

# Cell culture packages



Recommended configurations for the centrifugation of conical cell culture tubes



# Premium quality

## For microbiology and molecular biology laboratories



**Sigma Laborzentrifugen GmbH is a leading international manufacturer of laboratory and blood bank centrifuges. The company stands for innovative products and development of durable, energy-efficient and especially user-friendly devices. Laboratories everywhere in the world have been relying on premium Sigma quality for more than 40 years.**

Sigma centrifuges are designed to be highly suitable for deployment in cellular biology laboratories, and the multitude of rotor options and capacities allows them to meet a very wide variety of throughput requirements. Smart functions and well-matched accessories help to simplify everyday work in the laboratory and fulfil high quality requirements for cell harvesting.

All centrifuges described in this brochure are specifically tailored for the use with cell culture tubes, and many of them are available as cooled or uncooled models. Cooled centrifuges are particularly suitable for high throughput or temperature-sensitive specimens. Their high-performance cooling system ensures a specimen temperature of less than or equal to 4 °C in typical cell culture applications. Along with the frequently used conical 15 ml and 50 ml tubes, large-volume tubes or microtiter plates can be centrifuged. This flexibility and the ability to use fixed-angle rotors with high RCF values also make the centrifuges suitable for further and/or future applications.

The very smooth running of the centrifuges and speed adjustment with resolution as fine as 1 rpm are additional key features. Efficient and reproducible cell harvesting can be achieved even in the very low speed range. A selection of up to 30 acceleration and braking curves, some of which are user programmable, helps with further optimisation of separation processes and yields. Routine procedures can be stored in program memory and conveniently retrieved from the integrated process library. With the large controllers, program names can be stored uncoded and can optionally be transferred to other devices by barcode. Password-protected access control prevents unauthorised access to programs and unintentional parameter changes. Another safety feature is rotor lifetime monitoring by counting the number of elapsed rotor cycles.

In all of the devices, the risk of contamination is minimised by easily cleaned stainless steel chambers, which together with biosafe closable rotors support contamination-free work processes. With devices in the 3-series, the patented g-lock system enables fast and secure rotor exchange. The rotor is locked in place by centrifugal force after the start of the centrifugation run, eliminating the need for manual tightening. This ensures extremely high safety and saves valuable working time.

# Sigma 2-7

## Benchtop centrifuge

The Sigma 2-7 is a compact and versatile centrifuge which combines high capacity (up to 4 x 100 ml) with exceptional flexibility. It is available with various swing-out and fixed-angle rotors for standard 15 ml and 50 ml culture tubes as well as a microtiter plate rotor. In combination with the 2 acceleration and braking curves and the possibility to store up to 10 programs, the Sigma 2-7 is an ideal device for a variety of cell culture applications. A highlight is the blue LED running indicator, which enables operators to see whether the device is still running – even at a distance.



### Highlights

- Max. 30 x 15 ml / 4 x 50 ml culture tubes
- 10 programs
- LED light as running indicator
- Motorized lid lock
- 2 acceleration / braking curves

## Cell culture packages for conical 15 ml and 50 ml tubes

### Rotor 11071 + bucket 13299

- Max. speed: 4,000 rpm
- Max RCF: 2,540 x g



Tube	Without Cap <sup>1</sup>	
	Adapter	Capacity
15 ml	14300	8
50 ml	14299*	4

\*Hermetically closable with cap 17299

### Sigma 2-7 + rotor 11071 +

<sup>1</sup> 4 x bucket 13299 + 4 x adapter 14300 + 4 x adapter 14299

### Rotor 12073

- Max. speed: 4,000 rpm
- Max. RCF (outer / inner row) : 2,486 / 2,111 x g



Tube	Without Cap <sup>2</sup>	
	Adapter	Capacity
15 ml	–	30
50 ml	–	–

### Sigma 2-7 + rotor 12073 +

<sup>2</sup> 30 x bucket 13011

## A selection of further available rotor options

### Swing-out rotor 11071 + bucket 13299\*

- Max. capacity: 4 x 100 ml
- Max. speed: 4,000 rpm
- Max. RCF: 2,540 x g
- Hermetically closable with cap 17299

\* Bucket not autoclavable



### Swing-out rotor 11123 + MTP bucket 13223

- Max. capacity: 6 microtiter plates
- Max. speed: 4,000 rpm
- Max. RCF: 2,111 x g



### Fixed-angle rotor 12072

- Max. capacity: 20 x 15 ml
- Max. speed: 4,000 rpm
- Max. RCF: 2,486 x g



# Sigma 2-16KL

## Benchtop centrifuge

The refrigerated Sigma 2-16KL centrifuge features high performance, compact size and intuitive operation. The wide range of accessories is tailored to the requirements of cell culture processing. The powerful cooling system ensures constant temperatures even at high speeds. Standard routines can be stored and recalled conveniently in up to 50 programs. Ten selectable acceleration and braking curves facilitate optimisation of separation processes and additionally help to shorten run times.



### Highlights

- Max. 30 x 15 ml / 6 x 50 ml culture tubes
- 50 programs
- 10 acceleration / braking curves
- Low noise level
- Automatic imbalance monitoring

## Cell culture packages for conical 15 ml and 50 ml tubes

### Rotor 11170 + bucket 13299

- Max speed: 5,000 rpm
- Max RCF: 3,969 x g



#### Without Cap <sup>3</sup>

Tube	Adapter	Capacity
15 ml	14300	8
50 ml	14299*	4

\*Hermetically closable with cap 17299

### Sigma 2-16KL + rotor 11170 +

<sup>3</sup> 4 x bucket 13299 + 4 x adapter 14300 + 4 x adapter 14299

### Fixed-angle rotor 12071

- Max. speed: 4,000 rpm
- Max. RCF (outer / inner row): 2,254 / 1,842 x g



#### Without Cap <sup>4</sup>

Tube	Adapter	Capacity
15 ml	–	12
50 ml	–	6

### Sigma 2-16KL + rotor 12071 +

<sup>4</sup> 12 x bucket 13011 + 6 x bucket 13151

## A selection of further available rotor options

### Swing-out rotor 11170 + bucket 13299\*

- Max. capacity: 4 x 100 ml
- Max. speed: 5,000 rpm
- Max. RCF: 3,969 x g
- Hermetically closable with cap 17299



\* Bucket not autoclavable

### Swing-out rotor 11123 + MTP bucket 13223

- Max. capacity: 6 microtiter plates
- Max. speed: 4,000 rpm
- Max. RCF: 2,111 x g



### Fixed-angle rotor 12181

- Max. capacity: 6 x 50 ml conical
- Max. speed: 12,000 rpm
- Max. RCF: 15,294 x g



# Sigma 3-16L / 3-16KL

## Benchtop centrifuge

The compact benchtop centrifuge Sigma 3-16L and the refrigerated version 3-16KL have become indispensable in mid-size laboratories. The compact centrifuges are easy to operate, pleasantly quiet and have an extraordinary capacity of maximum 36 cell culture tubes per run. The patented one-knob controller is highly practical and offers outstanding features like 50 programs, rotor life monitoring or controller locking to prevent unintentional alteration of operating parameters. The backlit LCD display is easy to read at a distance.



### Highlights

- Max. 36 x 15 ml / 16 x 50 ml culture tubes
- 50 programs
- Multifunction one-knob controller
- 10 acceleration / braking curves
- Low noise level

## Cell culture packages for conical 15 ml and 50 ml tubes

### Swing-out rotor 11180 + bucket 13190

- Max. speed (3-16L / 3-16KL): 4,200 / 4,500 rpm
- Max RCF (3-16L / 3-16KL): 3,392 / 3,894 x g



Tube	Without Cap <span style="background-color: #FFC000; padding: 2px;">5-8</span>		With Biosafe Cap <span style="background-color: #FFC000; padding: 2px;">9-12</span>	
	Adapter	Capacity	Adapter	Capacity
15 ml	17359	36	17345	20
50 ml	17377	16	17346	12

g-lock:

**Rotor exchange in seconds.** Eliminating the need for screw mounting ensures a high degree of safety.

### Sigma 3-16L + rotor 11180 +

- 5 4 x bucket 13190 + 4 x adapter 17359 + 4 x adapter 17377
- 9 4 x bucket 13190 + 4 x adapter 17345 + 4 x adapter 17346 + 4 x cap 17190

### Sigma 3-16KL + rotor 11180 +

- 6 4 x bucket 13190 + 4 x adapter 17359 + 4 x adapter 17377
- 10 4 x bucket 13190 + 4 x adapter 17345 + 4 x adapter 17346 + 4 x cap 17190

### Sigma 3-16L + rotor 91124 13 +

- 7 4 x bucket 13190 + 4 x adapter 17359 + 4 x adapter 17377
- 11 4 x bucket 13190 + 4 x adapter 17345 + 4 x adapter 17346 + 4 x cap 17190

### Sigma 3-16KL + rotor 91124 13 +

- 8 4 x bucket 13190 + 4 x adapter 17359 + 4 x adapter 17377
- 12 4 x bucket 13190 + 4 x adapter 17345 + 4 x adapter 17346 + 4 x cap 17190

## A selection of further available rotor options

### Swing-out rotor 11180 + bucket 13190

- Max. capacity: 4 x 400 ml
- Max. speed (3-16L / 3-16KL): 4,200 / 4,500 rpm
- Max. RCF (3-16L / 3-16KL): 3,392 / 3,894 x g
- Biosafe with cap 17190 14
- **NEW:** g-lock rotor 91124 13



### Swing-out rotor 11241 + MTP bucket 13421

- Max. capacity: 8 microtiter plates
- Max. speed (3-16L / 3-16KL): 4,200 rpm
- Max. RCF (3-16L / 3-16KL): 2,623 x g
- Biosafe with cap 17108 15
- **NEW:** g-lock rotor 91551 14



### Fixed-angle rotor 12159

- Max. capacity: 6 x 94 ml round-bottom
- Max. speed (3-16L / 3-16KL): 8,000 rpm
- Max. RCF (3-16L / 3-16KL): 7,012 x g
- **NEW:** g-lock rotor 91119 16



# Sigma 3-18KS

## Benchtop centrifuge

With its maximum capacity of 1.6 litres in a swing-out rotor and a maximum RCF of 30,070 x g with a fixed-angle rotor, the 3-18KS is the ideal centrifuge for demanding requirements in the cell laboratory. Combined with the extensive portfolio of rotors and accessories for cell culture application, this universal centrifuge sets standards for versatility and performance. The refrigerated 3-18KS is very intuitive to use thanks to the patented one-knob controller. Additional features like rotor cycle counting, automatic rotor identification or lid opening assisted by gas springs simplify everyday laboratory work and provide maximum safety.



### Highlights

- Max. 36 x 15 ml / 16 x 50 ml culture tubes
- 60 programs
- Controller with 10 selectable languages
- Motorized lid locks
- 30 acceleration / braking curves

## Cell culture packages for conical 15 ml and 50 ml tubes

### Swing-out rotor 11180 + bucket 13190

- Max speed: 4,700 rpm
- Max RCF: 4,248 x g



Tube	Without Cap <sup>13+14</sup>		With Biosafe Cap <sup>15+16</sup>	
	Adapter	Capacity	Adapter	Capacity
15 ml	17359	36	17345	20
50 ml	17377	16	17346	12

**g-lock:**  
Rotor exchange in seconds. Eliminating the need for screw mounting ensures a high degree of safety.



### Sigma 3-18KS + rotor 11180 +

- <sup>13</sup> 4 x bucket 13190 + 4 x adapter 17359 + 4 x adapter 17377
- <sup>15</sup> 4 x bucket 13190 + 4 x adapter 17345 + 4 x adapter 17346 + 4 x cap 17190

### Sigma 3-18KS + rotor 91124 <sup>14</sup> +

- <sup>14</sup> 4 x bucket 13190 + 4 x adapter 17359 + 4 x adapter 17377
- <sup>16</sup> 4 x bucket 13190 + 4 x adapter 17345 + 4 x adapter 17346 + 4 x cap 17190

## A selection of further available rotor options

### Swing-out rotor 11180 + bucket 13190

- Max. capacity: 4 x 400 ml
- Max. speed: 4,700 rpm
- Max. RCF: 4,248 x g
- Biosafe with cap 17190 <sup>15</sup>
- **NEW:** g-lock rotor 91124 <sup>14</sup>



### Swing-out rotor 11241 + MTP bucket 13421

- Max. capacity: 8 microtiter plates
- Max. speed: 4,700 rpm
- Max. RCF: 3,285 x g
- Biosafe with cap 17108 <sup>15</sup>
- **NEW:** g-lock rotor 91551 <sup>14</sup>



### Fixed-angle rotor 12159

- Max. capacity: 6 x 94 ml round-bottom
- Max. speed: 11,400 rpm
- Max. RCF: 14,239 x g
- **NEW:** g-lock rotor 91119 <sup>14</sup>



# Sigma 4-5L

## Benchtop centrifuge

The Sigma 4-5L is designed for high throughput laboratories with changing workloads. The optimized air guidance guarantees very low specimen heating and pleasantly quiet running. The centrifuge has an extraordinary capacity of up to 60 cell culture tubes per run at a maximum RCF of 4.643 x g. Also cell harvesting in bottles up to 750 ml is possible. Standard routines can be stored and recalled conveniently in up to 50 programs. Ten selectable acceleration and braking curves facilitate optimisation of separation processes.

### Highlights

- Max. 60 x 15 ml / 28 x 50 ml culture tubes
- 50 programs
- Motorized lid lock
- High imbalance tolerance
- 10 acceleration / braking curves



## Cell culture packages for conical 15 ml and 50 ml tubes

### Rotor 11650 + bucket 13450

- Max. speed: 4,700 rpm
- Max. RCF: 4,643 x g



Tube	Without Cap <sup>17</sup>		With Biosafe Cap <sup>18</sup>	
	Adapter	Capacity	Adapter	Capacity
15 ml	17660	60	17659	48
50 ml	17649	28	17677	20

### Sigma 4-5L + rotor 11650 +

<sup>17</sup> 4 x bucket 13450 + 4 x adapter 17660 + 4 x adapter 17649

<sup>18</sup> 4 x bucket 13450 + 4 x adapter 17659 + 4 x adapter 17677 + 4 x cap 17170

## A selection of further available rotor options

### Swing-out rotor 11650 + bucket 13450

- Max. capacity: 4 x 750 ml
- Max. speed: 4,700 rpm
- Max. RCF: 4,643 x g
- Biosafe with cap 17170 <sup>18</sup>



### Swing-out rotor 11650 + MTP bucket 13421

- Max. capacity: 16 microtiter plates
- Max. speed: 4,700 rpm
- Max. RCF: 3,877 x g





# Sigma 4-16KS

## Benchtop centrifuge

The refrigerated 4-16KS centrifuge is ideal for large laboratories, since it features outstanding performance, intuitive operation and high capacities. Volumes of up to 3 litres (4 x 750 ml) can be processed as well as up to 60 cell culture tubes per run. In many cases with best-in-class RCF for this centrifuge segment. This versatility makes the 4-16KS the perfect choice for high and low throughput cell culture and cell harvest applications. Up to 60 routine procedures can be stored with user-defined names and quickly retrieved from the integrated process library.

### Highlights

- Max. 60 x 15 ml / 28 x 50 ml culture tubes
- 60 programs
- Controller with 10 selectable languages
- Motorized lid locks
- 30 acceleration / braking curves



## Cell culture packages for conical 15 ml and 50 ml tubes

### Rotor 11650 + bucket 13450

- Max. speed: 4,700 rpm
- Max. RCF: 4,643 x g



### Rotor 11150 + bucket 13235

- Max. speed: 5,100 rpm
- Max. RCF: 5,525 x g



Tube	Without Cap <sup>19</sup>		With Biosafe Cap <sup>20</sup>	
	Adapter	Capacity	Adapter	Capacity
15 ml	17660	60	17659	48
50 ml	17649	28	17677	20

Tube	Without Cap <sup>21</sup>	
	Adapter	Capacity
15 ml	13060	28
50 ml	–	28

### Sigma 4-16KS + rotor 11650 +

- <sup>19</sup> 4 x bucket 13450 + 4 x adapter 17660 + 4 x adapter 17649
- <sup>20</sup> 4 x bucket 13450 + 4 x adapter 17659 + 4 x adapter 17677 + 4 x cap 17170

### Sigma 4-16KS + rotor 11150 +

- <sup>21</sup> 4 x bucket 13235

## A selection of further available rotor options

### Swing-out rotor 11660 + bucket 13450

- Max. capacity: 4 x 750 ml
- Max. speed: 5,100 rpm
- Max. RCF: 5,467 x g
- Biosafe with cap 17170 <sup>20</sup>



### Swing-out rotor 11660 + MTP bucket 13421

- Max. capacity: 16 microtiter plates
- Max. speed: 5,100 rpm
- Max. RCF: 4,565 x g



### Fixed-angle rotor 12356

- Max. capacity: 6 x 250 ml
- Max. speed: 9,000 rpm
- Max. RCF: 13,131 x g
- Biosafe with lid 17603 <sup>20</sup>



# Sigma 6-16S / 6-16KS

## Benchtop centrifuge

The refrigerated 6-16KS and unrefrigerated 6-16S centrifuges are perfectly suited for high throughput in cell culture and fermentation. Particularly due to the ability to use large-volume fixed-angle rotors with high RCF, a broad range of high speed cell processing applications is possible as well. Thanks to the powerful cooling system a consistent specimen temperature can be maintained, even in case of heavy workload (6-16KS). The patented one-knob controller provides superior operating convenience, safety and versatility.



### Highlights

- Max. 96 x 15 ml / 40 x 50 ml culture tubes
- 60 programs
- Controller with 10 selectable languages
- Motorized lid locks
- 30 acceleration / braking curves

## Cell culture packages for conical 15 ml and 50 ml tubes

### Rotor 11650 + bucket 13635

- Max. speed (6-16S / 6-16KS): 4,200 / 4,700 rpm
- Max. RCF (6-16S / 6-16KS): 3,846 / 4,816 x g



### Rotor 11650 + bucket 13650

- Max. speed (6-16S / 6-16KS): 4,200 / 4,700 rpm
- Max. RCF (6-16S / 6-16KS): 4,181 / 5,236 x g



#### Without Cap <sup>22+23</sup>

Tube	Adapter	Capacity
15 ml	18605	96
50 ml	18606	40

#### Without Cap <sup>24+25</sup>

Tube	Adapter	Capacity
15 ml	17660	60
50 ml	17679	28

#### With Biosafe Cap <sup>26+27</sup>

Tube	Adapter	Capacity	Adapter	Capacity
15 ml	17659	48	17659	48
50 ml	17677	20	17677	20

### Sigma 6-16S + rotor 11650 +


- <sup>22</sup> 4 x bucket 13635 + 4 x adapter 18605 + 4 x adapter 18606
- <sup>24</sup> 4 x bucket 13650 + 4 x adapter 17660 + 4 x adapter 17679
- <sup>26</sup> 4 x bucket 13650 + 4 x adapter 17659 + 4 x adapter 17677 + 4 x cap 17170

### Sigma 6-16KS + rotor 11650 +

- <sup>23</sup> 4 x bucket 13635 + 4 x adapter 18605 + 4 x adapter 18606
- <sup>25</sup> 4 x bucket 13650 + 4 x adapter 17660 + 4 x adapter 17679
- <sup>27</sup> 4 x bucket 13650 + 4 x adapter 17659 + 4 x adapter 17677 + 4 x cap 17170

## A selection of further available rotor options

### Swing-out rotor 11660 + bucket 13650

- Max. capacity: 4 x 1,000 ml
- Max. speed (6-16S / 6-16KS): 4,200 / 5,100 rpm
- Max. RCF (6-16S / 6-16KS): 4,181 / 5,467 x g
- Biosafe with cap 17170 




### Swing-out rotor 11660 + MTP bucket 13421

- Max. capacity: 20 microtiter plates
- Max. speed (6-16S / 6-16KS): 4,200 / 5,100 rpm
- Max. RCF (6-16S / 6-16KS): 3,589 / 4,565 x g



### Fixed-angle rotor 12600












- Max. capacity: 6 x 500 ml
- Max. speed (6-16S / 6-16KS): 8,000 / 9,600 rpm
- Max. RCF (6-16S / 6-16KS): 11,949 / 17,207 x g
- Biosafe with lid 17600 



# Solutions for cell harvesting

## Available options

### Sample capacities for conical cell harvesting tubes in Sigma centrifuges

											
Description	15 ml conical	50 ml conical	175 ml Falcon, VWR	175 ml Nalgene	200 ml Nunc	225 ml Falcon, VWR	250 ml Nunc	250 ml Corning	450 ml TPP	500 ml Corning	600 ml TPP
Diameter x length [mm]	16.5 x 120	29 x 117	61 x 118	62 x 139.2	61 x 130	61 x 137	61 x 145	59.7 x 171.2	96 x 145	95.5 x 147	100 x 183
Item no.	15115	15151	–	15175	15174	–	–	–	–	–	–







**Max. Capacity** (swing-out rotor / fixed-angle rotor)

Sigma 2-7	8 / 30	4 / –									
Sigma 2-16P / 2-16KL	8 / 30	4 / 6									
Sigma 3-16L / 3-16KL	36 / 12	16 / 6	4 / –	4 / –	4 / –	4 / –					
Sigma 3-18KS	36 / 12	16 / 6	4 / –	4 / –	4 / –	4 / –					
Sigma 4-5L	60 / –	28 / –	4 / –	4 / –	4 / –	4 / –	4 / –		4* / –	4 / –	
Sigma 4-16S / 4-16KS	60 / 24	28 / 8	4 / –	4 / –	4 / –	4 / –	4 / –		4* / –	4 / –	
Sigma 6-16S / 6-16KS	96 / 24	40 / 8	4 / 4*	4 / 6	4 / 6	4 / 6*	4 / 6	4 / 6	4* / –	4 / –	
Sigma 8KS	144 / 30	84* / 12	12 / 6*	12 / 6	12 / 6	12 / 6*	12 / 6	12 / 6	12* / 6*	12 / 6	12* / –

\*On request

### Floor-standing centrifuge

#### Sigma 8KS

	12 x 1,000 ml		6 x 1,000 ml
	5,100 rpm		10,500 rpm
	8,578 x g		20,461 x g

The Sigma 8KS is a refrigerated floor-standing centrifuge that is ideal for universal deployment in research sectors or bioprocessing applications. This high-performance centrifuge features impressive capacity of up to 12 x 1,000 ml in a swing-out rotor or 6 x 1,000 ml in a fixed-angle rotor. With a maximum RCF of 20,461 x g, even demanding separation processes can be handled efficiently. The swing-out and fixed-angle rotors can both handle standard 1,000 ml USP VI bottles without using adapters.



#### Legend

	Max. capacity		Swing-out rotor
	Max. speed		Fixed-angle rotor
	Max. RCF		



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