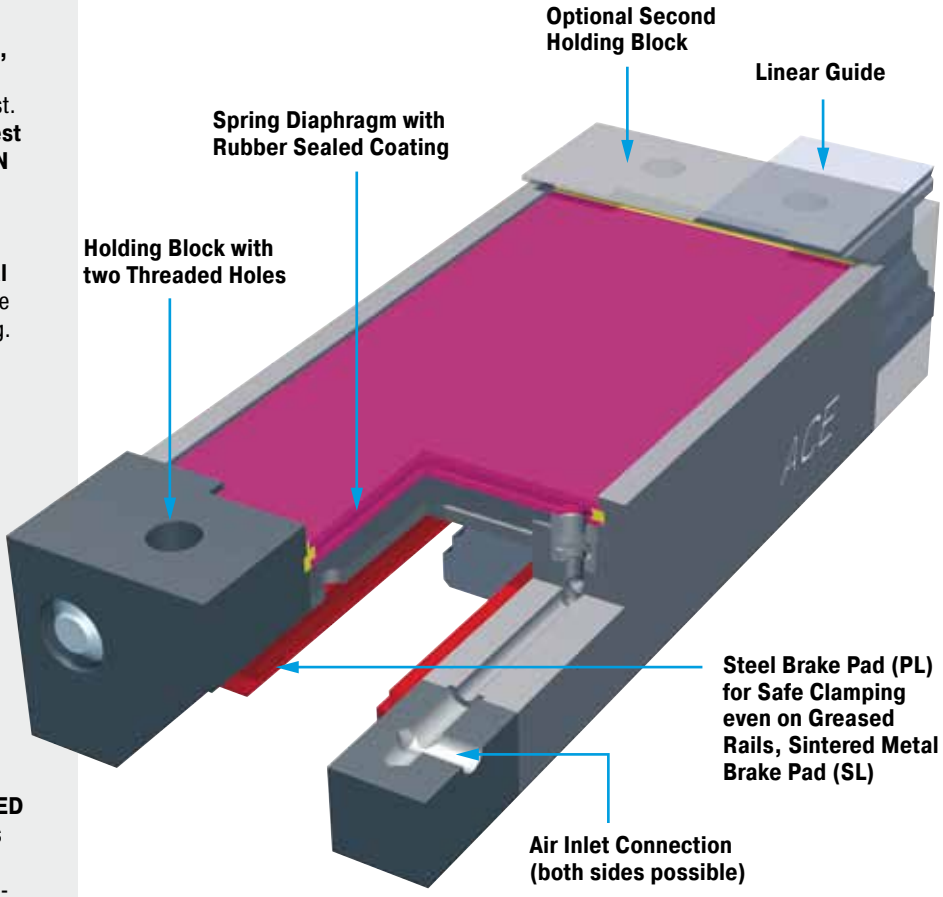
LOCKED-Series Type PL/SL

Process/Safety Clamping for Rail Systems

NEW

The innovative pneumatic clamping elements of the new **LOCKED series PL** were designed for a secure and reliable **process clamping** directly on the linear guide. They are adapted individually to the linear guide employed in each case and are available for almost all traditional rail sizes and manufacturers, for example, **INA, STAR/Rexroth, THK, NSK, Schneeberger, HiWin** and many more. Special profiles are also available on request. **The LOCKED series PL offers the highest process clamping forces up to 10 000 N** with low system costs, in comparison with hydraulic and electrical solutions. The clamping elements are free to move when compressed air is applied and offer **optimal static safety clamping**, since failure of the pneumatics does not influence the clamping. By means of the steel pads used, 100 % clamping forces are also achieved where greased rails are necessary.

"All common rail profiles available!"



The safety clamping elements of the **LOCKED series SL** work using the same principle as the PL and PLK Types and clamp directly on the open area of the guide rail. Through utilization of **special brake linings from low-wear sintered metal**, they offer an additional **emergency stop braking function**, as well as a clamping function. Stopping forces up to **10 000 N** are achieved by the well-proven spring steel sheet technology when the activation air is exhausted. In case of power failure, an instant emergency stop braking and/or **safety clamping** are implemented. The SL series is available for all usual rail profiles, and significantly increases the safety of your linear axis.

Rail sizes: 20 mm to 65 mm

Holding forces: 900 N to 10 000 N (6 bar type)

Clamping cycles/emergency use: 1 000 000/500. For higher values please consult ACE.

Material: Clamping body and milled parts: Tool steel. Spring steel plate: Spring steel. Brake pads: Steel (PL) or sintered metal (SL).

Mounting: In any position

Operating pressure: 4 bar or 6 bar (standard type)

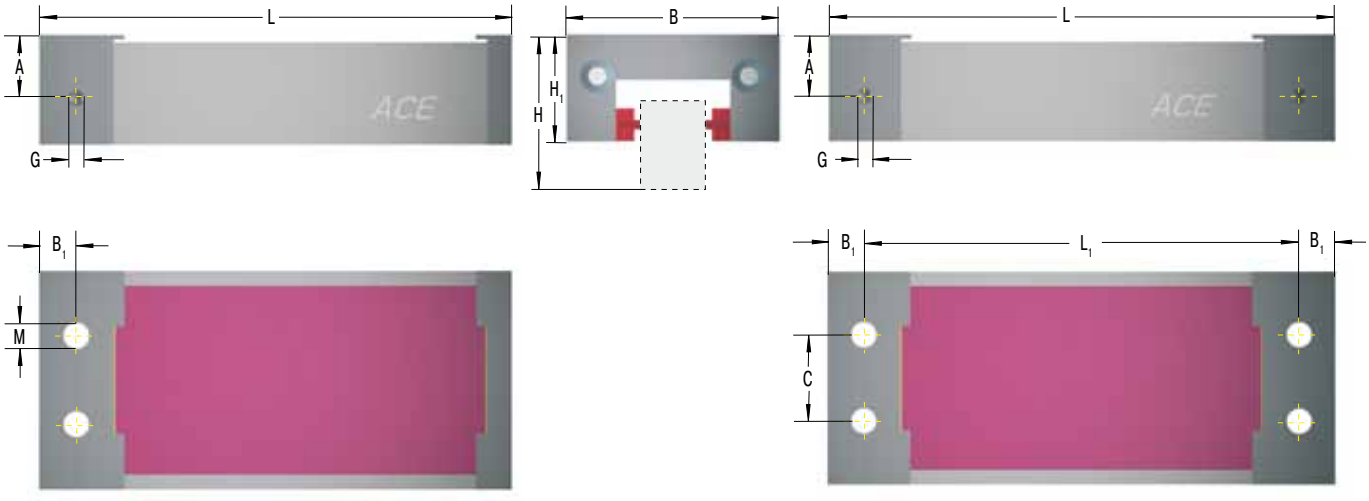
Pneumatic medium: Dried, filtered air

Operating temperature range: 15 °C to 45 °C

On request: Wipers and special profiles.

Issue 6.2011 Specifications subject to change

NEW



Ordering Example **PL45-2-6B-X**

Linear Process Clamping
Rail Nominal Size 45 mm
Number of Holding Blocks 2
6B = 6 bar Type
4B = 6 bar Type
Series Number assigned by ACE

Complete Details Required when Ordering

Rail manufacturer, rail type, rail size
Carriage type name
Number of clamping cycles per hour
Operating pressure: 4 bar or 6 bar
Number of holding blocks

The calculation and selection of the correct clamping device should be made or approved by ACE.

Dimensions and Capacity Chart LOCKED-Series PL

				Low Carriage			High Carriage							[1] Holding Force N Type		
Type	L	L_1	B	H	H_1	A	H	H_1	A	B_1	C	G	M	4 bar **N**	6 bar **N**	Weight **kg**
PL20-1	97.5	–	43	30	19.5	13.5	–	–	–	6	12	M5	M5	540	900	0.32
PL25-1	117.5	–	47	36	25	15.5	40	29	19.5	6	16	M5	M6	780	1 200	0.5
PL30-1	126.5	–	59	42	29.5	17	45	32.5	20	10	18	M5	M8	1 100	1 800	0.9
PL35-1	156.5	–	69	48	35	22.5	55	42	29.5	10	22	G1/8	M10	1 800	2 800	1.26
PL45-1	176.5	–	80	60	42	26.5	70	52	36.5	10	28	G1/8	M10	2 400	4 000	2.3
PL45-2	191.5	171.2	80	60	42	26.5	70	52	36.5	10	28	G1/8	M10	2 400	4 000	2.3
PL55-1	202.5	–	98	70	49	28	80	59	38	12.5	34	G1/8	M10	3 600	6 000	3.9
PL55-2	221.5	196.2	98	70	49	28	80	59	38	12.5	34	G1/8	M10	3 600	6 000	4.1
PL65-1	259.5	–	120	90	64	38	100	74	48	15	44	G1/8	M12	6 000	10 000	5
PL65-2	281.5	251.5	120	90	64	38	100	74	48	15	44	G1/8	M12	6 000	10 000	5.2

[1] The holding forces as shown in the capacity chart were determined **on dry rails** for roller systems (STAR, INA). Different holding forces may occur for other rails.

Dimensions and Capacity Chart LOCKED-Series SL

				Low Carriage			High Carriage							[1] Holding Force N Type		
Type	L	L_1	B	H	H_1	A	H	H_1	A	B_1	C	G	M	4 bar **N**	6 bar **N**	Weight **kg**
SL20-1	97.5	–	43	30	19.5	13.5	–	–	–	6	12	M5	M5	540	900	0.32
SL25-1	117.5	–	47	36	25	15.5	40	29	19.5	6	16	M5	M6	780	1 200	0.5
SL30-1	126.5	–	59	42	29.5	17	45	32.5	20	10	18	M5	M8	1 100	1 800	0.9
SL35-1	156.5	–	69	48	35	22.5	55	42	29.5	10	22	G1/8	M10	1 800	2 800	1.26
SL45-1	176.5		80	60	42	26.5	70	52	36.5	10	28	G1/8	M10	2 400	4 000	2.3
SL45-2	191.5	171.2	80	60	42	26.5	70	52	36.5	10	28	G1/8	M10	2 400	4 000	2.3
SL55-1	202.5	–	98	70	49	28	80	59	38	12.5	34	G1/8	M10	3 600	6 000	3.9
SL55-2	221.5	196.2	98	70	49	28	80	59	38	12.5	34	G1/8	M10	3 600	6 000	3.9
SL65-1	259.5	–	120	90	64	38	100	74	48	15	44	G1/8	M12	6 000	10 000	5
SL65-2	281.5	251.2	120	90	64	38	100	74	48	15	44	G1/8	M12	6 000	10 000	5.2

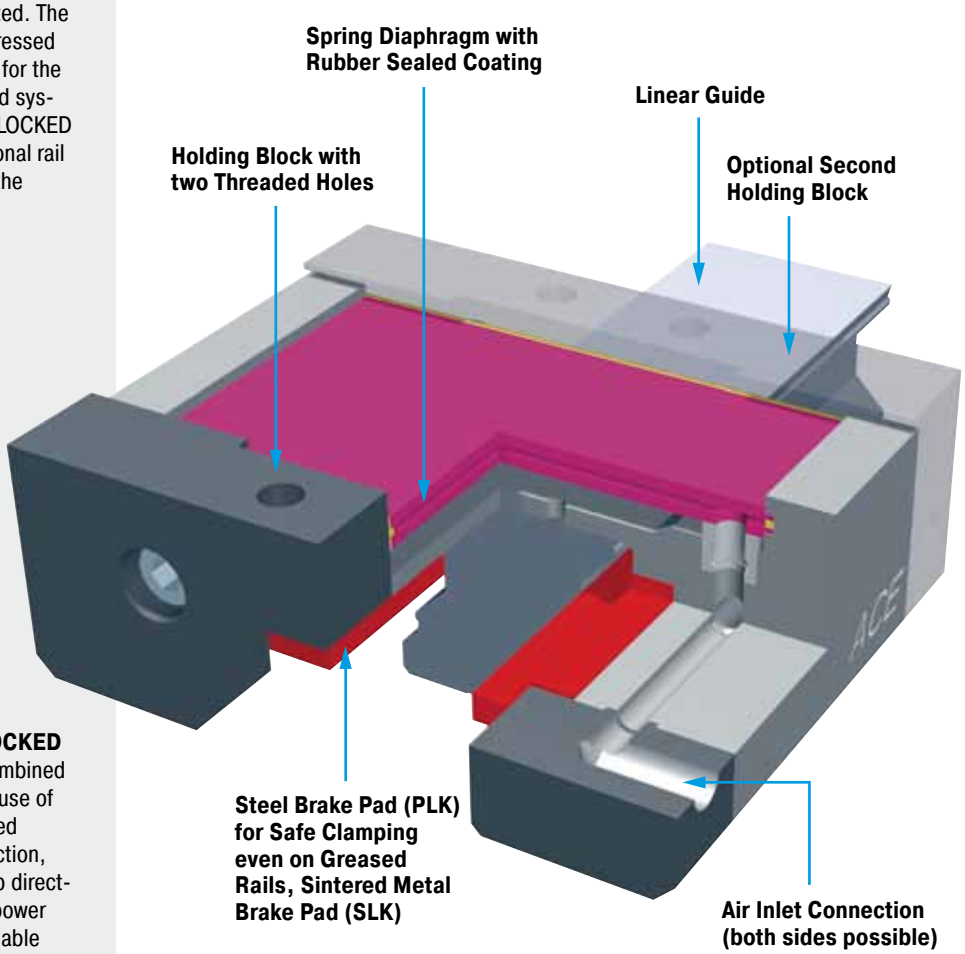
[1] The holding forces as shown in the capacity chart were determined **on dry rails** for roller systems (STAR, INA). Different holding forces may occur for other rails.

Issue 6.2011 Specifications subject to change

NEW

As the compact version of the PL series, the **LOCKED series PLK** clamps directly on the respective linear guide by means of the patented spring steel sheet system. Clamping and stopping forces of up to 2100 N are achieved by small, **compact designs** when vented. The clamping is released by applying compressed air. Both a 4-bar activated system, e.g. for the automotive sector, and a 6-bar activated system are available. Also, the types of the LOCKED series PLK can be adapted to all traditional rail sizes (15 to 55) and profile sections of the individual providers.

"Highest holding forces in a compact design!"



The safety clamping elements of the **LOCKED series SLK** also offer two functions combined into one clamping element through the use of special brake linings of low-wear sintered metal. As well as a purely clamping function, braking is possible with emergency stop directly on the rail, in the case of a possible power failure. On almost all commercially available linear guides, the highest stopping and braking forces are achieved with this the smallest, most compact construction design. Minimum reaction times result from the spring steel sheet technology employed.

Rail sizes: 15 mm to 55 mm

Holding forces: 450 N to 2100 N (6 bar type)

Clamping cycles/emergency use: 1 000 000/500. For higher values please consult ACE.

Material: Clamping body and milled parts: Tool steel. Spring steel plate: Spring steel. Brake pads: Steel (PLK). Brake pads: Sintered metal (SLK).

Mounting: In any position

Operating pressure: 4 bar or 6 bar (standard type)

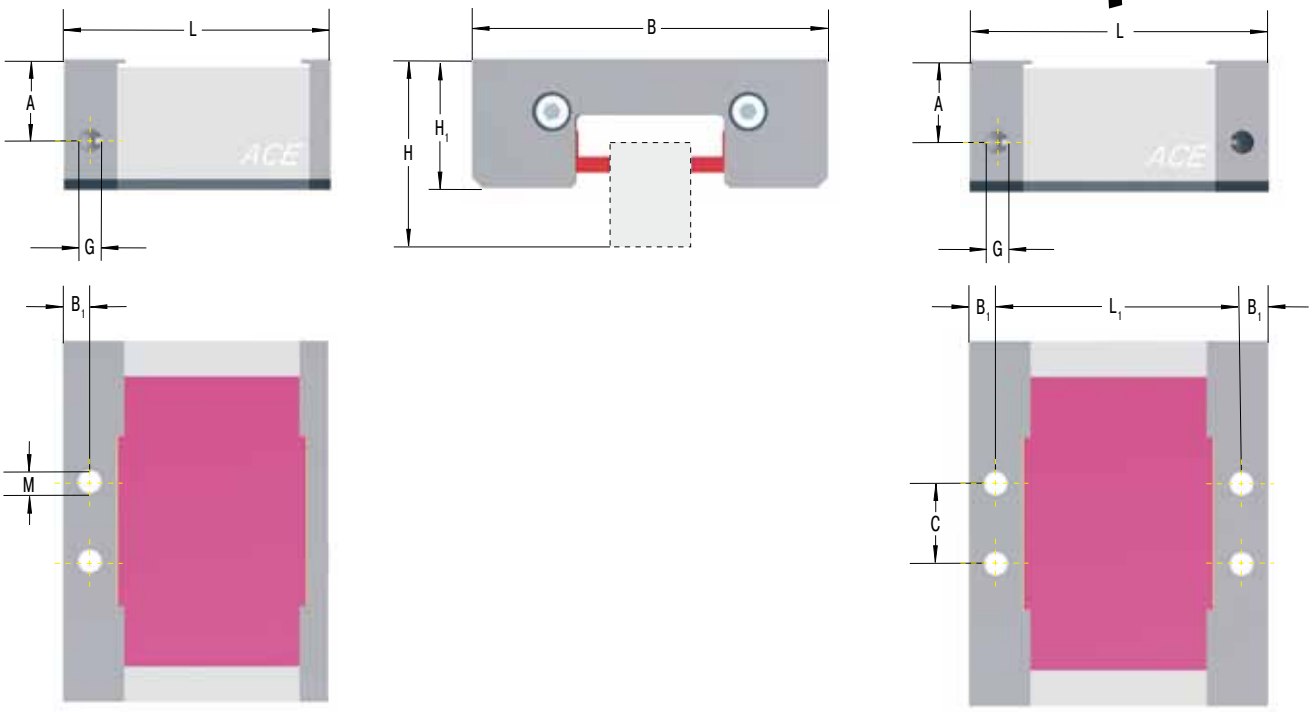
Pneumatic medium: Dried, filtered air

Operating temperature range: 15 °C to 45 °C

On request: Wipers and special profiles.

Issue 6.2011 Specifications subject to change

NEW



Ordering Example **PLK55-2-6B-X**

Linear Process Clamping Compact
Rail Nominal Size 55 mm
Number of Holding Blocks 2
6B = 6 bar Type
4B = 6 bar Type
Series Number assigned by ACE

Complete Details Required when Ordering

Rail manufacturer, rail type, rail size
Carriage type name
Number of clamping cycles per hour
Operating pressure: 4 bar or 6 bar
Number of holding blocks

The calculation and selection of the correct clamping device should be made or approved by ACE.

Dimensions and Capacity Chart LOCKED-Series PLK

				Low Carriage			High Carriage							[1] Holding Force Type		
Type	L	L_1	B	H	H_1	A	H	H_1	A	B_1	C	G	M	4 bar **N**	6 bar **N**	Weight **kg**
PLK15-1	55.5	–	45	24	18	14	–	–	14	5	12	M5	M5	300	450	0.5
PLK20-1	55.5	–	54	30	22	16	–	–	16	5	16	M5	M6	430	650	0.6
PLK25-1	55.5	–	75	36	25.5	16	40	29.5	16	5	16	M5	M6	530	800	0.7
PLK30-1	67	–	82	42	30	21	45	33	21	8.75	18	M5	M8	750	1 150	0.9
PLK35-1	67	–	96	48	35	21.2	55	42	21.2	8.75	22	G1/8	M10	820	1 250	1.27
PLK45-1	80	–	116	60	45	27.5	70	55	27.5	10	28	G1/8	M10	950	1 500	2
PLK45-2	92	72	116	60	45	27.5	70	55	27.5	10	28	G1/8	M10	950	1 500	2.2
PLK55-1	100	–	136	70	49	30.5	80	59	30.5	10	34	G1/8	M10	1 300	2 100	2.8
PLK55-2	112	92	136	70	49	30.5	80	59	30.5	10	34	G1/8	M10	1 300	2 100	3

[1] The holding forces as shown in the capacity chart were determined **on dry rails** for roller systems (STAR, INA). Different holding forces may occur for other rails.

Dimensions and Capacity Chart LOCKED-Series SLK

				Low Carriage			High Carriage							[1] Holding Force Type		
Type	L	L_1	B	H	H_1	A	H	H_1	A	B_1	C	G	M	4 bar **N**	6 bar **N**	Weight **kg**
SLK15-1	55.5	–	45	24	18	14	–	–	14	5	12	M5	M5	300	450	0.5
SLK20-1	55.5	–	54	30	22	16	–	–	16	5	16	M5	M6	430	650	0.6
SLK25-1	55.5	–	75	36	25.5	16	40	29.5	16	5	16	M5	M6	530	800	0.7
SLK30-1	67	–	82	42	30	21	45	33	21	8.75	18	M5	M8	750	1 150	0.9
SLK35-1	67	–	96	48	35	21.2	55	42	21.2	8.75	22	G1/8	M10	820	1 250	1.27
SLK45-1	80	–	116	60	45	27.5	70	55	27.5	10	28	G1/8	M10	950	1 500	2
SLK45-2	92	72	116	60	45	27.5	70	55	27.5	10	28	G1/8	M10	950	1 500	2.2
SLK55-1	100	–	136	70	49	30.5	80	59	30.5	10	34	G1/8	M10	1 300	2 100	2.8
SLK55-2	112	92	136	70	49	30.5	80	59	30.5	10	34	G1/8	M10	1 300	2 100	3

[1] The holding forces as shown in the capacity chart were determined **on dry rails** for roller systems (STAR, INA). Different holding forces may occur for other rails.

Issue 6.2011 Specifications subject to change

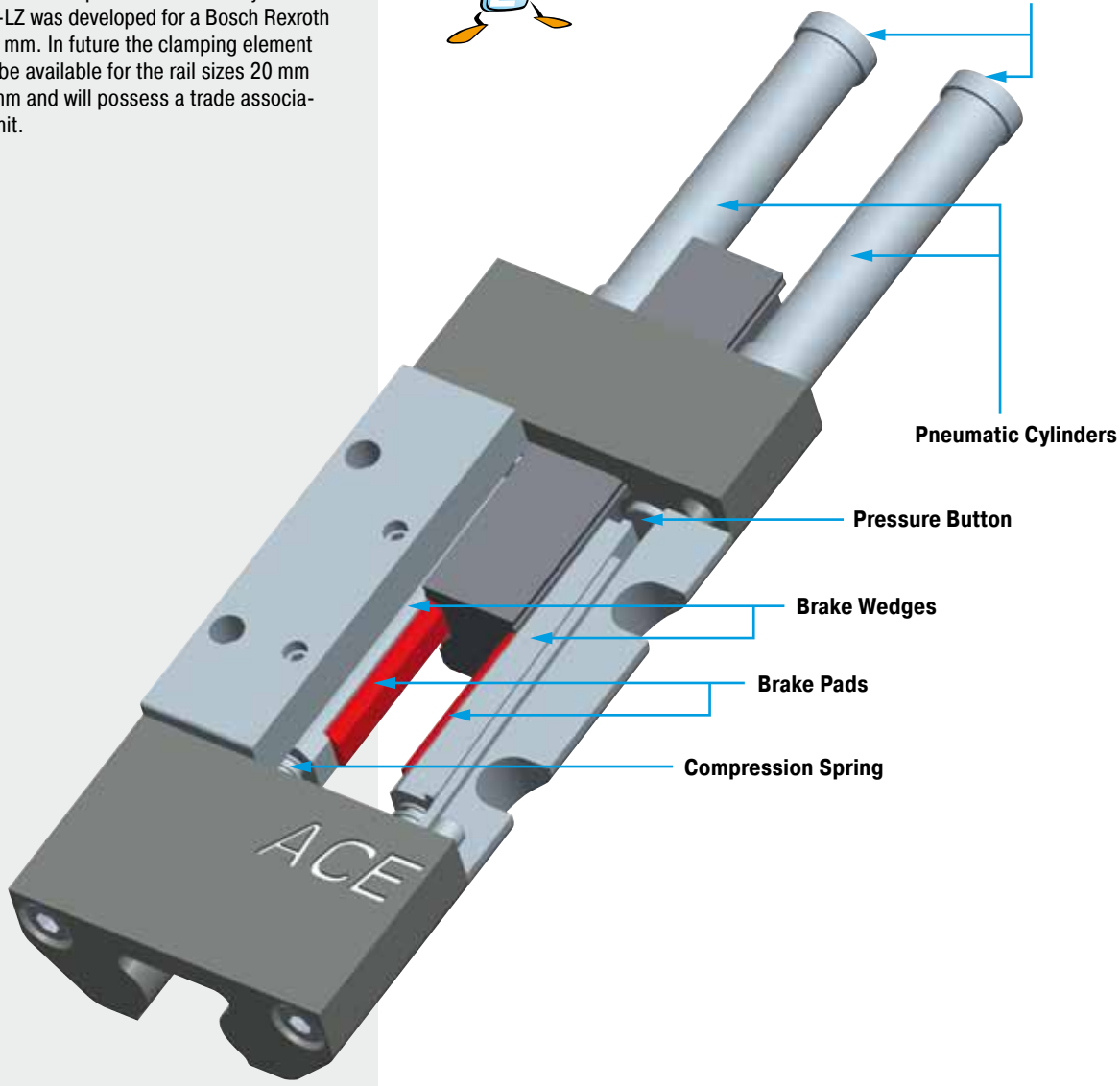
LOCKED-Series Type LZ-P

Clamping with Safety Function for Z-Axes

NEW

The innovative pneumatic clamping element of the new **LOCKED-LZ series** was especially designed for the safe and reliable clamping of vertical axes (Z-axes). The movement of the gravity-loaded axis is eliminated due to the tried and proven wedge principle. In the process the chocks are bilaterally pushed against the plane-parallel surfaces of the guide rail in case of a pressure drop. This system achieves holding forces of up to 1500 N. Initially the LOCKED-LZ was developed for a Bosch Rexroth rail of 15 mm. In future the clamping element will also be available for the rail sizes 20 mm and 25 mm and will possess a trade association permit.

"Highest clamping forces on the 15 mm rail!"



Rail sizes: Bosch Rexroth 15 mm

Holding forces: Up to 1500 N

Clamping cycles/emergency use: 1 000 000/2000

Material: Clamping body and milled parts: Tool steel.

Mounting: In vertical position

Effective direction: Z-axes toward gravity

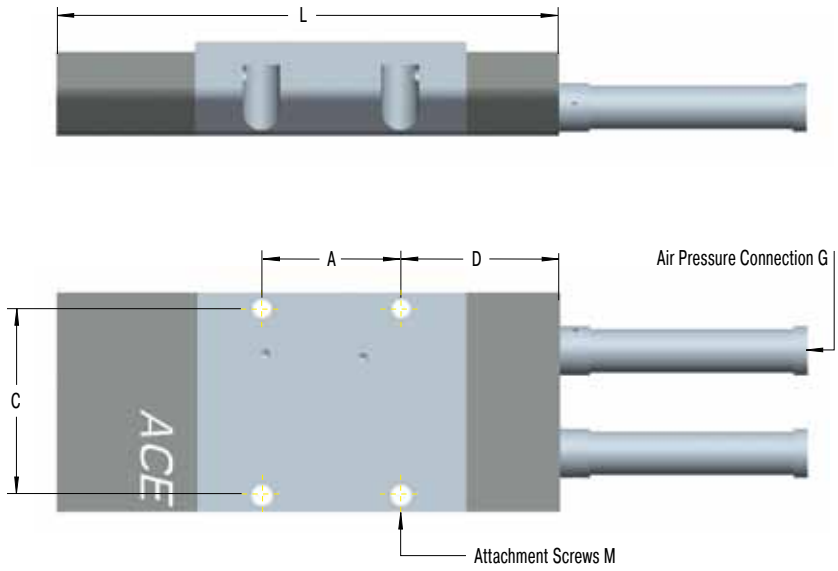
Operating pressure: 4 bar to 6 bar

Pneumatic medium: Dried, filtered air

Operating temperature range: 0 °C to 60 °C

Issue 6.2011 Specifications subject to change

NEW



Ordering Example **LZ-P15-X**

Process Clamping Z-Axis
Rail Nominal Size 15 mm
Series Number assigned by ACE

The calculation and selection of the correct clamping device should be made or approved by ACE.

Dimensions and Capacity Chart

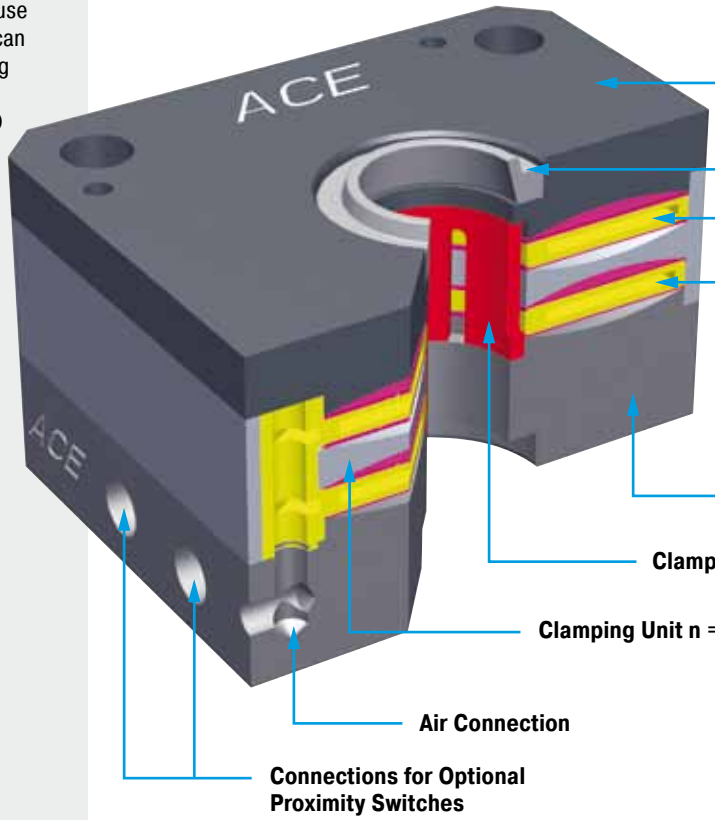
Type	L	B	H	H_1	A	C	D	G	M	Holding Force N	Weight kg
LZ-P15-X	108.5	47	24	20	30	40	34	M3	M4	1 500	0.4

Issue 6.2011 Specifications subject to change

NEW

The innovative **LOCKED series P** offers pneumatic rod clamping in both directions of motion, for rod diameters from 16 mm up to 50 mm. The forces achieved with hydraulic clamping are matched and often exceeded with **stopping forces up to 27 000 N**. LOCKED-P is an optimal safety clamping, because failure of the pneumatics means instant clamping of the system. ACE LOCKED is a much more cost effective solution to hydraulic systems. The ACE LOCKED-P clamping elements are advantageous due to their compact construction, and thus enable short rod lengths. By the use of a **modular system**, several segments can be stacked, so that the necessary clamping force can be sized individually for every application. In case of the versions for **ISO pneumatic cylinders**, cover and base plates are coordinated dimensionally to the flange measurements of the standard cylinders, in accordance with ISO 15552.

"On request also useable as torque lock!"



Rod diameter: 20 mm to 40 mm (hardened piston rod recommended)

Holding forces: Up to 27 000 N

Clamping cycles: 1 000 000. For higher values please consult ACE.

Material: Clamping body and milled parts: Tool steel. Spring steel plate: Spring steel. Clamping sleeve: Alum-bronze.

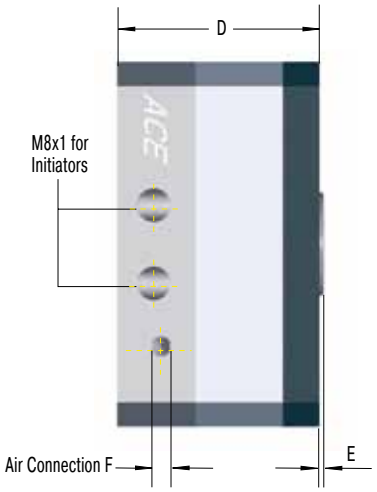
Operating pressure: 4 bar (automotive) or 6 bar

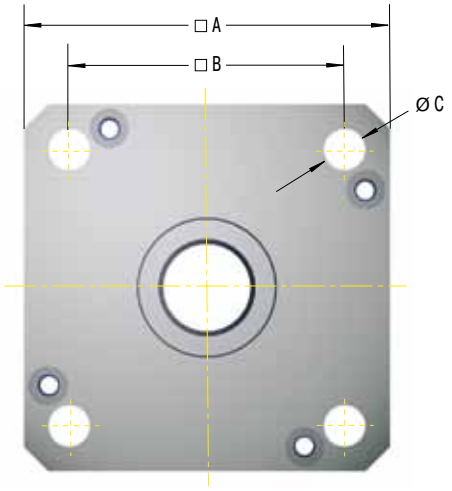
Pneumatic medium: Dried, filtered air

Operating temperature range: 10 °C to 45 °C

Issue 6.2011 Specifications subject to change

NEW





Ordering Example **PN80-25-3-4B**

Rod Clamping Standard Model
Cylinder Nominal Diameter 80 mm
Rod Diameter 25 mm
Number of Clamping Units 3
6B = 6 bar Type
4B = 4 bar Type

Standard rod sizes are listed in the capacity charts below. Special diameters are also available on request.

The calculation and selection of the correct clamping device should be made or approved by ACE.

Dimensions and Capacity Chart

Type	A	B	C	D	E	F	[1] Holding Force N Type 4 bar	[1] Holding Force N Type 6 bar	[1] Holding Torque Nm Type 4 bar	[1] Holding Torque Nm Type 6 bar	Weight kg
PN63-20-1	75	56.5	8.5	41.5	2.1	M5	1 400	2 000	15	20	0.7
PN63-20-2	75	56.5	8.5	59.5	2.1	M5	2 520	3 600	25	35	1.13
PN63-20-3	75	56.5	8.5	77.5	2.1	M5	3 780	5 400	35	50	1.56
PN80-25-1	96	72	10.5	43.5	2.14	G1/8	2 100	3 000	25	35	1.3
PN80-25-2	96	72	10.5	63.5	2.14	G1/8	3 780	5 400	40	60	2.2
PN80-25-3	96	72	10.5	83.5	2.14	G1/8	5 670	8 100	65	95	3.1
PN125-40-1	145	110	13	51.6	3	G1/8	7 000	10 000	140	200	3.65
PN125-40-2	145	110	13	75.2	3	G1/8	12 600	18 000	250	360	5.85
PN125-40-3	145	110	13	98.8	3	G1/8	18 900	27 000	375	540	8.05

[1] The listed holding forces are reached under optimum conditions. We recommend a safety factor of > 10 %. Please note that surface, material and cleanliness of the rod as well as wear and tear and the use of rod wipers lead to different holding forces. Test the clamping needed for series production or safety applications in its specific application environment and measure the actual values.

Issue 6.2011 Specifications subject to change

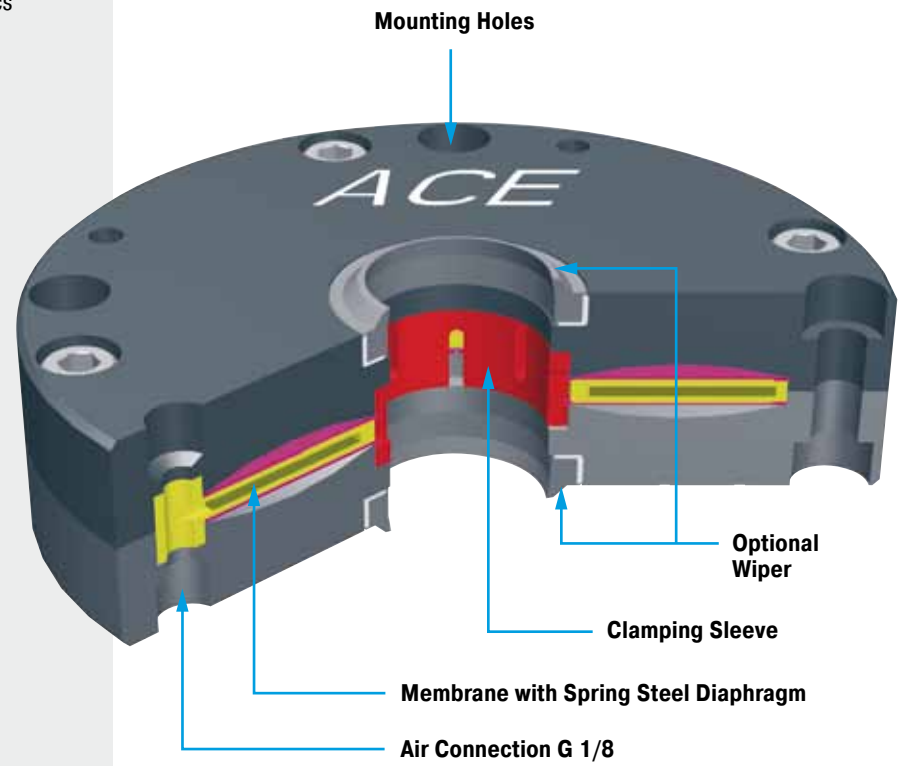
LOCKED-Series Type PRK

Pneumatic Rod Clamping Compact

NEW

The **LOCKED series PRK** is a pneumatic rod clamping in a compact construction design. The small installation height enables utilization in the case of limited construction space. Installation heights of 28 to 34 mm offer clamping forces up to 5000 N. The clamping forces are applied in both tension and compression. The clamping is implemented by a membrane/spring steel sheet system, and is released through the application of compressed air, either 4 bar or alternatively 6 bar. Due to the operational method, the PRK series is optimally suited for use as a static safety clamping sytem, because failure of the pneumatics means instant clamping.

"Rod clamping in a compact design!"



Rod diameter: 20 mm to 40 mm (special diameters on request; hardened piston rod recommended).

Holding forces: Up to 5000 N

Clamping cycles: 1 000 000. For higher values please consult ACE.

Material: Clamping body and milled parts: Tool steel. Spring steel plate: Spring steel. Clamping sleeve: Alum-bronze.

Operating pressure: 4 bar (automotive) or 6 bar

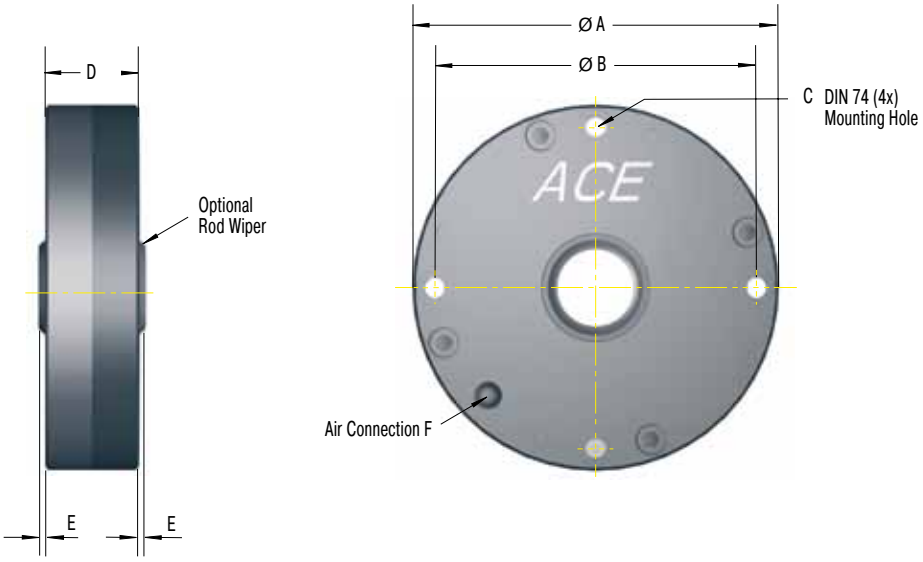
Pneumatic medium: Dried, filtered air

Operating temperature range: 10 °C to 45 °C

92

Issue 6.2011 Specifications subject to change

NEW



Ordering Example **PRK80-25-6B**

Rod Clamping Compact
Cylinder Nominal Diameter 80 mm
Rod Diameter 25 mm
6B = 6 bar Type
4B = 4 bar Type

Standard rod sizes are listed in the capacity charts below. Special diameters are also available on request.

The calculation and selection of the correct clamping device should be made or approved by ACE.

Dimensions and Capacity Chart

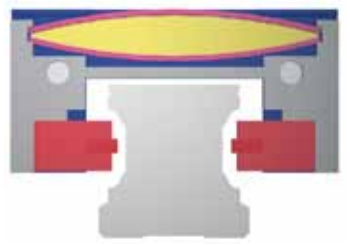
Type	A	B	C	D	E	F	[1] Holding Force N Type 4 bar	[1] Holding Force N Type 6 bar	[1] Holding Torque Nm Type 4 bar	[1] Holding Torque Nm Type 6 bar	Weight kg
PRK63-20	92	80	M5	28	2.1	G1/8	700	1 000	7	10	1.15
PRK80-25	118	104	M6	30	2.14	G1/8	1 050	1 500	12	17	2.1
PRK125-40	168	152	M6	34	3	G1/8	3 500	5 000	70	100	4.9

[1] The listed holding forces are reached under optimum conditions. We recommend a safety factor of > 10 %. Please note that surface, material and cleanliness of the rod as well as wear and tear and the use of rod wipers lead to different holding forces. Test the clamping needed for series production or safety applications in its specific application environment and measure the actual values.

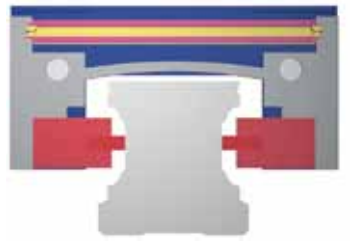
Issue 6.2011 Specifications subject to change

NEW

Functional Principle LOCKED-PL/PLK/SL/SLK



Example: STAR/Rexroth-installation



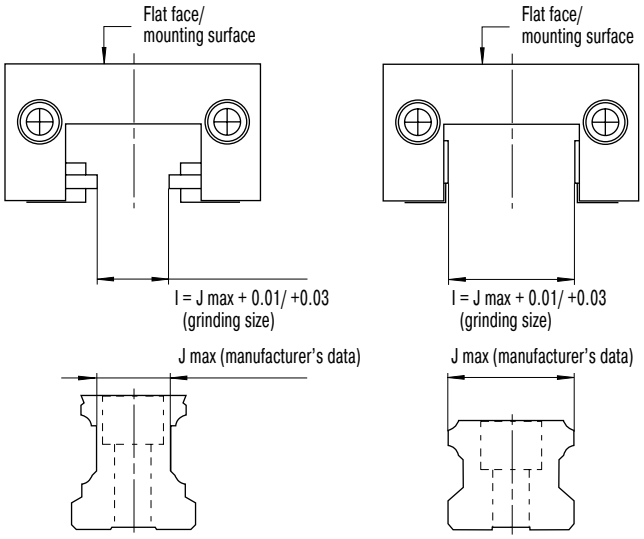
Released:

The chamber filled with compressed air between the spring steel plates relaxes and thus releases the clamping/brake pads from the rail. The clamping element is now free to move.

Engaged:

The clamping force of the mechanically pre-stressed spring steel plates is transferred to the clamping/brake pads as holding force. The clamping element is clamped on the guide rail.

Slot Dimensions between Braking and Clamping Linings and Linear Guide Rail



The internal dimension "I" between the linings of every LOCKED rail clamping is ground to an exact value. This is always 0.01 to 0.03 mm greater than the upper limit J max. of the respective linear guide rail (see drawing), resulting from the manufacturer's directives. The maximum holding force results at J max. and, in the most unfavorable case, holding force losses up to 30 % can occur (see table).

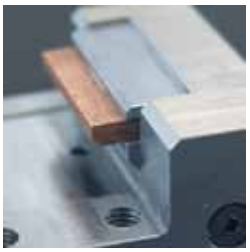
Air Gap Lining/Linear Guide Rail **mm**	Loss in Holding Force **%**
0.01	5
0.03	10
0.05	20
0,07	30

Clamping

Position Clamping

The types of the LOCKED series PL and PLK are designed for clamping directly on the linear guide. The clamping linings are produced from tool steel and offer 100 % clamping force, even in the case of lubricated rails.

Braking



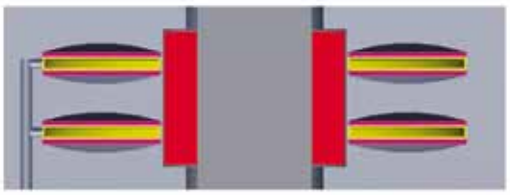
Position Clamping and Emergency Stop Braking

With the typical SL, SLK, low-wear sinter graphite linings are employed. These enable both a position clamping, as well as emergency stop braking on the linear guide. In case of lubricated rails, a stopping force of 60 % of the nominal stopping force should be considered.

Issue 6.2011 Specifications subject to change

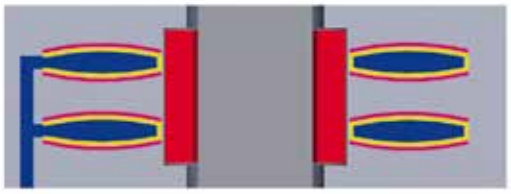
NEW

Functional Principle LOCKED-PN/PRK



Engaged:

The clamping force of the mechanically pre-stressed spring steel plates system is transferred as as a holding force into the clamping sleeve. The rod or shaft is engaged.



Released:

The membrane filled with compressed air relaxes the spring steel plate system and releases the clamping sleeve.

Intelligent Component System Solution for LOCKED-PN

By connecting up to three clamping units between the base and deck plates, it is possible to easily increase the clamping force.

Notes on Safety

Design-related, the addition of the individual component tolerances leads to an elastic axial tolerance allowance.This axial tolerance allowance can be up to 500 µm in the clamped status, according to implementation!

The axis/shaft/rod must be machined with at least h9-fit (or better) above h5. Deviations from the prescribed tolerance can lead to reduction of the stopping force, or functional failure.

Issue 6.2011 Specifications subject to change