

# Universal Centrifuges

■ Z 446

■ Z 446 K



**HERMLE**  
LABORTECHNIK

Z 446

Z 446 K



### Specifications

- Maintenance-free induction drive
- Microprocessor with large LCD display
- Motor driven lid lock
- Automatic radio-frequency rotor identification system (RFID) with over speed protection, immediately upon rotor insertion
- Active imbalance identification and cut off (rotor-specific)
- CFC-free refrigeration system
- A large variety of rotors and accessories
- Audible signal at the end of each run with several melody options
- Noise level < 65 dBA (depend on rotor)
- Manufactured according to international safety regulations, i. e. IEC 61010
- Stainless steel chamber

These high-volume centrifuges Z 446 and Z 446 K achieve a throughput of 68 x 15 ml conical tubes or 28 x 50 ml conical tubes at a max. RCF of 3,434/4,346 xg. If higher speeds are required, we also offer e.g. an angle rotor with a max. RCF of 16,022 xg for 10 x 50 ml. The fixed-angle and swing-out rotors are suitable for almost all applications in everyday use in clinical, industrial and research laboratories.

### Technical Data

max. speed:	16,000 rpm
max. RCF:	24,325 xg / 26,328 xg
max. volume:	4 x 750 ml
speed range:	200 - 16,000 rpm
Temperature range	
Z 446 K:	-20°C to 40°C
Running time:	59 min 50 s / 10 s increments 99 h 59 min / 1 min increments

Dimensions:	
Z 446:	54 cm x 39 cm x 67 cm (WxHxD)
Z 446 K:	73 cm x 39 cm x 67 cm (WxHxD)

Weight:	
Z 446:	79 kg
Z 446 K:	111 kg

Power input:	
Z 446:	640 W
Z 446 K:	1,630 W

Order numbers:	
Z446:	316.00 V01 - Z446, 230 V / 50-60 Hz 316.00 V02 - Z446, 120 V / 50-60 Hz
Z446K:	317.00 V01 - Z446 K, 230 V / 50-60 Hz 317.00 V03 - Z446 K, 120 V / 50-60 Hz / 20 A 317.00 V02 - Z446 K, 120 V / 50-60 Hz / 15 A*

\*The speed of rotor 221.36 V20 and 220.86 V20 is lower by 500 rpm



### Distinct Control Panel

- Simple one handed operation
- Easy to program with gloves on
- Foil keyboard
- Permanent indication of preset and actual values
- Selection of speed in both rpm and g-force, with increments of 10
- 10 acceleration and deceleration rates, possibility of unbraked deceleration
- Temperature range from -20°C to 40°C with 1°C increments
- Pre-cooling program
- Standstill cooling
- Pre-selection of the running time from 10 s to 99 h 59 min or continuous
- Storage of up to 99 runs including rotor
- Quick-key for short runs
- Timer: the centrifuge starts at the preselected time

# Accessories Z 446 and Z 446 K

Rotor/Bucket	Adapter		
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Order No.:  
221.36 V20  
Swing out rotor 4 place  
Angle: 0-90°



616.102\*  
PC-Screw cap  
for round bucket 616.200



616.112\*  
PC-Lid  
for rectangular bucket 616.110



Order No.:  
616.200  
Round bucket



Acceleration in s: 47/483  
Deceleration in s: 49/1,287  
Acceleration in s: 55/551  
Deceleration in s: 54/1,501  
max. speed: 4,000/4,550 rpm  
max. RCF: 3,434/4,467 xg  
max. radius: 19.2 cm  
Temp. at max. speed: 4°C

616.111  
Removing aid  
for rectangular bucket 616.110



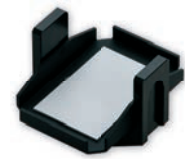
Order No.:  
616.110  
Rectangular bucket  
for Microtitre plates



Acceleration in s: 47/483  
Deceleration in s: 49/1,287  
Acceleration in s: 55/551  
Deceleration in s: 54/1,501  
max. speed: 4,000/4,550 rpm  
max. RCF: 3,130/4,050 xg  
max. radius: 17.5 cm  
max. loading height: 80 mm  
max. loading weight: 640 g  
Temp. at max. speed: 4°C

Adapters for rectangular bucket  
on request

Order No.:  
616.120  
Microtitre carrier



Acceleration in s: 47/482  
Deceleration in s: 49/1,287  
Acceleration in s: 55/551  
Deceleration in s: 54/1,501  
max. speed: 4,000/4,550 rpm  
max. RCF: 2,754/3,564 xg  
max. radius: 15.4 cm  
max. loading height: 72 mm  
max. loading weight: 310 g  
Temp. at max. speed: -3°C

\*hermetical sealable

	Corning®		Falcon®		conical	conical	conical	conical	conical	conical	conical	conical	conical	conical	conical
Volume	750 ml	500 ml	500 ml	250/290 ml	175/225 ml	100 ml	50 ml	50 ml	50 ml	30 ml	15 ml	15 ml	15 ml	10 ml	7 ml
ø in mm	98	98	97	62	61	40	29	29	29	26	17	17	17	16	13
Round bucket															
Length min./max. (mm)	152	114	148	122/137	118/137	102/123	116	116	102/123	102/123	120	120	97/120	70/121	98/119
Tubes per rotor	4	4	4	4	4	12	20	28	28	32	56	68 <sup>1</sup>	72	84	128
Radius correction (cm)	0	0	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.5	0.4	0.6
Order No. Adapter	without	without	716.110	716.024	716.100	716.023	716.101	716.102	716.021	716.020	716.103	716.104	716.018	716.015	716.016

<sup>1</sup> 2-level

	Vacutainer®				Sarstedt®								
Volumen	1.8-5 ml	4-7 ml	5 ml	6-10 ml	1.1-4 ml	2-3 ml	3.5-5 ml	2.6-2.9 ml	2.7-4.3 ml	4.9 ml	4.0-5.5 ml	7.5-8.2 ml	9-10 ml
ø in mm	13	13	16	16	8	11	11	13	13	13	15	15	16
Round bucket													
Length min./max. (mm)	75	100	75	100	66	66	92	65	75	90	75	92	92
Tubes per rotor	108	108	72	72	152	108	108	108	108	108	72	72	72
Radius correction (cm)	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Order No. Adapter	716.112	716.112	716.105	716.105	716.109	716.112	716.112	716.112	716.112	716.112	716.105	716.105	716.105

Order No.:  
221.16 V20



Swing out rotor 2 x 3 Microtitreplates  
Angle: 0-90°

Acceleraton in s: 27/251  
Deceleration in s: 23/602  
max. speed: 4,500 rpm  
max. RCF: 2,716 xg  
max. radius: 12 cm  
max. loading height: 63 mm  
max. loading weight: 310 g  
Temp. at max. speed: -8°C

Order No.:  
706.000  
Tube rack  
48 x 1.5 ml (2.0 ml)  
Reaction tubes

Order No.:  
221.17 V21



Angle rotor 30 x 1.5/2.0 ml  
Angle: 45°

Acceleration in s: 24/218  
Deceleration in s: 30/526  
max. speed: 15,000 rpm  
max. RCF: 23,643 xg  
max. radius: 9.4 cm  
max. ø: 11 mm  
Temp. at max. speed: 1°C

Order No.:	Tube rack	ø (mm)	Length (min./max.)
without Adapter	1 x 2.0 ml	11	40
without Adapter	1 x 1.5 ml	11	40
704.005	1 x 0.5 ml	8	45
704.004	1 x 0.4/0.2 ml PCR	6	45

# Accessories Z 446 and Z 446 K

## Rotor/Bucket

Order No.:  
220.86 V20  
Swing out rotor 4 place  
Angle: 0-90°



## Adapter

610.000  
Rectangular bucket



Acceleration in s: 26/252  
Deceleration in s: 28/560  
Acceleration in s: 30/273  
Deceleration in s: 31/626  
max. speed: 4,500/5,000 rpm  
max. RCF: 3,894/4,807 xg  
max. radius: 17.2 cm  
Temp. at max. speed: 4°C

611.000  
Round bucket



Acceleration in s: 26/250  
Deceleration in s: 27/415  
Acceleration in s: 30/277  
Deceleration in s: 30/526  
max. speed: 4,500/5,000 rpm  
max. RCF: 3,894/4,807 xg  
max. radius: 17.2 cm  
Temp. at max. speed: 0°C

Volume	Falcon®						conical			conical			
	250 ml	175/225 ml	100 ml	85 ml	80 ml	50 ml	50 ml	50 ml	25 ml	15 ml	15 ml	7 ml	5 ml
ø in mm	62	61	40	38	44	34	29	28.5	24	17	17	13	13
Rectangular bucket Length min./max. (mm)	100/122	118/137	90/120	90/125	90/120	90/115	116	90/120	90/115	120	85/120	90/100	55/75
Tubes per rotor	4	4	4	4	4	8	8	8	20	24	48	80	80
Radius correction (cm)	0.3	0.4	0.6	0.4	0.6	0.6	0.4	0.4	0.6	0.3	0.7	0.6	0.6
Order No. adapter	710.000	710.001	710.002	710.003	710.004	710.005	710.007	710.006	710.009	710.011	710.010	710.013	710.014

Round bucket Length min./max. (mm)	122	118/137	114	80/120	85/110	85/120	116	95/130	85/120	120	105/120	100	55/75
Tubes per rotor	4	4	4	4	4	4	4	4	8	16	28	48	48
Radius correction (cm)	0.1	0.2	0.2	0.2	0.7	0.7	0.3	0.2	0.5	0.1	0.5	0.5	0.5
Order No. adapter	without rack	713.009	713.010	713.011	711.003	711.004	711.006	711.005	711.007	711.009	711.008	711.010	711.011

Volume	Vacutainer®				Sarstedt®			
	1.8 - 5 ml	4 - 7 ml	5 ml	6 - 10 ml	2 - 5 ml 3.5-5 ml	4.9 ml	4 - 5.5 ml 7.5 - 8.2 ml	9 - 10 ml
ø in mm	13	13	16	16	11	13	15	16.5
Rectangular bucket Length min./max. (mm)	75	100	75	100	66/92	90	75/92	92
Tubes per rotor	56	56	48	48	60	60	48	32
Radius correction (cm)	0.4	0.4	0.4	0.7	0.6	0.4	0.4	0.4
Order No. adapter	710.016	710.017	710.015	710.010	710.022	710.021	710.020	710.019

Round bucket Length min./max. (mm)	75	100	75	100	66/92	90	75/92	92
Tubes per rotor	32	32	28	28	48	48	28	20
Radius correction (cm)	0.2	0.2	0.2	0.5	0.5	0.5	0.7	0.2
Order No. adapter	713.002	713.003	713.001	711.008	713.004	713.006	713.005	713.007

Order No.:  
221.08 V20  
Swing out rotor  
4 place  
Angle: 90°

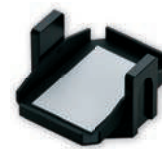


Order No.:  
625.004  
Round bucket



Acceleration in s: 35/320  
Deceleration in s: 34/751  
max. speed: 4,500 rpm  
max. RCF: 4,210 xg  
max. radius: 18.6 cm  
Temp. at max. speed: 0°C

Order No.:  
625.020  
Mikrotitre carrier



Acceleration in s: 34/319  
Deceleration in s: 33/727  
max. speed: 4,500 rpm  
max. RCF: 3,327 xg  
max. radius: 14.7 cm  
max. loading height: 63 mm  
max. loading weight: 310 g  
Temp. at max. speed: -2°C





Volume	Vacutainer®										Sarstedt®	
	500 ml	250 ml	50 ml	50 ml	15 ml	1.5/2.0 ml	1.8 - 5 ml	4 - 7 ml	5 ml	6 - 10 ml	2.6 - 2.9 ml 2.7 - 4.3 ml 4.9 ml	4 - 5.5 ml 7.5 - 8 ml 9 - 10 ml
ø in mm	81	62	29	29	17	11	13	13	16	16	13	16
Length min./max. (mm)	125	110/130	116	116	120	40	75	100	75	100	65/90	75/92
Tubes per rotor	4	4	20	28	48	100	88	88	76	76	76	56
Radius correction (cm)	0.9	0.6	0.4	0.4	0	6.4	3.8	1.4	0.2	1.7	0.1	0.2
Order No. adapter	625.004	625.003	625.002	625.001	625.000	625.013	625.009	625.014	625.023	625.010	625.008	625.007

# Accessories Z 446 and Z 446 K

Rotor/Bucket		Adapter				
<b>Order No.:</b> 221.18 V21   Angle rotor 6 x 85 ml Angle: 38°	Acceleration in s: 49/462 Deceleration in s: 46/1,655 Acceleration in s: 69/549 Deceleration in s: 67/1,307 max. speed: 11,000/13,000 rpm max. RCF: 15,555/21,726 xg max. radius: 11.5 cm max. ø: 38 mm Temp. at max. speed: 8°C	<b>Order No.:</b>	Tube rack	ø (mm)	Length (min./max.)	
		without Adapter	1 x 85 ml	38	113	
		707.003	1 x 50 ml	29	105	
		707.004	1 x 50 ml conical	29	116	
		707.002	1 x 30 ml	25	90/103	
		707.015	1 x 16 ml	18	103/110	
		707.000	2 x 15 ml	17	95/100	
		707.001	1 x 15 ml	17	103/110	
		707.014	1 x 15 ml conical	17	120	
<b>Order No.:</b> 221.20 V20   Angle rotor 4 x 85 ml Angle: 30°	Acceleration in s: 50/448 Deceleration in s: 45/1,251 Acceleration in s: 61/480 Deceleration in s: 47/1,220 max. speed: 15,000/16,000 rpm max. RCF: 23,140/26,328 xg max. radius: 9.2 cm max. ø: 38 mm Temp. at max. speed: 7°	<b>Order No.:</b>	Tube rack	ø (mm)	Length (min./max.)	
		without Adapter	1 x 85 ml	38	113	
		707.003	1 x 50 ml	29	105	
		707.004	1 x 50 ml conical*	29	116	
		707.002	1 x 30 ml	25	90/103	
		707.015	1 x 16 ml	18	103/110	
		707.000	2 x 15 ml	17	95/100	
		707.001	1 x 15 ml	17	103/110	
		707.014	1 x 15 ml conical*	17	120	
			* only without rotor lid			
<b>Order No.:</b> 221.21 V20   Angle rotor 6 x 250 ml Angle: 28°	Acceleration in s: 66/573 Deceleration in s: 84/1,871 max. speed: 8,000 rpm max. RCF: 10,016 xg max. radius: 14 cm max. ø: 62 mm Temp. at max. speed: -1°C	<b>Order No.:</b>	Tube rack	ø (mm)	Length (min./max.)	
		without Adapter	1 x 250 ml	62	122	
		713.045	1 x 175/225 ml Falcon®	61	118/137	
		713.042	1 x 50 ml conical	29	116	
		713.030	1 x 50 ml	29	103	
		713.028	2 x 30 ml	26	92	
		713.025	4 x 15 ml conical	17	120	
		713.020	5 x 10 ml	16	80	
		713.015	8 x 1.5/2.0 ml	11	40	
<b>Order No.:</b> 221.22 V21   Angle rotor 6 x 50 ml Angle: 26°	Acceleration in s: 28/263 Deceleration in s: 31/922 max. speed: 13,000 rpm max. RCF: 15,869 xg max. radius: 8.4 cm max. ø: 29 mm Temp. at max. speed: -4°C	<b>Order No.:</b>	Tube rack	ø (mm)	Length (min./max.)	
		without Adapter	1 x 50 ml	29	95/115	
		708.019	1 x 30 ml	25	92/95	
		708.003	1 x 16 ml	18	100/105	
		708.004	1 x 15 ml	17	100/105	
		708.017	1 x 15 ml conical*	17	120	
			* only without rotor lid			
<b>Order No.:</b> 221.28 V21   Angle rotor 20 x 10 ml Angle: 30°	Acceleration in s: 32/305 Deceleration in s: 37/984 max. speed: 12,000 rpm max. RCF: 15,775 xg max. radius: 9.8 cm max. ø: 16 mm Temp. at max. speed: -3°C	<b>Order No.:</b>	Tube rack	ø (mm)	Length (min./max.)	
		without Adapter	1 x 10 ml	16	80	
<b>Order No.:</b> 221.51 V20   Angle rotor 4 x 500 ml Angle: 24°	Acceleration in s: 73/575 Deceleration in s: 84/2,317 max. speed: 8,000 rpm max. RCF: 10,367 xg max. radius: 14.5 cm max. ø: 69.5 mm Temp. at max. speed: 4°C	<b>Order No.:</b>	Tube rack	ø (mm)	Length (min./max.)	
		without Adapter	1 x 500 ml	69.5	165	
		712.001	1 x 250 ml	62	122	
		712.102	1 x 250 ml Corning®	60	159	
		712.100	1 x 175 ml Falcon®	61	118	
		712.100	1 x 225 ml Falcon®	61	137	
		712.101	1 x 50 ml conical	29	116	
		712.104	3 x 50 ml	29	103	
		712.103	4 x 30 ml	25	92	
		712.105	6 x 15 ml conical	17	120	
<b>Order No.:</b> 221.52 V20   Angle rotor 10 x 50 ml conical Angle: 38°	Acceleration in s: 60/480 Deceleration in s: 68/1,747 Acceleration in s: 61/480 Deceleration in s: 480/1,747 max. speed: 10,000/10,500 rpm max. RCF: 14,532/16,022 xg max. radius: 13 cm max. ø: 29 mm Temp. at max. speed: 2°C	<b>Order No.:</b>	Tube rack	ø (mm)	Length (min./max.)	
		without Adapter	1 x 50 ml conical	29	116	
		708.050	1 x 15 ml RB	17	97/123	
		701.011*	1 x 7 ml	13.5	95/115	
		701.012*	1 x 5 ml	13.5	70/90	
		701.015*	1 x 1.5/2.0 ml	11	40	
		708.051	1 x 15 ml konisch	17	120	

\*only possible with adapter 708.050 or 708.051

# Accessories Z 446 and Z 446 K

Rotor/Bucket	Adapter																				
<p><b>Order No.:</b> 220.87 V22</p>  <p>PPS-Lid Angle rotor 24 x 1.5/2.0 ml Angle: 45°   hermetically sealed</p>	<p>Acceleration in s: 21/204 Deceleration in s: 29/375 max. speed: 16,000 rpm max. RCF: 24,325 xg max. radius: 8.5 cm max. ø: 11 mm Temp. at max. speed: 1°C</p> <table border="1"> <thead> <tr> <th>Order No.:</th> <th>Tube rack</th> <th>ø (mm)</th> <th>Length (min./max.)</th> </tr> </thead> <tbody> <tr> <td>without</td> <td>1 x 2.0 ml</td> <td>11</td> <td>40</td> </tr> <tr> <td>without</td> <td>1 x 1.5 ml</td> <td>11</td> <td>40</td> </tr> <tr> <td>704.005</td> <td>1 x 0.5 ml</td> <td>8</td> <td>45</td> </tr> <tr> <td>704.004</td> <td>1 x 0.4/0.2 ml PCR</td> <td>6</td> <td>45</td> </tr> </tbody> </table>	Order No.:	Tube rack	ø (mm)	Length (min./max.)	without	1 x 2.0 ml	11	40	without	1 x 1.5 ml	11	40	704.005	1 x 0.5 ml	8	45	704.004	1 x 0.4/0.2 ml PCR	6	45
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704.005	1 x 0.5 ml	8	45																		
704.004	1 x 0.4/0.2 ml PCR	6	45																		
<p><b>Order No.:</b> 220.87 V20</p>  <p>Alu-Lid Angle rotor 24 x 1.5/2.0 ml Angle: 45°   hermetically sealed</p>	<p>Acceleration in s: 21/204 Deceleration in s: 29/394 max. speed: 16,000 rpm max. RCF: 24,325 xg max. radius: 8.5 cm max. ø: 11 mm Temp. at max. speed: 1°C</p> <table border="1"> <thead> <tr> <th>Order No.:</th> <th>Tube rack</th> <th>ø (mm)</th> <th>Length (min./max.)</th> </tr> </thead> <tbody> <tr> <td>without</td> <td>1 x 2.0 ml</td> <td>11</td> <td>40</td> </tr> <tr> <td>without</td> <td>1 x 1.5 ml</td> <td>11</td> <td>40</td> </tr> <tr> <td>704.005</td> <td>1 x 0.5 ml</td> <td>8</td> <td>45</td> </tr> <tr> <td>704.004</td> <td>1 x 0.4/0.2 ml PCR</td> <td>6</td> <td>45</td> </tr> </tbody> </table>	Order No.:	Tube rack	ø (mm)	Length (min./max.)	without	1 x 2.0 ml	11	40	without	1 x 1.5 ml	11	40	704.005	1 x 0.5 ml	8	45	704.004	1 x 0.4/0.2 ml PCR	6	45
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704.005	1 x 0.5 ml	8	45																		
704.004	1 x 0.4/0.2 ml PCR	6	45																		
<p><b>Order No.:</b> 221.38 V20</p>  <p>Angle rotor 4 x 8-PCR Strips</p>	<p>Acceleration in s: 12/100 Deceleration in s: 12/202 max. speed: 15,000 rpm max. RCF: 15,343 xg max. radius: 6.1 cm max. ø: 6 mm Temp. at max. speed: -2°C</p>																				
<p><b>Order No.:</b> 221.68 V20</p>  <p>Angle rotor 44 x 1.5/2.0 ml Angle: 32°/55°</p>	<p>Acceleration in s: 25/235 Deceleration in s: 25/500 max. speed: 16,000 rpm max. RCF: 24,325 xg max. radius: 8.5 cm max. ø: 11 mm Temp. at max. speed: -2°C</p> <table border="1"> <thead> <tr> <th>Order No.:</th> <th>Tube rack</th> <th>ø (mm)</th> <th>Length (min./max.)</th> </tr> </thead> <tbody> <tr> <td>without</td> <td>1 x 2.0 ml</td> <td>11</td> <td>40</td> </tr> <tr> <td>without</td> <td>1 x 1.5 ml</td> <td>11</td> <td>40</td> </tr> <tr> <td>704.005</td> <td>1 x 0.5 ml</td> <td>8</td> <td>45</td> </tr> <tr> <td>704.004</td> <td>1 x 0.4/0.2 ml PCR</td> <td>6</td> <td>45</td> </tr> </tbody> </table>	Order No.:	Tube rack	ø (mm)	Length (min./max.)	without	1 x 2.0 ml	11	40	without	1 x 1.5 ml	11	40	704.005	1 x 0.5 ml	8	45	704.004	1 x 0.4/0.2 ml PCR	6	45
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## More from Hermle



Z 216 M



Z 366 K

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