



Sigma 3-30KS Sigma 3-30KHS



High Speed Centrifuge

- Refrigerated
- Refrigerated/heatable

With the new g-lock® rotor system

SIGMA



Speed **13744** min⁻¹ 14500 (max.)

RCF **19852** *g 22096 (max.)

Temperature **21** °C 19

Runtime **4:02** m:s 0:05:00

Rotor **12310**

Prog: **Select the speed**

19%

↗:g ↘:g



Extraordinary in every regard



Sigma is a leading international manufacturer of laboratory centrifuges for diverse sectors, including biotechnology, pharmaceutical, medical and environment analysis. Laboratories, institutions and companies everywhere in the world have been relying on premium Sigma quality – Made in Germany – for more than 40 years. The company stands for innovative products and development of durable, energy-efficient and especially user-friendly devices.

As excellent refinements of previous models, the Sigma 3-30KS and Sigma 3-30KHS incorporate many decades of experience in high-speed laboratory centrifuges. Positioned between the laboratory

centrifuge and ultracentrifuge segments, these refrigerated benchtop centrifuges feature outstanding performance characteristics and excellent value for money.

The high RCF of more than 70,000 x g enables fast separation, even of microscopic particles and cell fragments. That makes the 3-30 centrifuge series especially suitable for high-speed applications in fields such as cellular biology, molecular biology, diagnostics and clinical biology, nanotechnology, research and genetics. The heatable version Sigma 3-30KHS is used in particular with specimens whose viscosity needs to be reduced during centrifugation.

Top ranking

Smooth running even at maximum speed

The Sigma 3-30KS and Sigma 3-30KHS centrifuges represent a unique combination of performance, versatility, and ease of use. With their high RCF, well-conceived controller and extensive range of accessories, they are suitable for even the most demanding applications in research and industry.

Thanks to the patented one-knob controller, automatic rotor recognition and imbalance detection, as well as capacity for 60 programs, these centrifuges are remarkably easy to use and highly versatile.

Even at maximum speed, the proven drive concept of the 3-30 series is very smooth and quiet in operation, with a low noise level of less than 57 dB(A) at more than 70,000 x g. High speeds and RCF values are barely perceptible, and the noise level is always pleasantly low.

These premium centrifuges additionally feature exceptionally long life and outstanding safety.

Sigma 3-30KS

- High-speed benchtop centrifuge
- Speed range up to 30,000 rpm
- Maximum RCF 70,121 x g
- User-friendly Spincontrol S controller
- Extra large TFT display
- 60 programs
- Compact, space-saving unit
- High-performance cooling
- Temperature setting range: -20 °C to +40 °C
- Pre-cooling function "Rapid Temp"
- Rotor cooling also possible at standstill
- Low noise level
- Automatic rotor identification
- Zero-maintenance induction motor
- Motorised lid lock
- Automatic imbalance monitoring
- Rotor life monitoring for high safety
- Easily cleaned stainless steel chamber
- Window in lid for external speed monitoring
- Manufactured according to the latest national and international standards (e.g. EN 61010-2-020)

Sigma 3-30KHS

All features of the Sigma 3-30KS, plus:

- Heatable refrigerated centrifuge
- Standstill cooling or heating
- Temperature setting range: -20 °C to +60 °C



Revolutionary simplicity

g-lock® rotor exchange without tools or buttons

The innovative g-lock rotor system from Sigma enables rotor exchange with no need for any tools or button pushing. Mounting and exchanging rotors could hardly be easier. The rotor is locked in place by centrifugal force after the centrifuge starts running, eliminating the need for screw mounting.

The new g-lock system makes rotor exchange effortless and is ideally suited to application scenarios that require working with more than one rotor. It minimises non-productive time and saves time and money.

Along with simplified and efficient handling, the system features exceptionally high safety. Improper or incorrect use is also prevented by the rotor identification system.

Furthermore, the g-lock system enables easy cleaning of the stainless steel chamber to help minimise contamination risks.

g-lock



With the g-lock system, no tools or buttons at all are necessary for rotor exchange.



More on the
Web!

View our video to learn
more about g-lock.
Scan the QR code or go
directly to the web page:
[www.sigma-zentrifugen.de/
en/g-lock](http://www.sigma-zentrifugen.de/en/g-lock)



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Rotors and accessories

Many potential combinations for high flexibility

The special drive system of the Sigma 3-30 series is specifically designed for use at very high speeds. This concept allows the high speed device series to achieve RCF values above 70,000 x g with microliter tubes. Even 15 ml and 50 ml culture tubes can be centrifuged at more than 40,000 x g in fixed-angle rotor 12155.

A total of 20 rotors are available, along with a wide range of accessories. The tube capacity extends from 0.2 ml to 94 ml in fixed-angle rotors or 0.2 ml to 100 ml in swing-out rotors. Microtiter and deep-well plates can also be centrifuged. Thanks to the extensive acces-

series, the centrifuges can be flexibly adapted to new or enhanced requirements. All compatible rotors can be autoclaved for 30 minutes at +121 °C.

As a special feature, Sigma can produce custom accessories upon request. The rotors and accessories are made from certified high-grade materials to withstand the most severe stresses.

The centrifuges can be supplied with the g-lock system or with the previous conventional rotor mounting system.

Swing-out rotors starting on page 9

Swing-out rotor 11171

- Max. capacity: 4 x 100 ml
- Max. speed (3-30KS / 3-30KHS): 5,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 3,969 x g
- Angle: 90°



Swing-out rotor 11134

- Max. capacity: 4 x 10 ml
- Max. speed (3-30KS / 3-30KHS): 10,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 10,956 x g
- Angle: 90°



Drum rotor 11136

- Max. capacity: 60 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 16,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 20,035 x g
- Angle: 90°



MTP swing-out rotor 11222

- Max. capacity: 6 microtiter plates
- Max. speed (3-30KS / 3-30KHS): 3,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 1,218 x g
- Angle: 90°



Fixed-angle rotors starting on page 13

Fixed-angle rotor 12115 for PCR strips

- Max. capacity: 96 x 0.2 ml conical
- Max. speed (3-30KS / 3-30KHS): 16,400 rpm
- Max. RCF (3-30KS / 3-30KHS): 29,468 x g
- Angle: 45° (both rows)



Fixed-angle rotor 12110

- Max. capacity: 12 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 30,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 65,403 x g
- Angle: 45°
- NEW:** g-lock rotor 91355 [🔗](#)



Fixed-angle rotors starting on page 14

▶ p. 14

Fixed-angle rotor 12154

- Max. capacity: 24 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 26,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 61,973 x g
- Angle: 45°
- NEW:** g-lock rotor 91123 [🔗](#)



▶ p. 14

Fixed-angle rotor 12131

- Max. capacity: 30 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 20,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 44,720 x g
- Angle: 45°



▶ p. 15

Fixed-angle rotor 12370

- Max. capacity: 36 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 28,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 70,121 x g
- Angle (upper / lower row): 30° / 50°
- NEW:** g-lock rotor 91371 [🔗](#)



▶ p. 15

Fixed-angle rotor 12349

- Max. capacity: 48 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 15,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 25,155 x g
- Angle (upper / lower row): 25° / 53°
- NEW:** g-lock rotor 91520 [🔗](#)



▶ p. 16

Fixed-angle rotor 12182

- Max. capacity: 12 x 5 ml conical
- Max. speed (3-30KS / 3-30KHS): 20,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 37,565 x g
- Biosafe with aluminium lid 17182 [🔗](#)
- Angle: 40°



▶ p. 16

Fixed-angle rotor 12111

- Max. capacity: 10 x 10 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 26,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 57,438 x g
- Angle: 35°
- NEW:** g-lock rotor 91527 [🔗](#)



▶ p. 17

Fixed-angle rotor 12157

- Max. capacity: 20 x 10 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 16,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 28,048 x g
- Angle: 25°



▶ p. 17

Fixed-angle rotor 12311

- Max. capacity: 12 x 15 ml conical
- Max. speed (3-30KS / 3-30KHS): 15,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 24,903 x g
- Biosafe with aluminium lid 17935 [🔗](#)
- Angle: 25°
- NEW:** g-lock rotor 91534 [🔗](#)



▶ p. 18

Fixed-angle rotor 12158

- Max. capacity: 6 x 30 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 26,200 rpm
- Max. RCF (3-30KS / 3-30KHS): 60,628 x g
- Angle: 29°
- NEW:** g-lock rotor 91365 [🔗](#)



▶ p. 18

Fixed-angle rotor 12150

- Max. capacity: 6 x 50 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 21,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 41,415 x g
- Angle: 25°
- NEW:** g-lock rotor 91375 [🔗](#)



▶ p. 19

Fixed-angle rotor 12310

- Max. capacity: 6 x 50 ml conical
- Max. speed (3-30KS / 3-30KHS): 15,500 rpm
- Max. RCF (3-30KS / 3-30KHS): 25,248 x g
- Biosafe with aluminium lid 17934 [🔗](#)
- Angle: 25°
- NEW:** g-lock rotor 91377 [🔗](#)



▶ p. 19

Fixed-angle rotor 12156

- Max. capacity: 8 x 50 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 16,500 rpm
- Max. RCF (3-30KS / 3-30KHS): 29,220 x g
- Angle: 25°



▶ p. 20

Fixed-angle rotor 12155

- Max. capacity: 4 x 94 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 20,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 40,695 x g
- Angle: 26°
- NEW:** g-lock rotor 91532 [🔗](#)



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Fixed-angle rotor 12159

- Max. capacity: 6 x 94 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 15,500 rpm
- Max. RCF (3-30KS / 3-30KHS): 26,323 x g
- Angle: 25°
- NEW:** g-lock rotor 91119 [🔗](#)





Swing-out rotor 11171





















Round bucket 13299 (1 set = 2 pcs.)*





















- Max. capacity: 4 x 100 ml
- Max. speed (3-30KS / 3-30KHS): 5,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 3,969 x g
- Max. tube length in middle of bucket without / with cap: 126 / 117 mm
- Hermetically closable with cap 17299
- Tmin at maximum speed: <4°C
- Angle: 90°

* Bucket not autoclavable



The regular greasing of the rotor bolts is no longer necessary – this minimises non-productive time and guarantees maximum safety.

Tube										
Rated capacity (filling volume) [ml]	0,5	1,5	2	5	5	6 (5)	7	10	10	10
Diameter x length [mm]	10.8 x 46.5	10.7 x 42	10.7 x 42	17 x 60	12 x 75	12 x 100	12 x 100	16.1 x 81.1	16.1 x 81.1	16.1 x 81.1
Tube material	PP	PP	PP	PPCO	PS	Glass	Glass	PF	PC	PPCO
Item no.	Paediatrics	15008	15040	–	15060	15007	15027	15000	15010	15039
Adapter										
for round bucket 13299										
Bore diameter x length [mm]		11.1 x 35		17 x 52		13.5 x 52			16.5 x 56	
Tubes per adapter / rotor		4 / 16		3 / 12		5 / 20			4 / 16	
Centrifuging radius [mm]		137		139		139			138	
Item no.		14301*		14309		14302			14303	

Tube										
Rated capacity (filling volume) [ml]	10	10	14	14	15 (13)	15	25	25	25	30 (26)
Diameter x length [mm]	16 x 100	16 x 100	17 x 100	17 x 100	17 x 110	16.5 x 120	25 x 90	24 x 100	24 x 100	25.3 x 98
Tube material	Glass	Glass	PS	PP	Glass	PP	PP	Glass	Glass	PF
Item no.	15015	15024	15020	15023	15022	15115	–	15025	15026	15029
Adapter										
for round bucket 13299										
Bore diameter x length [mm]		16.5 x 56		17.5 x 67.5		17 x 76	25.5 x 56			25.5 x 58
Tubes per adapter / rotor		4 / 16		3 / 12		2 / 8	1 / 4			1 / 4
Centrifuging radius [mm]		138		140		126	138			140
Item no.		14303		14307		14300**	14308			14304

* If used with paediatric tubes, only partial loading is possible in some cases ** Only possible without cap 17299

Swing-out rotor 11171










Round bucket 13299 (1 set = 2 pcs.)*

- Max. capacity: 4 x 100 ml
- Max. speed (3-30KS / 3-30KHS): 5,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 3,969 x g
- Max. tube length in middle of bucket without / with cap: 126 / 117 mm
- Hermetically closable with cap 17299
- Tmin at maximum speed: <4°C
- Angle: 90°

* Bucket not autoclavable








Tube

									
Rated capacity (filling volume) [ml]	30 (26)	30 (28)	30	30	50	50	50	50	50
Diameter x length [mm]	25.3 x 98	25.3 x 98	24 x 105	25 x 107	34 x 100	34 x 100	35 x 100	34 x 100	28 x 115
Tube material	PPCO	PC	Glass	PP	Glass	Glass	Glass	PC	PP
Item no.	15032	15030	15033	–	15045	15050	15056	15049	–





Adapter

for round bucket 13299



					
Bore diameter x length [mm]	25.5 x 58	25.5 x 56	35.5 x 58	29.5 x 67	29.6 x 90
Tubes per adapter / rotor	1 / 4	1 / 4	1 / 4	1 / 4	1 / 4
Centrifuging radius [mm]	140	138	140	139	142
Item no.	14304	14308	14305	14310*	14299


Tube

				
Rated capacity (filling volume) [ml]	100 (75)	100 (90)	100	100
Diameter x length [mm]	44 x 100	44 x 100	44 x 100	45 x 100
Tube material	Glass	Glass	Glass	PC
Item no.	15078	15106	15100	15103

Adapter

for round bucket 13299



		
Bore diameter x length [mm]	45.1 x 98.5	
Tubes per adapter / rotor	1 / 4	
Centrifuging radius [mm]	139	
Item no.	16051	

Swing-out rotor 11171

Round bucket 13299 (1 set = 2 pcs.)*

- Max. capacity: 4 x 100 ml
- Max. speed (3-30KS / 3-30KHS): 5,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 3,969 x g
- Max. tube length in middle of bucket without / with cap: 126 / 117 mm
- Hermetically closable with cap 17299
- Tmin at maximum speed: <4°C
- Angle: 90°

* Bucket not autoclavable



Swing-out rotor 11134

with four round buckets 13134

- Max. capacity: 4 x 10 ml
- Max. speed (3-30KS / 3-30KHS): 10,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 10,956 x g
- Tmin at maximum speed: <4°C
- Angle: 90°



Blood and urine tubes

Rated capacity (filling volume) [ml]	1.1–1.4	2.7–5	1.6–6	1.8–7	4–8.5	6–10	10	9–10
Diameter x length with lid [mm]	8 x 82	11 x 82–108	13 x 81–106	13 x 81–107	15 x 91–108	16 x 107	15 x 118	16 x 108
Tube material	PP	PP	PP	PET	PP	PET	PP	PP
Item no.	–	–	–	–	–	–	–	–

Adapter

for round bucket 13299



Bore diameter x length [mm]	13.5 x 52	16.5 x 56	16.5 x 56	17.5 x 67.5
Tubes per adapter / rotor	5 / 20	4 / 16	4 / 16	3 / 12
Centrifuging radius [mm]	139	138	138	140
Item no.	14302*	14303	14303**	14307

Tube



Rated capacity (filling volume) [ml]	10	10	10
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	16.1 x 81.1
Tube material	PF	PC	PPCO
Item no.	15000	15010	15039

Adapter

for round bucket 13134



Bore diameter x length [mm]	16.3 x 71
Tubes per adapter / rotor	– / 4
Centrifuging radius [mm]	95
Item no.	–

* Tube 13 x 107 mm only possible without cap 17299, ** Only possible without cap 17299

Drum rotor 11136

with aluminium lid 17898

- Max. capacity: 60 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 16,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 20,035 x g
- Hermetically closable with aluminium lid 17878
- Tmin at maximum speed: <4°C
- Angle: 90°








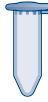
Swing-out rotor 11222

with 1 set (quantity 2) rectangular buckets 13222

- Max. plate height: 56 mm
- Max. speed (3-30KS / 3-30KHS): 3,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 1,218 x g
- Max. load per carrier: 337 g
- Tmin at maximum speed: <4°C
- Angle: 90°








Tube

						
Rated capacity (filling volume) [ml]	0.2	0.2	0.4	0.5	1.5	2
Diameter x length [mm]	5.8 x 20	–	5.8 x 47	7.9 x 28	10.7 x 42	10.7 x 42
Tube material	PP	–	PE	PP	PP	PP
Item no.	15042	PCR strips	15014	15005	15008	15040

Adapter





for drum rotor 11136



					
Bore diameter x length [mm]	6.2 x 17	6.2 x 17	6 x 46	8.1 x 21	11.2 x 39
Tubes per adapter / rotor	32 / 192	4 x 8 / 24 x 8	20 / 120	10 / 60	10 / 60
Centrifuging radius [mm]	48	48	70	52	70
Item no.	14021	14021	14000	14020	14002

Plate







				
Description	MTP (without lid)	MTP (with lid)	DWP	PCR plate 96-fold
W x D x H [mm]	128 x 86 x 15	128 x 86 x 17.5	128 x 86 x 44.5	128 x 86 x 20

Adapter

for rectangular bucket 13222



				
Bore diameter x length [mm]	–	–	–	–
Plates per rotor	6	6	2	4
Centrifuging radius [mm]	–	–	121	–
Item no.	–	–	–	–

Fixed-angle rotor 12115

with aluminium lid 17875

- Max. capacity: 96 x 0.2 ml conical
- Max. speed (3-30KS / 3-30KHS): 16,400 rpm
- Max. RCF outer row (3-30KS / 3-30KHS): 29,468 x g
- Max. RCF inner row (3-30KS / 3-30KHS): 24,958 x g
- Hermetically closable with aluminium lid 17875
- Tmin at maximum speed: <4°C
- Angle: 45° (both rows)





Fixed-angle rotor 12110

with aluminium lid 17834

- Max. capacity: 12 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 30,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 65,403 x g
- Hermetically closable with aluminium lid 17834
- Tmin at maximum speed: <4°C
- Angle: 45°
- NEW:** g-lock rotor 91355 [A](#)





Tube

		
Rated capacity (filling volume) [ml]	0.2	0.2
Diameter x length [mm]	5.8 x 20	–
Tube material	PP	–
Item no.	15042	PCR strips






Adapter

for
fixed-angle rotor
12115



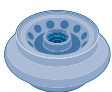
		
Bore diameter x length [mm]	6.3 x 15.5	6.3 x 16.5
Tubes per adapter / rotor	96	12 x 8
Centrifuging radius outer / inner row [mm]	98 / 83	98 / 83
Item no.	–	–






Tube

					
Rated capacity (filling volume) [ml]	0.2	0.4	0.5	1.5	2
Diameter x length [mm]	5.8 x 20	5.8 x 47	7.9 x 28	10.7 x 42	10.7 x 42
Tube material	PP	PE	PP	PP	PP
Item no.	15042	15014	15005	15008	15040

Adapter


for
fixed-angle rotor
12110



					
Bore diameter x length [mm]	6.3 x 18.5	6 x 45	8 x 45	11.1 x 37.5	11.1 x 38.5
Tubes per adapter / rotor	1 / 12	1 / 12	1 / 12	1 / 12	– / 12
Centrifuging radius [mm]	61	63	63	64	65
Item no.	13021	13000	13002	13003*	–

Fixed-angle rotor 12154

with aluminium lid 17829

- Max. capacity: 24 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 26,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 61,973 x g
- Hermetically closable with aluminium lid 17829
- Max. speed for 4 °C: 23,000 min⁻¹
- Angle: 45°
- NEW:** g-lock rotor 91123 







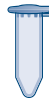
Fixed-angle rotor 12131

with aluminium lid 17848

- Max. capacity: 30 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 20,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 44,720 x g
- Hermetically closable with aluminium lid 17848
- Max. speed for 4 °C: 18,400 min⁻¹
- Angle: 45°








Tube

					
Rated capacity (filling volume) [ml]	0.2	0.4	0.5	1.5	2
Diameter x length [mm]	5.8 x 20	5.8 x 47	7.9 x 28	10.7 x 42	10.7 x 42
Tube material	PP	PE	PP	PP	PP
Item no.	15042	15014	15005	15008	15040





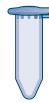
Adapter

for
fixed-angle rotor
12154



					
Bore diameter x length [mm]	6.3 x 18.5	6 x 45	8 x 45	11.1 x 37.5	11.1 x 38.5
Tubes per adapter / rotor	1 / 24	1 / 24	1 / 24	1 / 24	- / 24
Centrifuging radius [mm]	78	80	80	81	82
Item no.	13021	13000	13002	13003*	-






Tube

					
Rated capacity (filling volume) [ml]	0.2	0.4	0.5	1.5	2
Diameter x length [mm]	5.8 x 20	5.8 x 47	7.9 x 28	10.7 x 42	10.7 x 42
Tube material	PP	PE	PP	PP	PP
Item no.	15042	15014	15005	15008	15040

Adapter

for
fixed-angle rotor
12131



					
Bore diameter x length [mm]	6.3 x 18.5	6 x 45	8 x 45	11.1 x 37.5	11.1 x 38.5
Tubes per adapter / rotor	1 / 30	1 / 30	1 / 30	1 / 30	- / 30
Centrifuging radius [mm]	96	98	98	99	100
Item no.	13021	13000	13002	13003*	-

Fixed-angle rotor 12370

with 36 adapters 13003 and aluminium lid 17618

- Max. capacity: 36 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 28,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 70,121 x g
- Hermetically closable with aluminium lid 17618
- Max. speed for 4 °C: 23,700 min⁻¹
- Angle (upper / lower row): 30° / 50°
- NEW:** g-lock rotor 91371 [LA](#)








Fixed-angle rotor 12349

with aluminium lid 17349

- Max. capacity: 48 x 2 ml
- Max. speed (3-30KS / 3-30KHS): 15,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 25,155 x g
- Hermetically closable with aluminium lid 17349
- Tmin at maximum speed: <4°C
- Angle (upper / lower row): 25° / 53°
- NEW:** g-lock rotor 91520 [LA](#)

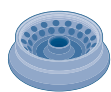







Tube

					
Rated capacity (filling volume) [ml]	0.2	0.4	0.5	1.5	2
Diameter x length [mm]	5.8 x 20	5.8 x 47	7.9 x 28	10.7 x 42	10.7 x 42
Tube material	PP	PE	PP	PP	PP
Item no.	15042	15014	15005	15008	15040






Adapter

for
fixed-angle rotor
12370



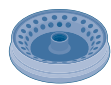
					
Bore diameter x length [mm]	6.3 x 18.5	6 x 45	8 x 45	11.1 x 37.5	11.1 x 38.5
Tubes per adapter / rotor	1 / 36	1 / 36	1 / 36	1 / 36	- / 36
Centrifuging radius inner / outer row [mm]	76 / 76	78 / 78	78 / 78	79 / 79	80 / 80
Item no.	13021	13000	13002	13003*	-






Tube

					
Rated capacity (filling volume) [ml]	0.2	0.4	0.5	1.5	2
Diameter x length [mm]	5.8 x 20	5.8 x 47	7.9 x 28	10.7 x 42	10.7 x 42
Tube material	PP	PE	PP	PP	PP
Item no.	15042	15014	15005	15008	15040

Adapter


for
fixed-angle rotor
12349



					
Bore diameter x length [mm]	6.3 x 18.5	6 x 45	8 x 45	11.1 x 37.5	11.1 x 38.5
Tubes per adapter / rotor	1 / 48	1 / 48	1 / 48	1 / 48	- / 48
Centrifuging radius inner / outer row [mm]	96 / 96	98 / 98	98 / 98	99 / 99	100 / 100
Item no.	13021	13000	13002	13003*	-

Fixed-angle rotor 12182


with aluminium lid 17182

- Max. capacity: 12 x 5 ml conical
- Max. speed (3-30KS / 3-30KHS): 20,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 37,565 x g
- Biosafe with aluminium lid 17182 
- T_{min} at maximum speed: <4°C
- Angle: 40°








Fixed-angle rotor 12111

with aluminium lid 17835

- Max. capacity: 10 x 10 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 26,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 57,438 x g
- Hermetically closable with aluminium lid 17835
- Max. speed for 4°C: 24,400 min⁻¹
- Angle: 35°
- **NEW:** g-lock rotor 91527 







Tube

					
Rated capacity (filling volume) [ml]	1.5	1.5–1.8	1.5	2	5
Diameter x length [mm]	11.7 x 34	12.3 x 49	10.7 x 42	10.7 x 42	17 x 60
Tube material	Glass	PP	PP	PP	PPCO
Item no.	HPLC	Cryo tube	15008	15040	–




Adapter

for
fixed-angle rotor
12182



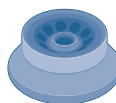
				
Bore diameter x length [mm]	12.5 x 28	12.7 x 32	11.1 x 38.5	17 x 52
Tubes per adapter / rotor	1 / 12	1 / 12	1 / 12	– / 12
Centrifuging radius [mm]	57	61	69	84
Item no.	14081	14080*	14082	–

Tube

			
Rated capacity (filling volume) [ml]	10	10	10
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	16.1 x 81.1
Tube material	PF	PC	PPCO
Item no.	15000	15010	15039

Adapter

for
fixed-angle rotor
12111



Bore diameter x length [mm]	16.3 x 69
Tubes per adapter / rotor	1 / 10
Centrifuging radius [mm]	76
Item no.	–

Fixed-angle rotor 12157



with aluminium lid 17841

- Max. capacity: 20 x 10 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 16,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 28,048 x g
- Hermetically closable with aluminium lid 17841
- Tmin at maximum speed: <4°C
- Angle: 25°



Fixed-angle rotor 12311

with aluminium lid 17935

- Max. capacity: 12 x 15 ml conical
- Max. speed (3-30KS / 3-30KHS): 15,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 24,903 x g
- Biosafe with aluminium lid 17935 
- Optimised for high speed tubes (BD, Corning, Eppendorf, TPP, etc.)
- Tmin at maximum speed: <4°C
- Angle: 25°
- **NEW:** g-lock rotor 91534 



Tube



Rated capacity (filling volume) [ml]	10	10	10
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	16.1 x 81.1
Tube material	PF	PC	PPCO
Item no.	15000	15010	15039

Adapter

for
fixed-angle rotor
12157



Bore diameter x length [mm]	16.3 x 69
Tubes per adapter / rotor	- / 20
Centrifuging radius [mm]	98
Item no.	-

Tube



Rated capacity (filling volume) [ml]	15
Diameter x length [mm]	16.5 x 120
Tube material	PP
Item no.	15115

Adapter

for
fixed-angle rotor
12311



Bore diameter x length [mm]	17.5 x 106
Tubes per adapter / rotor	- / 12
Centrifuging radius [mm]	99
Item no.	-

Cleanroom

Robust and resistant



An extremely resistant cleanroom coating is available from Sigma for all aluminium buckets and rotors. This coating provides reliable corrosion protection for accessories, especially where aggressive chemicals

are used. The cleanroom coating can even withstand exposure to sodium hydroxide and hydrochloric acid. The surfaces are also food-grade (FDA certified) and can easily be cleaned without residues.

Cleanroom coating
Available for all accessories

Fixed-angle rotor 12158


with aluminium lid 17842

- Max. capacity: 6 x 30 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 26,200 rpm
- Max. RCF (3-30KS / 3-30KHS): 60,628 x g
- Hermetically closable with aluminium lid 17842
- Max. speed for 4°C: 23,200 min⁻¹
- Angle: 29°
- NEW:** g-lock rotor 91365 



Fixed-angle rotor 12150

with aluminium lid 17837

- Max. capacity: 6 x 50 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 21,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 41,415 x g
- Hermetically closable with aluminium lid 17837
- Tmin at maximum speed: <4°C
- Angle: 25°
- NEW:** g-lock rotor 91375 



Tube



Rated capacity (filling volume) [ml]	10	10	10	30 (26)	30 (26)	30 (28)
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	16.1 x 81.1	25.3 x 98	25.3 x 98	25.3 x 98
Tube material	PF	PC	PPCO	PF	PPCO	PC
Item no.	15000	15010	15039	15029	15032	15030

Adapter

for
fixed-angle rotor
12158



Bore diameter x length [mm]	16.5 x 70			25.7 x 82.5		
Tubes per adapter / rotor	1 / 6			- / 6		
Centrifuging radius [mm]	69			79		
Item no.	13059			-		

Tube



Rated capacity (filling volume) [ml]	10	10	14	15	30 (26)	30 (28)	30	50 (38)	50 (43)	50
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	17 x 100	17.5 x 106	25.3 x 98	25.3 x 98	23.6 x 106	28.8 x 107	28.5 x 107	28.5 x 101.5
Tube material	PF	PPCO	PP	HS glass	PPCO	PC	HS glass	PPCO	PF	Stainless steel
Item no.	15000	15039	15023	15085	15032	15030	15086	15052	15051	13055

Adapter



for
fixed-angle rotor
12150



Bore diameter x length [mm]	16.2 x 65	17 x 88	18 x 90	25.6 x 75	24.5 x 93	29 x 98				
Tubes per adapter / rotor	1 / 6	1 / 6	1 / 6	1 / 6	1 / 6	- / 6				
Centrifuging radius [mm]	52	79	79	69	82	84				
Item no.	13087	13062	16018	13086	16030	-				

Fixed-angle rotor 12310

with aluminium lid 17934

- Max. capacity: 6 x 50 ml conical
- Max. speed (3-30KS / 3-30KHS): 15,500 rpm
- Max. RCF (3-30KS / 3-30KHS): 25,248 x g
- Biosafe with aluminium lid 17934 
- Optimised for high speed tubes (BD, Corning, Eppendorf, TPP, etc.)
- Tmin at maximum speed: <4°C
- Angle: 25°
- NEW:** g-lock rotor 91377 









Fixed-angle rotor 12156

with aluminium lid 17840

- Max. capacity: 8 x 50 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 16,500 rpm
- Max. RCF (3-30KS / 3-30KHS): 29,220 x g
- Hermetically closable with aluminium lid 17840
- Tmin at maximum speed: <4°C
- Angle: 25°

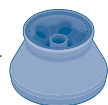






Tube

						
Rated capacity (filling volume) [ml]	15	25	30	50 (38)	50 (43)	50
Diameter x length [mm]	16.5 x 120	25 x 90	25 x 107	28.8 x 107	28.5 x 107	29 x 117
Tube material	PP	PP	PP	PPCO	PF	PP
Item no.	15115	–	–	15052	15051	15151







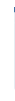



Adapter

for
fixed-angle rotor
12310



				
Bore diameter x length [mm]	17 x 107	25.5 x 71	30 x 91	30 x 101
Tubes per adapter / rotor	1 / 6	1 / 6	1 / 6	– / 6
Centrifuging radius [mm]	93	71	84	94
Item no.	13060	13064	13079	–







Tube

										
Rated capacity (filling volume) [ml]	10	10	14	15	30 (26)	30 (28)	30	50 (38)	50 (43)	50
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	17 x 100	17.5 x 106	25.3 x 98	25.3 x 98	23.6 x 106	28.8 x 107	28.5 x 107	28.5 x 101.5
Tube material	PF	PPCO	PP	HS glass	PPCO	PC	HS glass	PPCO	PF	Stainless steel
Item no.	15000	15039	15023	15085	15032	15030	15086	15052	15051	13055

Adapter


for
fixed-angle rotor
12156



						
Bore diameter x length [mm]	16.2 x 65	17 x 88	18 x 90	25.6 x 75	24.5 x 93	29 x 98
Tubes per adapter / rotor	1 / 8	1 / 8	1 / 8	1 / 8	1 / 8	– / 8
Centrifuging radius [mm]	64	91	91	81	94	96
Item no.	13087	13062	16018	13086	16030	–







Fixed-angle rotor 12155

with aluminium lid 17839

- Max. capacity: 4 x 94 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 20,000 rpm
- Max. RCF (3-30KS / 3-30KHS): 40,695 x g
- Hermetically closable with aluminium lid 17839
- Max. speed for 4 °C: 19,200 min⁻¹
- Angle: 26°
- NEW:** g-lock rotor 91532 








Tube

										
Rated capacity (filling volume) [ml]	10	10	10	14	14	15	15	25	30 (26)	30 (26)
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	16.1 x 81.1	17 x 100	17 x 100	17.5 x 106	16.5 x 120	24 x 100	25.3 x 98	25.3 x 98
Tube material	PF	PC	PPCO	PS	PP	HS glass	PP	Glass	PF	PPCO
Item no.	15000	15010	15039	15020	15023	15085	15115	15025	15029	15032











Adapter

for fixed-angle rotor 12155



					
Bore diameter x length [mm]	16.2 x 71	18 x 87	17 x 107	24.5 x 88	26 x 83
Tubes per adapter / rotor	2 / 8	1 / 4	1 / 4	1 / 4	1 / 4
Centrifuging radius [mm]	62	83	90	84	74
Item no.	13084	16019	13081*	16031	13083






Tube

										
Rated capacity (filling volume) [ml]	30 (28)	30	50 (38)	50 (43)	50	50	85 (73)	85 (76)	94 (85)	94
Diameter x length [mm]	25.3 x 98	23.6 x 106	28.8 x 107	28.5 x 107	28.5 x 101.5	29.5 x 117	38 x 112	38 x 112	38 x 103	38 x 110
Tube material	PC	HS glass	PPCO	PF	Stainless steel	PP	PF	PPCO	Stainless steel	PC
Item no.	15030	15086	15052	15051	13055	15151	15080	15076	13085	15094

Adapter


for fixed-angle rotor 12155









					
Bore diameter x length [mm]	26 x 83	24.5 x 88	29 x 97	30 x 100	38.3 x 91
Tubes per adapter / rotor	1 / 4	1 / 4	1 / 4	1 / 4	- / 4
Centrifuging radius [mm]	74	84	88	91	91
Item no.	13083	16031	13082	13080*	-

Fixed-angle rotor 12159

with aluminium lid 17843

- Max. capacity: 6 x 94 ml round-bottom
- Max. speed (3-30KS / 3-30KHS): 15,500 rpm
- Max. RCF (3-30KS / 3-30KHS): 26,323 x g
- Hermetically closable with aluminium lid 17843
- Tmin at maximum speed: <4°C
- Angle: 25°
- NEW:** g-lock rotor 91119 


















Tube										
Rated capacity (filling volume) [ml]	10	10	10	14	14	15	15	25	30 (26)	30 (26)
Diameter x length [mm]	16.1 x 81.1	16.1 x 81.1	16.1 x 81.1	17 x 100	17 x 100	17.5 x 106	16.5 x 120	24 x 100	25.3 x 98	25.3 x 98
Tube material	PF	PC	PPCO	PS	PP	HS glass	PP	Glass	PF	PPCO
Item no.	15000	15010	15039	15020	15023	15085	15115	15025	15029	15032

Adapter

for
fixed-angle rotor
12159








Adapter					
Bore diameter x length [mm]	16.2 x 71	18 x 87	17 x 107	24.5 x 88	26 x 83
Tubes per adapter / rotor	2 / 12	1 / 6	1 / 6	1 / 6	1 / 6
Centrifuging radius [mm]	69	90	97	91	81
Item no.	13084	16019	13081	16031	13083

Tube										
Rated capacity (filling volume) [ml]	30 (28)	30	50 (38)	50 (43)	50	50	85 (73)	85 (76)	94 (85)	94
Diameter x length [mm]	25.3 x 98	23.6 x 106	28.8 x 107	28.5 x 107	28.5 x 101.5	29.5 x 117	38 x 112	38 x 112	38 x 103	38 x 110
Tube material	PC	HS glass	PPCO	PF	Stainless steel	PP	PF	PPCO	Stainless steel	PC
Item no.	15030	15086	15052	15051	13055	15151	15080	15076	13085	15094

Adapter

for
fixed-angle rotor
12159



Adapter					
Bore diameter x length [mm]	26 x 83	24.5 x 88	29 x 97	30 x 100	38.3 x 91
Tubes per adapter / rotor	1 / 6	1 / 6	1 / 6	1 / 6	- / 6
Centrifuging radius [mm]	81	91	95	98	98
Item no.	13083	16031	13082	13080	-

Material properties

Guideline for optimal tube selection

Due to the many factors that influence material properties, this overview is only intended as a general recommendation. There is no guarantee of the stated properties. Users should therefore carefully

test materials for suitability under specific application conditions. Tubes should be discarded as soon as they show any sign of material fatigue.

	Polycarbonate (PC)	Polyvinyl fluoride (PF)	Polystyrene (PS)	Polyethylene (PE)	Polypropylene (PP)
Autoclave resistant	Yes	Yes	No	No	Yes
Elasticity	Not elastic	Not elastic	Not elastic	Good	Not elastic
Transparency	Transparent	Translucent	Transparent	Translucent	Translucent
Microwave resistant	Moderate	Yes	No	Limited	Moderate
Chemical resistance					
Weak acids	Yes	Yes	Yes	Yes	Yes
Strong acids	No	Yes	Limited	Yes	Yes
Alcohols and alkalis	No	Yes	Yes	Yes	Yes
Salts	Limited	Yes	Limited	Yes	Yes
Note:	Frequent autoclaving leads to loss of strength	Tubes should be completely filled and closed for use at maximum RCF			

	PP copolymer (PPCO)	Glass	High-speed glass (HS glass)	Stainless steel
Autoclave resistant	Yes	Yes	Yes	Yes
Elasticity	Moderate	Not elastic	Not elastic	Not elastic
Transparency	Translucent	Transparent	Transparent	Opaque
Microwave resistant	Moderate	Yes	Yes	No
Chemical resistance				
Weak acids	Yes	Yes	Yes	Limited
Strong acids	Yes	Yes	Yes	Limited
Alcohols and alkalis	Yes	Yes	Yes	Yes
Salts	Yes	Yes	Yes	Limited
Note:		Max. RCF for all glass tubes approx. 4,000 x g	High-speed glass for maximum RCF of 13,100 x g	

Spincontrol S controller

Intuitive operation and many options

The patented one-knob Spincontrol S controller sets standards in control technology for laboratory centrifuges. All parameters, such as speed, RCF or temperature, are set using the multifunction knob and can even be altered during operation. Illuminated buttons for starting, stopping and lid opening facilitate access to these functions.

Along with manual parameter configuration, previously entered programs can be selected via shortcuts. These programs can be assigned alphanumeric names to enhance process reliability and simplify operation. Another practical feature is the progress bar that visualises program status and can be seen at a distance. All setpoint and actual values are constantly shown on the clearly organised display.

The countless features leave nothing to be desired: time after target speed reached, capacity for 60 programs, password protection to prevent unintentional alteration of operating parameters, and the rotor cycle counter are just a few of the highlights that make the Spincontrol S controller a highly versatile system that is ready to meet the laboratory requirements of the future.

This premium controller from Sigma supports internal quality management functions as well as external communication with a laboratory information management system (LIMS). That way the Spincontrol S supports traceable professional reporting.



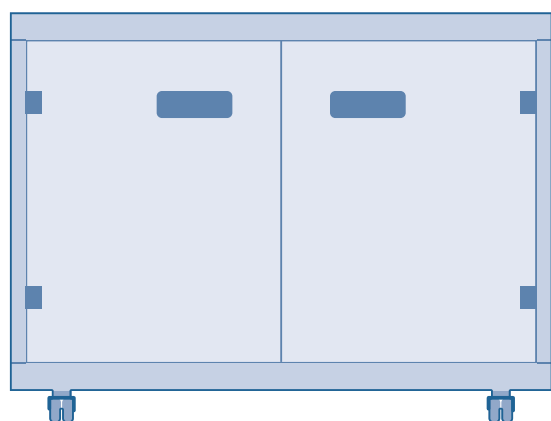
Spincontrol S
Get more information.
View our video:
www.sigma-zentrifugen.de/en/v/spincontrol

Display	TFT
Message window	+
Constant display of setpoints and actual values	+
Languages	DE, GB, PT, FR, ES, RU, HU, IT, SE, CN
Timer (s; h:min)	10 – 99:59
Timer tracks time after setpoint speed is reached; switchable	+, +
Time increment [s]	60; 1
Short run, Continuous run	+, +
Speed increment [rpm]	100; 1
Temperature increment [°C]	1
RCF increment [x g]	10; 1
Progress bar	+
Programs	60
User-definable program name (alphanumeric)	+
Program list, preview of all parameters	+, +
Linear acceleration curves	10
Quadratic acceleration curves	10
User-definable acceleration curves	10
Linear braking curves	10
Quadratic braking curves	10
User-definable braking curves	10
Free run-out	+
Automatic lid opening at end of run, switchable	+, +
Start delay (clotting time) adjustable/switchable	+, +
Standstill cooling; switchable	+, +
Standstill heating; switchable*	+, +
Pre-cooling function "Rapid Temp"	+
Temperature deviation monitoring, settable	+
Audible signal, switchable	+, +
Visual standstill indication	+
Centrifuge cycle count	+
Rotor cycle monitoring	+
Rotor end-of-life warning	+
Configurable for liquids > 1.2 g/cm ³	+
Lockable controller with password protection	+
Microprocessor control	+

* Only for 3-30KHS

Centrifuge tables

Sigma centrifuge tables are available in six different sizes. Matched to the corresponding centrifuge dimensions, they combine convenient work height with an optimally calculated footprint. The tables are made from coated sheet steel and are equipped with a storage compartment (with two doors) and a convenient pull-out shelf. Lockable castors allow the centrifuge tables to be easily moved and positioned in the laboratory.



Centrifuge table 17920

For Sigma 2-16KL

W x H x D [mm]: 600 x 501 x 550

Centrifuge table 17921

For Sigma 6-16KS

W x H x D [mm]: 790 x 515 x 684

Centrifuge table 17922

For Sigma 6-16S

W x H x D [mm]: 581 x 481 x 684

Centrifuge table 17923

For Sigma 3-30KS

W x H x D [mm]: 570 x 481 x 616

Centrifuge table 17926

For Sigma 3-16KL, 3-18KS, 4-16KS

W x H x D [mm]: 650 x 501 x 647

Centrifuge table 17927

For Sigma 3-16L, 4-5L, 4-16S

W x H x D [mm]: 490 x 497 x 647

Premium quality

Made in Germany

The Sigma 3-30KS and Sigma 3-30KHS meet the highest technical requirements of laboratory standards. Developed and produced at our facility in Osterode, Germany, they are high-performance, durable and energy-efficient quality products and conform to the latest safety, emissions and environmental standards. Sigma guarantees the availability of spare parts and wearing parts for at least

10 years. Furthermore, you benefit from our extensive services portfolio, including commissioning, maintenance, device calibration and more. Our qualified service technicians are ready to provide professional maintenance and repair as well as loaner devices if necessary. All support services are designed to ensure reliability and optimise system availability.

	Sigma 3-30KS	Sigma 3-30KHS
Max. capacity [ml]		
Swing-out rotor	4 x 100	4 x 100
Fixed-angle rotor	6 x 94	6 x 94
Max. RCF	70,121	70,121
Maximum speed [rpm]	30,000	30,000
Minimum speed [rpm]	100	100
Noise level at maximum speed (approx) [dB(A)]		
Fixed-angle rotor 12370	≤ 57	≤ 57
Swing-out rotor 11171 with bucket 13299 and cap	≤ 53	≤ 53
Max. acceleration time [s]		
Fixed-angle rotor 12370	≤ 45	≤ 45
Swing-out rotor 11171 with bucket 13299 and cap	≤ 19	≤ 19
Max. braking time [s]		
Fixed-angle rotor 12370	≤ 53	≤ 53
Swing-out rotor 11171 with bucket 13299 and cap	≤ 13	≤ 13
Temperature adjustment range [°C]	-20 – +40	-20 – +60
Power consumption [W]	1,800	1,800
Height x width x depth [mm]	464 x 570 x 643	464 x 570 x 643
Height with open lid [mm]	890	890
Weight without rotor [kg]	100	100

Sigma Service

For maintenance and repairs please contact our Service department at www.sigma-zentrifugen.de/en/service

Calibration

Documented proof of compliance with essential technical parameters.

Speed or run time (item no. 17713)
 Speed and run time (item no. 17714)
 Speed, run time, temperature (Item no. 17715)

Device qualification (IQOQ)

This comprehensive device qualification includes installation qualification and metrological checking of all functional parameters with a rotor.

IQOQ package for:

Unrefrigerated centrifuges (item no. 17710)
 Refrigerated centrifuges (Item no. 17711)
 An additional rotor (item no. 17712)

Sigma 3-30KS centrifuge

220 – 240 V, 50 Hz (item no. 10375)
 220 – 240 V, 60 Hz (item no. 10376)
 208 V, 60 Hz (item no. 10377)
 200 V, 50/60 Hz (item no. 10378)

Sigma 3-30KHS centrifuge

230 V, 50 Hz (item no. 10379)

Sigma 3-30KS centrifuge, inert gas

220 – 240 V, 50 Hz (item no. 90897)



Product portfolio

Sigma offers a broad product portfolio with more than 25 laboratory centrifuges. They can be combined with an extensive range of fixed-angle and swing-out rotors and a large variety of accessories to obtain the right device configuration for every application.



Microcentrifuge
Sigma 1-16

- 36 x 2 ml
- 15,000 rpm
- 20,627 x g

Floor-standing centrifuge
Sigma 8KS

- 12 x 1,000 ml
- 5,100 rpm
- 8,578 x g

- 6 x 1,000 ml
- 10,500 rpm
- 20,461 x g



Benchtop centrifuge
Sigma 2-7

- 4 x 100 ml
- 4,000 rpm
- 2,540 x g

- 30 x 15 ml
- 4,000 rpm
- 2,486 x g



Benchtop centrifuge
Sigma 3-30KS

- 4 x 100 ml
- 5,000 rpm
- 3,969 x g

- 6 x 94 ml
- 30,000 rpm
- 70,121 x g



Robot centrifuge
Sigma 4-5KRL

- 100 x 15 ml
- 4,700 rpm
- 4,470 x g

Legend

Max. capacity

Max. speed

Max. RCF

Swing-out rotor

Fixed-angle rotor



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