Code No.	Cushion Code No.	Maximum Radius R cm	Allowable load gram *7
2	24	PP	9.5-11 × 36-42	C R	2ml micro tube *3	4,000	2,410	053-4800	—	—	13.5	50
5	24	GL PL	12.5-13.3 × 46-105	R	Becton, Dickinson Hemolyse tube		2,430	053-5850	—	—	13.6	70
10					052-6320							
10	4	PL	15-17.2 × 87-110	R	VENOJECT II etc. Hemolyse tube		2,540	053-4910	—	—	14.2	30
15	4	GL		C R	052-6360 052-6330		2,540	053-4910	—	024-1400	14.2	
15	4	PL	17 × 121	C	Conical tubes FALCON etc.		2,580	053-4910 *4		Use bucket without cushion.	14.4	
10	8	PL	15-17.2 × 87-110		VENOJECT II etc. Hemolyse tube		2,520	053-4900	—	024-1400	14.1	60
15	8	GL		C R	052-6360 052-6330							
15	8	PL	17 × 121	C	Conical tubes FALCON etc.		2,580	053-4900 *4		Use bucket without cushion.	14.4	
10	4	PL	15-17.8 × 87-110	R	VENOJECT II etc. Hemolyse tube		2,500	053-4990	055-7400	024-1400	14.0	100
15	4	GL		C R	052-6360 052-6330							
50	4	GL	27-37 × 95-110	R	VENOJECT II etc. Hemolyse tube		2,540	053-4990	—	024-3190	14.2	100
50	4	PL	30 × 117	C	Conical tubes FALCON etc.		2,560	053-5010		024-1480 *6	14.3	80
15	4		17 × 121				2,610		055-6010 *5	Use bucket without cushion.	14.6	
50			30 × 117				2,500				14.0	

*1 PP : Polypropylene GL : Pyrex Glass PL : Plastic

*2 C : Conical R : Round type

*3 The support for the tube of a special size can be produced. Please contact your local dealer.

*4 Use a bucket after removing cushion.

*5 Be sure to remove the cushion (No. 024-1480) and then use the adaptor (Code No. 055-6010).

*6 Cushion is included with this bucket.

*7 Allowable load per bucket.
This load includes the weight of the sample, adaptor, tube rack, cushion, tube, cap, etc.
The weight of bucket is not included in the allowable load.

NOTE

Our company cannot accept responsibility for any accidents that are caused by unauthorized retrofit of the rotor or bucket, or that result from the use of an unspecified adapter.