

USE AND CARE OF CENTRIFUGE TUBES AND BOTTLES

Refer to the applicable rotor manual for specific information about the use of your rotor and labware.

TUBE AND BOTTLE DOs AND DON'Ts

DO	DON'T
<ul style="list-style-type: none">Do inspect tubes for cracks or any major deformities before use.Do observe careful filling and sealing procedures to prevent tube collapse. Centrifugal force may cause improperly filled or sealed tubes to collapse.Do pretest plastic tubes and bottles for high- or low-temperature runs (above 25°C or below 2°C) under anticipated run conditions, using buffer or gradient of similar density rather than a valuable sample. Be sure that plastic labware is thawed to at least 2°C prior to centrifugation.Do observe run speed limitations contained in applicable rotor manuals.Do discard Quick-Seal[®], OptiSeal[™], and thinwall open-top tubes after a single use.Do hand-wash tubes and bottles, using a mild detergent solution such as Beckman Solution 555[™] diluted 10 to 1 with water. Rinse with distilled water, and air-dry. (Refer to the sterilization and disinfection chart below.)Do make sure all tubes and bottles are completely dry before storing them. Store them in their containers in a cool, dry place away from ozone, chemical fumes, and ultraviolet light.	<ul style="list-style-type: none">Don't use a tube or bottle that shows signs of cracks or major deformity.Don't use a tube or bottle that has become discolored or brittle.Don't exceed run speed limitations contained in applicable rotor manuals.Don't re-use thinwall, Quick-Seal, or OptiSeal tubes.Don't wash tubes or bottles in a dishwasher.Don't soak tubes or bottles in hot water or detergent solution for longer than 10 minutes.Don't use strongly alkaline detergent solutions for washing tubes or bottles.Don't use a hemostat or any metal tool to pry a jammed or collapsed tube or bottle out of the rotor. The rotor can be scratched and damaged. <i>Remove the tube or bottle contents</i> and place the rotor upside-down in an autoclave. Autoclave at 121°C for about 30 minutes. At the end of the autoclave cycle the tube or bottle material should be softened enough for easy removal. Contact your Beckman Coulter Service representative if this method is unsuccessful.

CHEMICAL RESISTANCES OF TUBE AND BOTTLE MATERIALS

This information has been consolidated from a number of sources and is provided only as a guide to the selection of tube and bottle materials. Soak tests at 1 g (at 20°C) established the data for most of the materials; reactions may vary under the stress of centrifugation, or with extended contact or temperature variations. To prevent failure and loss of valuable sample, ALWAYS TEST SOLUTIONS UNDER OPERATING CONDITIONS BEFORE USE. Refer to *Chemical Resistances* (publication IN-175) for information about specific solutions.

Tube/Bottle Material	Optical Property	Acids (dilute or weak)	Acids (strong)	Alcohols (aliphatic)	Aldehydes	Bases	Esters	Hydrocarbons (aliphatic)	Hydrocarbons (aromatic and halogenated)	Ketones	Oxidizing Agents (strong)	Salts
Ultra-Clear	transparent	S	U	U	S	U	U	U	U	U	U	S
polycarbonate	transparent	M	U	U	M	U	U	U	U	U	M	M
polypropylene	translucent/transparent	S	S	S	M	S	M	S	M	M	M	S
polyethylene	transparent/translucent	S	S	S	M	S	M	U	M	M	M	S
cellulose propionate	transparent	S	U	U	U	U	M	S	S	U	M	S
stainless steel	opaque	S	U	S	S	M	S	S	S	M	S	M

S = satisfactory resistance M = marginal resistance U = unsatisfactory resistance



WARNING

Do not use flammable substances in or near operating centrifuges.

STERILIZATION AND DISINFECTION

This information is provided as a guide to the use of sterilization and disinfection techniques for tube and bottle materials. Cold sterilization results shown are for short-duration (10-minute) soak periods; reactions may differ with extended contact. Refer to *Chemical Resistances* for information about specific solutions.



NOTE

Although Beckman Coulter has tested these materials for compatibility with labware materials, 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.

Tube/Bottle Material	Autoclave ¹ (121°C)	UV Irradiation	Ethylene Oxide	Formaldehyde	Ethanol (70%) ²	Sodium Hypochlorite (10%)	Hydrogen Peroxide (10%)	Glutaraldehyde (2%)	Phenolic Derivatives
Ultra-Clear	no	no	yes	yes ³	yes	yes	yes	yes	no
polycarbonate	yes ⁴	no	yes	yes ³	no	yes ⁵	yes	yes	no
polypropylene	yes	no	yes	yes	yes	yes ⁶	yes ⁷	yes	no
polyethylene	no	no	yes	yes	yes ⁸	yes	yes	yes	yes
cellulose propionate	no	no	no	no	no	yes	yes	yes	no
stainless steel	yes	yes	yes	yes	yes ⁹	no	yes	yes	no

¹ To avoid deformation, autoclave tubes or bottles upside-down in a tube rack at 15 psig for no more than 20 minutes (allow to cool before removing from tube rack). DO NOT autoclave capped or sealed tubes or bottles. Do not autoclave tube or bottle accessories made of Noryl (a registered trademark of GE Plastics).

² Flammable; do not use in or near operating centrifuges.

³ Do not use if there is methanol in the formula.

⁴ Tube life will be significantly reduced by autoclaving.

⁵ Discoloration may occur.

⁶ Can be used if diluted.

⁷ Below 26°C only.

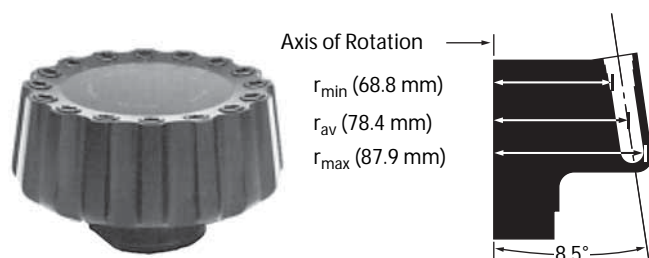
⁸ Below 21°C only.

⁹ Marginal.

DECONTAMINATION

If tubes and/or accessories are contaminated with radioactive or pathogenic solutions, decontaminate or dispose of them following appropriate safety guidelines and/or regulations.

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**NVT Near-Vertical Tube Rotor, Titanium**For use in instruments classified: **H R S**

Note: Solutions up to 1.7 g/mL in density can be run in this rotor without a reduction in rotor speed.

Major applications: Separation of plasmid, mitochondrial, or chromosomal DNA, proteoglycans, and lipoproteins.

Max. RPM	Max. <i>g</i>	<i>k</i> Factor	Number of Tubes Volume/Size	Rotor Capacity
65 000	416 000	15	16 x 5.1 mL ½ x 2 in 13 x 51 mm	81.6 mL

No. 361073. NVT 65.2 Rotor Package with 12 each 342882 Rotor Plug Gaskets, 1 each 342705 Vise Assembly, 858121 Torque Wrench, 976959 Torx Wrench Adapter, 306812 Spinkote Lubricant, and 2 each 330338 Overspeed Disks.

No. 360972. OptiSeal Tube Kit with 4 boxes 362185 OptiSeal Polyallomer Tubes, 16 Spacers 362198, 1 Tube Rack 361638, 1 Tube Extraction Tool 361668, and 1 Spacer Removal Tool 338765.

No. 360977. Quick-Seal Tube Kit with 4 boxes 342412 Quick-Seal Polyallomer Tubes, 16 Spacers 342883, 1 Tube Rack 348122, and 1 Tube Extraction Tool 361668 (Cordless Tube Topper Kit required, see Tools, Accessories, and Supplies).

Tubes and Bottles

Tube Style/Material	Vol. (mL) <i>g-Max</i>	Part No.	Quantity	Size (mm)	Spacers (qty. 1)	Floating Spacers (qty. 1)	<i>g</i> -Force	<i>k</i> Factor	Max. Speed
OptiSeal Polyallomer	4.9	362185	56	13 x 51	362198	—	416 000	15	65 000
Quick-Seal Polyallomer	2.0	345829	50	13 x 25	342883	345827	416 000	7	65 000
	2.0	357326 ^s	50	13 x 25	342883	345827	416 000	7	65 000
	5.1	342412	50	13 x 51	342883	—	416 000	15	65 000
Quick-Seal Ultra-Clear	5.1	344075	50	13 x 51	342883	—	416 000	15	65 000

Note: To help you locate *g-Max* tubes in the rotor listings, these tubes are highlighted with bold, italic type.

^s To simplify ordering, this *g-Max* Kit includes enough spacers to fill rotor, 50 tubes and required tools.

Rotor Replacement Parts

330338 Overspeed Disk, 65 000 rpm
 342882 Gasket for Rotor Plug
 368545 Rotor Replacement Plug (single)
 368546 Rotor Replacement Plugs with Gaskets (set of 8)
 858121 Torque Wrench
 976959 Torx Wrench Adapter

Adapters/Spacers

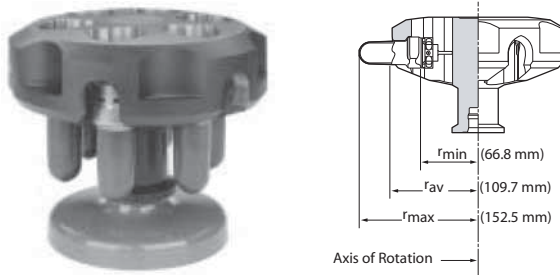
342883 345827 362198



SW 32 Ti **BIOE**

6 x 38.5 mL

SW 32 Ti

**Swinging-Bucket Rotor and Buckets, Titanium**For use in instruments classified: **H R S**

Major applications: Separation of subcellular particles and viruses in density gradients.

Max. RPM	Max. g	k Factor	Number of Tubes Volume/Size	Rotor Capacity
32 000	175 000	204	6 x 38.5 mL 1 x 3.5 in 25 x 89 mm	231 mL

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No. 369694. SW 32 Ti Rotor Package. Includes Rotor, 1 box 326823 Polyallomer Tubes, 2 boxes 344058 Ultra-Clear Tubes, 1 box 355631 Polycarbonate Tubes, 1 each 331186 Bucket Holder Rack, 306812 Spinkote Lubricant, 335148 Vacuum Grease, 335456 Overspeed Disk, 978354 hooked O-ring Removal Tool, and 24 each 812715 O-rings.

No. 369650. SW 32 Ti Rotor Assembly.

Tubes and Bottles

Tube Style/Material	Vol. (mL) <i>g-Max</i>	Part No.	Quantity	Size (mm)	Floating Spacers (qty. 1)	Adapters (qty. 6)	<i>g</i> -Force	k Factor	Max. Speed
OptiSeal Polyallomer	32.4	361625	56	25 x 77	392833 ^{§§}	—	175 000	155	32 000
Quick-Seal Polyallomer	15.0	343664	50	25 x 38	355536	—	175 000	81	32 000
Bell-Top	27.0	343665	50	25 x 64	355536	—	175 000	146	32 000
	33.5	344623	50	25 x 83	355536	—	175 000	192	32 000
Quick-Seal konical Polyallomer	8.4	358652	50	25 x 38	355536	358156	175 000	74	32 000
	22.5	358654	50	25 x 76	355536	358156	175 000	155	32 000
Bell-Top	28.0	358651	50	25 x 83	355536	358156	175 000	198	32 000
Thinwall konical Polyallomer	25.5	358125	50	25 x 76	—	358156	175 000	156	32 000
	31.5	358126	50	25 x 89	—	358156	175 000	156	32 000
Thickwall Polyallomer	31.0	355642	25	25 x 89	—	—	175 000	198	32 000
Thinwall Polyallomer	38.5	326823	50	25 x 89	—	—	175 000	204	32 000
Thickwall Polycarbonate	31.0	355631	25	25 x 89	—	—	175 000	202	32 000
Ultra-Clear	38.5	344058	50	25 x 89	—	—	175 000	204	32 000

Note: To help you locate g-Max tubes in the rotor listings, these tubes are highlighted with bold, italic type.

^{§§} Set of 2.

Rotor Replacement Parts

331186 Bucket Holder Rack
 332400 Rotor Stand
 335456 Overspeed Disk, 32 000 rpm
 369643 Bucket Cap (each)
 369692 Bucket Assembly, with Caps and O-rings, set of 6
 812715 O-ring for Bucket

Extra Buckets for the SW 32 Ti

The buckets of the SW 32.1 can be used with the SW 32 rotor head.
 369693 Bucket Assembly, with Caps and O-rings, set of 6

Adapters/Spacers

355536

358156

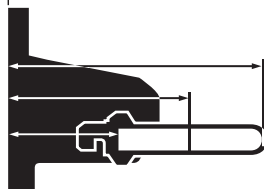
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Axis of Rotation →

 r_{\max} (153.1 mm) r_{av} (110.2 mm) r_{\min} (67.4 mm)**Swinging-Bucket Rotor, Titanium Head, and Buckets (black buckets)**For use in instruments classified: **H R S**

Major applications: Rate-zonal and isopycnic centrifugation of viruses, rate-zonal centrifugation of RNA.

Max. RPM	Max. <i>g</i>	<i>k</i> Factor	Number of Tubes Volume/Size	Rotor Capacity
41 000	288 000	124	6 x 13.2 mL ⅝ x 3½ in 14 x 89 mm	79.2 mL

No. 331336. SW 41 Ti Rotor Package. Includes Rotor, 2 boxes 331372 Polyallomer Tubes, 2 boxes 344059 Ultra-Clear Tubes, 1 each 330070 Hinge Pin Tool, 331313 Bucket Holder Rack, 306812 Spinkote Lubricant, 335148 Vacuum Grease, 330335 Overspeed Disk, and 24 each 331309 Gaskets for Buckets.

No. 331362. SW 41 Ti Rotor Assembly.

Tubes and Bottles

Tube Style/Material	Vol. (mL) <i>g-Max</i>	Part No.	Quantity	Size (mm)	Floating Spacers (qty. 1)	Adapters (qty. 6)	<i>g</i> -Force	<i>k</i> Factor	Max. Speed
Quick-Seal	3.5	355870	50	14 x 25	355534	—	288 000	27	41 000
Polyallomer	5.9	355537	50	14 x 47	355534	—	288 000	55	41 000
Quick-Seal <i>konical</i>	4.0	358650	50	14 x 48	355534	358154*	288 000	57	41 000
Polyallomer	8.0	358649	50	14 x 89	355534	358154*	288 000	124	41 000
Thinwall Polyallomer	13.2	331372	50	14 x 89	—	—	288 000	124	41 000
Thinwall <i>konical</i>	10.0	358120	50	14 x 89	—	358154*	284 000	124	41 000
Polyallomer									
Ultra-Clear	13.2	344059	50	14 x 89	—	—	288 000	124	41 000

Note: To help you locate *g-Max* tubes in the rotor listings, these tubes are highlighted with bold, italic type.

* Recommend P/N 354468 Extractor Tool (*konical* tube adapters).

Rotor Replacement Parts

330335 Overspeed Disk, 41 000 rpm

331309 Gasket for Bucket

331763 Caps, matched set of 6

331313 Bucket Holder Rack

332400 Rotor Stand

333790 Bucket Assembly, Black Titanium, with Caps and Gaskets, matched set of 6

Adapters/Spacers

355534

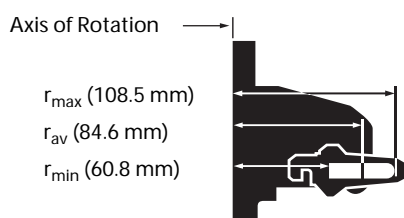
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SW 55 Ti **BIOE**

6 x 5 mL

SW 55 Ti

**Swinging-Bucket Rotor, Titanium Head, and Buckets (red buckets)**For use in instruments classified: **H R S**

Major applications: Rate-zonal separations of small particles.

Max. RPM	Max. <i>g</i>	<i>k</i> Factor	Number of Tubes Volume/Size	Rotor Capacity
55 000	368 000	48	6 x 5 mL ½ x 2 in 13 x 51 mm	30 mL

No. 342196. SW 55 Ti Rotor Package. Includes Rotor, 2 boxes 326819 Polyallomer Tubes, 2 boxes 344057 Ultra-Clear Tubes, 1 each 330070 Hinge Pin Tool, 331313 Bucket Holder Rack, 306812 Spinkote Lubricant, 335148 Vacuum Grease, 328896 Overspeed Disk, and 24 each 824412 O-rings.

No. 342194. SW 55 Ti Rotor Assembly.

No. 361661. OptiSeal Tube Kit with 4 boxes 361627 OptiSeal Polyallomer Tubes, 6 Spacers 361678 (3 pkg of 2), 1 OptiSeal Tube Rack 361650, and 1 Tube Extraction Tool 361668.

Tubes and Bottles

Tube Style/Material	Vol. (mL) <i>g</i> -Max	Part No.	Quantity	Size (mm)	Floating Spacers (qty. 1)	Adapters (qty. 6)	<i>g</i> -Force	<i>k</i> Factor	Max. Speed
OptiSeal Polyallomer	3.3	361627	56	13 x 33	361678 ^{ss}	—	368 000	48	55 000
Quick-Seal Polyallomer	2.0	345829	50	13 x 25	355535	—	368 000	29	55 000
	2.0	357327 ^s	50	13 x 25	355535	—	368 000	29	55 000
Quick-Seal konical Polyallomer	3.2	358647	50	13 x 51	355535	358153	368 000	48	55 000
Thinwall Polyallomer	5.0	326819	50	13 x 51	—	—	368 000	48	55 000
Thinwall konical Polyallomer	3.0	358119	50	13 x 51	—	358153	368 000	48	55 000
Thickwall Polyallomer	3.5	349623	25	13 x 51	—	—	368 000	48	55 000
Thickwall Polycarbonate	3.5	349622	25	13 x 51	—	—	368 000	48	55 000
Ultra-Clear	0.8	344090	50	5 x 41	—	356860*	269 000	64	48 000
	5.0	344057	50	13 x 51	—	—	368 000	48	55 000

Note: To help you locate *g*-Max tubes in the rotor listings, these tubes are highlighted with bold, italic type.

^s To simplify ordering, this *g*-Max Kit includes enough spacers to fill rotor, 50 tubes, and required tools.

^{ss} Set of 2.

* Adapter 305527 can be used for speed up to 25 000 rpm, set of 1.

Rotor Replacement Parts

328896 Overspeed Disk, 55 000 rpm
 331313 Bucket Holder Rack
 332400 Rotor Stand
 342190 Bucket Cap (each)
 342199 Bucket Assembly, Titanium, with Caps and O-rings, matched set of 6
 824412 O-ring for Bucket

Adapters/Spacers

355535

356860

358153

361678

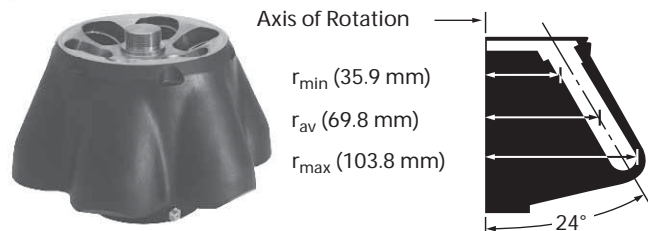


Type 45 Ti **BIOE**

6 x 94 mL

Type 45 Ti

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**Fixed-Angle Rotor, Titanium**For use in instruments classified: **H R S**

Note: This rotor cannot be used in 40 000 rpm F or H instruments or the L5-50E unless the instruments have been upgraded with a diffusion pump and vacuum indicator.

Major applications: Differential centrifugation of large volumes of subcellular fractions and viruses.

Max. RPM	Max. g	k Factor	Number of Tubes Volume/Size	Rotor Capacity
45 000	235 000	133	6 x 94 mL 1½ x 4 in 38 x 102 mm	564 mL

No. 339160. Type 45 Ti Rotor Assembly with 3 each 854519 O-rings, 3 each 878260 O-rings, and 2 each 335458 Overspeed Disks.

No. 348175. Quick-Seal Tube Kit with 4 boxes 345776 Polyallomer Tubes, 4 boxes 345778 Ultra-Clear Tubes, 8 Spacers 342697, 1 each 348125 Tube Rack, 306812 Spinkote Lubricant, and 335148 Vacuum Grease. (Cordless Tube Topper Kit required; see Tools, Accessories, and Supplies.)

No. 348176. Open-Top Tube Kit with 4 boxes 345775 Polyallomer Tubes, 4 boxes 345777 Ultra-Clear Tubes, 8 Tube Caps 330901, 1 Spinkote Lubricant 306812, and 1 Vacuum Grease 335148. (331202 and 305075 Tools required; see Tools, Accessories, and Supplies.)

Tubes and Bottles

Tube Style/Material	Vol. (mL)	Part No.	Quantity	Size (mm)	Required Caps/Spacers (qty. 1)	Required Adapters (qty. 1)	g-Force	k Factor	Max. Speed
Quick-Seal Polyallomer	94.0	345776	25	38 x 102	342697	—	235 000	133	45 000
Quick-Seal Ultra-Clear	94.0	345778	25	38 x 102	342697	—	235 000	133	45 000
Polycarbonate Bottle/Assembly	70.0	355655 ^{ΔΔ}	6	38 x 102	355623	—	235 000	133	45 000 [†]
	70.0	355622 ^{SSS}	6	38 x 102	—	—	235 000	133	45 000 [†]
Thinwall Polyallomer	6.5	326820	50	13 x 64	346256	303449	138 000	90	39 000
	10.5	326822	50	13 x 89	346256	303459	156 000	110	39 000
	13.5	326814	50	16 x 76	330860	303448	149 000	107	39 000
	94.0	345775	25	38 x 102	330901	—	235 000	133	45 000
Thickwall Polyallomer	4.0	355644	25	13 x 64	—	303449	138 000	90	39 000
	10.0	355640	25	16 x 76	338907 [†]	303448	149 000	107	39 000
	10.0	355639	25	13 x 89	—	303459	156 000	110	39 000
	81.0	355643	25	38 x 102	338905 [†]	—	235 000	133	45 000
Thickwall Polycarbonate	4.0	355645	25	13 x 64	—	303449	138 000	90	39 000
	10.0	355630	25	16 x 76	338907 [†]	303448	149 000	107	39 000
	10.0	355629	25	13 x 89	—	303459	156 000	110	39 000
	81.0	355628	25	38 x 102	338905 [†]	—	235 000	133	45 000
Ultra-Clear	6.5	344088	50	13 x 64	346256	303449	138 000	90	39 000
	10.5	344087	50	13 x 89	346256	303459	156 000	110	39 000
	13.5	344085	50	16 x 76	330860	303448	149 000	107	39 000
	94.0	345777	25	38 x 102	330901	—	235 000	133	45 000

^{SSS} Bottle assembly. Reduce speed to 35 000 rpm when the bottle is centrifuged less than full (minimum fill volume is 35 mL).

^{ΔΔ} Bottle only. Reduce speed to 35 000 rpm when the bottle is centrifuged less than full (minimum fill volume is 35 mL).

[†] Caps are optional for these Thickwall tubes. In the Type 45 Ti the filling level for 355643 and 355628 is 47 mL. For 355640 and 355630, the filling level is 8 mL. Maximum speeds for these open-top tubes without a cap: Polycarbonate — 30 000 rpm; Polyallomer — 15 000 rpm.

Rotor Replacement Parts

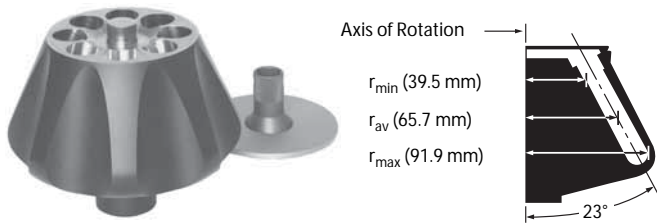
335458 Overspeed Disk, 45 000 rpm
 339163 Rotor Lid
 339164 Rotor Handle
 854519 O-ring, small, for Rotor Lid
 878260 O-ring, large, for Rotor Lid

Adapters/Spacers/Caps

Type 70 Ti **BIOE**

8 x 39 mL

Type 70 Ti

**Fixed-Angle Rotor, Titanium**For use in instruments classified: **H R S**

Major applications: Differential centrifugation of subcellular fractions.

Max. RPM	Max. <i>g</i>	<i>k</i> Factor	Number of Tubes Volume/Size	Rotor Capacity
70 000	504 000	44	8 x 39 mL 1 x 3 ½ in 25 x 89 mm	312 mL

No. 337922. Type 70 Ti Rotor Assembly with 3 each 011757 O-rings, 3 each 870612 O-rings, and 2 each 335585 Overspeed Disks.

No. 348178. Quick-Seal Tube Kit with 2 boxes 342414 Polyallomer Tubes, 2 boxes 344326 Ultra-Clear Tubes, 12 Spacers 342699, 1 each 348124 Tube Rack, 306812 Spinkote Lubricant, and 335148 Vacuum Grease. (Cordless Tube Topper Kit required; see Tools, Accessories, and Supplies.)

No. 348172. Open-Top Tube Kit with 4 boxes 344367 Polyallomer Tubes, 10 Tube Caps 337927, 1 Spinkote Lubricant 306812, and 1 Vacuum Grease 335148. (338841 and 305075 Tools required; see Tools, Accessories, and Supplies.)

No. 361662. OptiSeal Tube Kit with 4 boxes of OptiSeal Tubes 361625, 12 Spacers 361669 (6 pkg of 2), 1 OptiSeal Tube Rack 361646, 1 Tube Extraction Tool 361668, and 1 Spacer Removal Tool 338765.

Tubes and Bottles

Tube Style/Material	Vol. (mL) <i>g-Max</i>	Part No.	Quantity	Size (mm)	Required Caps/ Spacers (qty. 1)	Required Adapters (qty. 1)	<i>g</i> -Force	<i>k</i> Factor	Max. Speed
OptiSeal Polyallomer	32.4	361625	56	25 x 77	361669 ^{SS}	—	504 000	44	70 000
Quick-Seal	15.0	343664	50	25 x 38	343448	—	504 000	24	70 000
Polyallomer	15.0	357343 ^S	50	25 x 38	343448	—	504 000	24	70 000
	27.0	343665	50	25 x 64	343448	—	504 000	31	70 000
	27.0	357346 ^S	50	25 x 64	343448	—	504 000	31	70 000
	33.0	344623	50	25 x 83	344635	—	504 000	38	70 000
	39.0	342414	50	25 x 89	342699	—	504 000	44	70 000
Quick-Seal	15.0	344324	50	25 x 38	343448	—	504 000	24	70 000
Ultra-Clear	27.0	344323	50	25 x 64	343448	—	504 000	31	70 000
	39.0	344326	50	25 x 89	342699	—	504 000	44	70 000
Polycarbonate Bottle Assembly	26.3	355618	6	25 x 89	—	—	371 000	59	60 000
Thinwall Polyallomer	6.5	326820	50	13 x 64	346256	303392	102 000	69	45 000
	13.5	326814	50	16 x 76	330860	303307	151 000	104	40 000
	35.5	344367	50	25 x 83	337927	—	504 000	43	70 000
	38.5	326823	50	25 x 89	331151	—	371 000	59	60 000
Thickwall Polyallomer	4.0	355644	25	13 x 64	—	303392	102 000	69	45 000
	10.0	355640	25	16 x 76	338907 [†]	303307	151 000	104	40 000
	30.0	355642	25	25 x 89	338906 [†]	—	371 000	59	60 000
Thickwall Polycarbonate	4.0	355645	25	13 x 64	—	303392	102 000	69	45 000
	10.0	355630	25	16 x 76	338907 [†]	303307	151 000	104	40 000
	30.0	355631	25	25 x 89	338906 [†]	—	371 000	59	60 000
Ultra-Clear	6.5	344088	50	13 x 64	346256	303392	102 000	69	45 000
	13.5	344085	50	16 x 76	330860	303307	151 000	104	40 000
	38.5	344058	50	25 x 89	331151	—	371 000	59	60 000
Stainless Steel	38.5	301112	1	25 x 89	302133	—	165 000	135	40 000 ^{††}

Note: To help you locate *g*-Max tubes in the rotor listings, these tubes are highlighted with bold, italic type.

^S To simplify ordering, this *g*-Max Kit includes enough spacers to fill rotor, 50 tubes and required tools.

^{SS} Set of 2.

[†] Caps are optional for these Thickwall tubes. In the Type 70 Ti, the filling level for 355642 and 355631 is 16.5 mL. For 355640 and 355630, the filling level is 7.5 mL. Maximum speeds for these open-top tubes without a cap: Polycarbonate—45 000 rpm. Polyallomer—20 000 rpm. These speeds are those which the tubes could withstand when tested at 25°C for 24 hours. Further tests have shown that the polycarbonate tube can run at 50 000 rpm for four hours.

^{††} For solution densities of 2.0 g/mL and below. For solution densities above 2.0 g/mL, further speed reductions are required. Refer to publication L5-TB-072 when centrifuging stainless steel tubes.

Rotor Replacement Parts

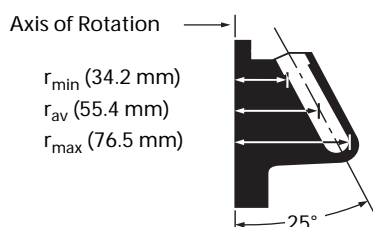
011757 O-ring for Rotor Handle
335585 Overspeed Disk, 70 000 rpm
337923 Rotor Lid
337924 Rotor Handle
870612 O-ring for Rotor Lid

Adapters/Spacers/Caps

Type 90 Ti **BIOE**

8 x 13.5 mL

Type 90 Ti

**Fixed-Angle Rotor, Titanium**For use in instruments classified: **H R S**

Major applications: Five-hour separation of plasmid DNA and rapid differential centrifugation of small particles.

Max. RPM	Max. g	k Factor	Number of Tubes Volume/Size	Rotor Capacity
90 000	694 000	25	8 x 13.5 mL 5/8 x 3 in 16 x 76 mm	108 mL

No. 355530. Type 90 Ti Rotor Assembly with 3 each 839347 O-rings, 3 each 876089 O-rings, and 2 each 355539 Overspeed Disks.

No. 348179. Quick-Seal Tube Kit with 2 boxes 342413 Polyallomer Tubes, 2 boxes 344322 Ultra-Clear Tubes, 12 Spacers 342695, 1 each 348123 Tube Rack, 306812 Spinkote Lubricant, and 335148 Vacuum Grease. (Cordless Tube Topper Kit required; see Tools, Accessories, and Supplies.)

No. 348180. Open-Top Tube Kit with 2 boxes 326814 Polyallomer Tubes, 2 boxes 344085 Ultra-Clear Tubes, 12 Tube Caps 341968, 1 Spinkote Lubricant 306812, and 1 Vacuum Grease 335148. (331202 and 305075 Tools required; see Tools, Accessories, and Supplies.)

No. 361660. OptiSeal Tube Kit with 4 boxes of OptiSeal Tubes 361623, 12 Spacers 361670 (6 pkg. of 2), 1 OptiSeal Tube Rack 361642, 1 Tube Extraction Tool 361668, and 1 Spacer Removal Tool 338765.

Tubes and Bottles

Tube Style/Material	Vol. (mL) g-Max	Part No.	Quantity	Size (mm)	Required Caps/ Spacers (qty. 1)	Required Adapters (qty. 1)	g-Force	k Factor	Max. Speed
OptiSeal Polyallomer	8.9	361623	56	16 x 60	361670 ^{§§}	—	694 000	21	90 000
Quick-Seal Polyallomer	4.2	356562	50	16 x 38	345828	—	694 000	11	90 000
	4.2	357332 [§]	50	16 x 38	345828	—	694 000	11	90 000
	6.3	345830	50	16 x 45	345828	—	694 000	14	90 000
	6.3	357334 [§]	50	16 x 45	345828	—	694 000	14	90 000
	10.0	344622	50	16 x 67	344676	—	694 000	21	90 000
	13.5	342413	50	16 x 76	342695	—	694 000	25	90 000
Quick-Seal Ultra-Clear	13.5	344322	50	16 x 76	342695	—	694 000	25	90 000
Polycarbonate Bottle/Assembly	10.4	355603	6	16 x 76	—	—	362 000	48	65 000
	10.4	355651^{ΔΔ}	25	16 x 76	—	—	362 000	48	65 000
Thinwall Polyallomer	6.5	326820	50	13 x 64	346256	303313	197 000	69	50 000
	13.5	326814	50	16 x 76	341968	—	548 000	32	80 000
Thickwall Polyallomer	4.0	355644	25	13 x 64	—	303313	197 000	69	50 000 ^Δ
	10.0	355640	25	16 x 76	338907 ^Δ	—	77 000	190	30 000 ^Δ
Thickwall Polycarbonate	4.0	355645	25	13 x 64	—	303313	197 000	69	50 000 ^Δ
	10.0	355630	25	16 x 76	338907 ^Δ	—	197 000	69	50 000 ^Δ
Ultra-Clear	2.0	344091	50	8 x 49	303624	303376	128 000	72	40 000
	4.0	344093	50	13 x 41	346256	303402	138 000	67	45 000
	6.5	344088	50	13 x 64	346256	303313	197 000	69	50 000
	13.5	344085	50	16 x 76	341968	—	548 000	32	80 000

Note: To help you locate g-Max tubes in the rotor listings, these tubes are highlighted with bold, italic type.

[§] To simplify ordering, this g-Max Kit includes enough spacers to fill rotor; 50 tubes and required tools.

^{§§} Set of 2.

^Δ Maximum speeds given above are those which the tubes could withstand when tested at 25°C for 24 hours. Further tests have shown that the polycarbonate tubes can be run at 75 000 rpm for six hours or at 65 000 rpm for eight hours.

^{ΔΔ} Bottles only.

Rotor Replacement Parts

355528 Lid
355529 Rotor Handle
355530 Rotor Assembly
355539 Overspeed Disk
356959 Tool, Handle
839347 O Ring, Inner
876089 O Ring, Outer

Adapters/Spacers/Caps

303313 303376 303402 303624 338907 341968 346256 342695 344676 345828 361670

