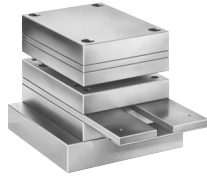


Die sets made of steel and aluminium

- In standardized sizes from stock or in any forms and dimensions to your drawings.
- Die sets stress-relieved, surfaces polished plane parallel. Ruptures, recesses, boreholes to your instructions.
- Sliding guides with guide bushes of hardened steel with bronze-plated treat as well as
- Ball guides, roller guides
- Precision die sets for progressive and compound dies
- Steel plates for die sets
- Centering and damping units



ST 35.. page 1.03 **ST 35..** page 1.07 **ST 3730** page 1.10 **ST 3712** page 1.12 **ST 3719** page 1.12 **ST 3500** page 1.18

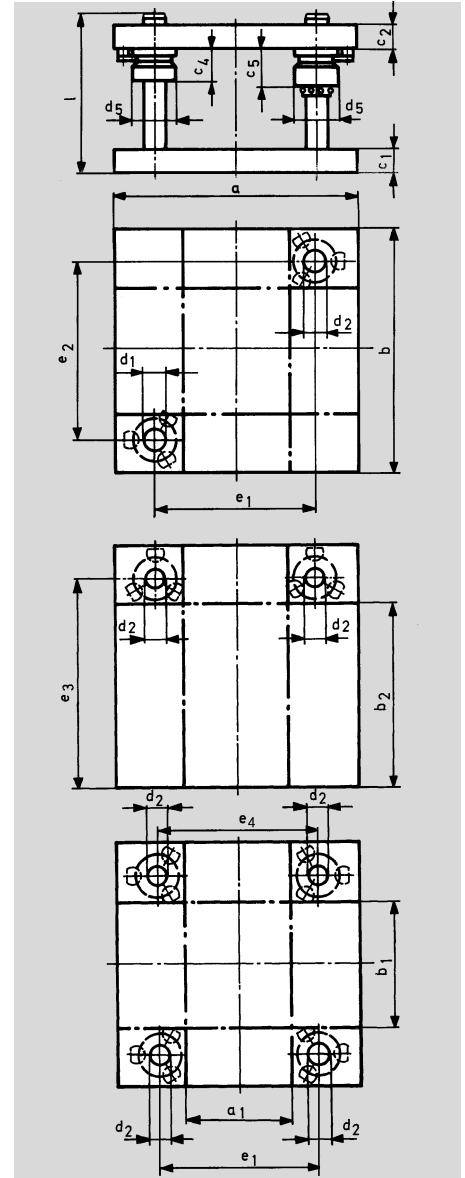
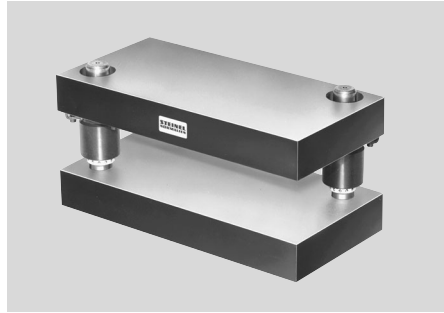
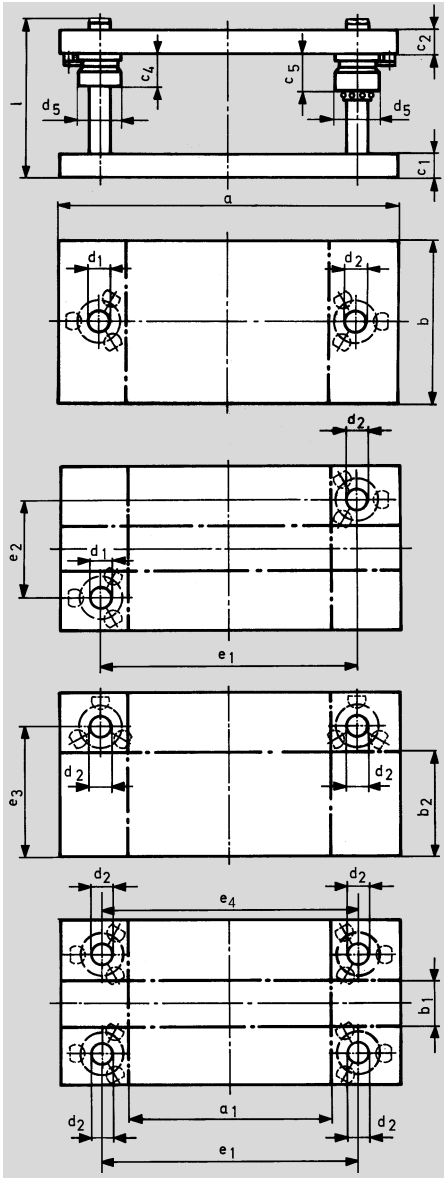


ST 3502 page 1.19



Die sets ST 35..

without stripper plate



Rectangular working area
2 or 4 pillars

Material: 1.0570 (St 52.3) aluminium on request

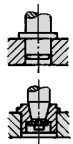
The plates are cleanly flame cut and normalized. Upon request edges finished. Please state on order.

Position of bushings:
Normally the positions of bushings will be as shown. If different positions are required indicate this on the order.

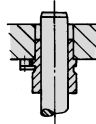
DIN 9868

Different Guide pillars length on request

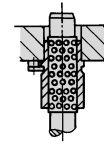
Lifting devices see under accessories



Removable pillars upon request
ST 7120 or
ST 7181/82

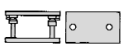


Sliding guide
hardened
steel bushing
bronze plated
Guide bushing with shoulder ST 7419
medium version



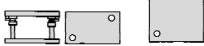
Ball guide
Guide bushing with shoulder ST 7412
long version
Cage travel = 1/2 length of stroke

Add size and combination of plates to order number



Order no. **ST 3539.**

Order no. **ST 3532.**



Order no. **ST 3549.**

Order no. **ST 3542.**



Order no. **ST 3559.**

Order no. **ST 3552.**



Order no. **ST 3569.**

Order no. **ST 3562.**



Die sets ST 35..

without stripper plate

STEINEL[®]
NORMALIEN

Order example:

Die set with 2 rear mounted pillars,
bronze-plated steel **ST 3559**, sliding guide

Size a x b = 250 x 250

c₁ = 40, c₂ = 32

Add **250 x 250.3**

Order number **ST 3559. 250 x 250.3**

Add
size and combination
of plates
to order number

□ x □

a x b	a ₁	b ₁	b ₂	c ₁ ^{+0.5} _{+0.2}	c ₂ ^{+0.5} _{+0.2}	c ₄	c ₅	d ₅	e ₁	e ₂	e ₃	e ₄	ST 7100. d ₁ /d ₂ x l	▲
160 x 80	60	-	-	32	32	20	36	40	100	-	50	-	19/20 x 160	160 x 080
160 x 100	60	-	50	32	32	20	36	40	100	-	70	-	19/20 x 160	160 x 100
160 x 125	60	-	75	32	32	20	36	40	100	-	95	-	19/20 x 160	160 x 125
160 x 160	60	60	110	32	32	20	36	40	100	100	130	103	19/20 x 160	160 x 160
200 x 100	70	-	-	40 32 40 32	40 40 32 32	37	57	48	120	-	-	-	24/25 x 180	200 x 100.1 200 x 100.2 200 x 100.3 200 x 100.4
200 x 125	70	-	60	40 32 40 32	40 40 32 32	37	57	48	120	-	85	-	24/25 x 180	200 x 125.1 200 x 125.2 200 x 125.3 200 x 125.4
200 x 160	70	-	95	40 32 40 32	40 40 32 32	37	57	48	120	-	120	-	24/25 x 180	200 x 160.1 200 x 160.2 200 x 160.3 200 x 160.4
200 x 200	70	70	135	40 32 40 32	40 40 32 32	37	57	48	120	120	160	123	24/25 x 180	200 x 200.1 200 x 200.2 200 x 200.3 200 x 200.4
250 x 125	120	-	60	40 32 40 32	40 40 32 32	37	57	48	170	-	85	-	24/25 x 180	250 x 125.1 250 x 125.2 250 x 125.3 250 x 125.4
250 x 160	120	-	95	40 32 40 32	40 40 32 32	37	57	48	170	-	120	-	24/25 x 180	250 x 160.1 250 x 160.2 250 x 160.3 250 x 160.4
250 x 200	120	70	135	40 32 40 32	40 40 32 32	37	57	48	170	120	160	173	24/25 x 180	250 x 200.1 250 x 200.2 250 x 200.3 250 x 200.4
250 x 250	120	120	185	40 32 40 32	40 40 32 32	37	57	48	170	170	210	173	24/25 x 180	250 x 250.1 250 x 250.2 250 x 250.3 250 x 250.4
315 x 160	165	-	85	50 40 50 40	50 50 40 40	45	63	56	225	-	115	-	30/32 x 200	315 x 160.1 315 x 160.2 315 x 160.3 315 x 160.4
315 x 200	165	50	125	50 40 50 40	50 50 40 40	45	63	56	225	110	155	228	30/32 x 200	315 x 200.1 315 x 200.2 315 x 200.3 315 x 200.4
315 x 250	165	100	175	50 40 50 40	50 50 40 40	45	63	56	225	160	205	228	30/32 x 200	315 x 250.1 315 x 250.2 315 x 250.3 315 x 250.4
315 x 315	165	165	240	50 40 50 40	50 50 40 40	45	63	56	225	225	270	228	30/32 x 200	315 x 315.1 315 x 315.2 315 x 315.3 315 x 315.4
400 x 200	250	50	125	50 40 50 40	50 50 40 40	45	63	56	310	110	155	313	30/32 x 200	400 x 200.1 400 x 200.2 400 x 200.3 400 x 200.4
400 x 250	250	100	175	50 40 50 40	50 50 40 40	45	63	56	310	160	205	313	30/32 x 200	400 x 250.1 400 x 250.2 400 x 250.3 400 x 250.4

Die sets ST 35..

without stripper plate

Order example:

Die set with 2 rear mounted pillars,
bronze-plated steel **ST 3559**, sliding guide

Size a x b = 250 x 250

c₁ = 40, c₂ = 32

Add **250 x 250.3**

Order number **ST 3559. 250 x 250.3**

Add
size and combination
of plates
to order number

□ x □

a	x b	a ₁	b ₁	b ₂	c ₁ ^{+0,5} _{-0,2}	c ₂ ^{+0,5} _{-0,2}	c ₄	c ₅	d ₅	e ₁	e ₂	e ₃	e ₄	ST 7100. d ₁ /d ₂ x l	▲
400 x 315		250	165	240	50	50	45	63	56	310	225	270	313	30/32 x 200	400 x 315.1
					40	50									400 x 315.2
					50	40									400 x 315.3
					40	40									400 x 315.4
400 x 400		250	250	325	50	50	45	63	56	310	310	355	313	30/32 x 200	400 x 400.1
					40	50									400 x 400.2
					50	40									400 x 400.3
					40	40									400 x 400.4
500 x 250		330	80	165	50	50	45	70	66	400	150	200	403	38/40 x 200	500 x 250.1
					40	50									500 x 250.2
					50	40									500 x 250.3
					40	40									500 x 250.4
500 x 315		330	145	230	50	50	45	70	66	400	215	265	403	38/40 x 200	500 x 315.1
					40	50									500 x 315.2
					50	40									500 x 315.3
					40	40									500 x 315.4
500 x 400		330	230	315	50	50	45	70	66	400	300	350	403	38/40 x 200	500 x 400.1
					40	50									500 x 400.2
					50	40									500 x 400.3
					40	40									500 x 400.4
500 x 500		330	330	415	50	50	45	70	66	400	400	450	403	38/40 x 200	500 x 500.1
					40	50									500 x 500.2
					50	40									500 x 500.3
					40	40									500 x 500.4
630 x 315		430	115	215	63	63	50	80	80	510	195	255	513	48/50 x 250	630 x 315.1
					50	63									630 x 315.2
					63	50									630 x 315.3
					50	50									630 x 315.4
630 x 400		430	200	300	63	63	50	80	80	510	280	340	513	48/50 x 250	630 x 400.1
					50	63									630 x 400.2
					63	50									630 x 400.3
					50	50									630 x 400.4
630 x 500		430	300	400	63	63	50	80	80	510	380	440	513	48/50 x 250	630 x 500.1
					50	63									630 x 500.2
					63	50									630 x 500.3
					50	50									630 x 500.4
630 x 630		430	430	530	63	63	50	80	80	510	510	570	513	48/50 x 250	630 x 630.1
					50	63									630 x 630.2
					63	50									630 x 630.3
					50	50									630 x 630.4
710 x 400		510	200	300	63	63	50	80	80	590	280	340	593	48/50 x 250	710 x 400.1
					50	63									710 x 400.2
					63	50									710 x 400.3
					50	50									710 x 400.4
710 x 500		510	300	400	63	63	50	80	80	590	380	440	593	48/50 x 250	710 x 500.1
					50	63									710 x 500.2
					63	50									710 x 500.3
					50	50									710 x 500.4
710 x 630		510	430	530	63	63	50	80	80	590	510	570	593	48/50 x 250	710 x 630.1
					50	63									710 x 630.2
					63	50									710 x 630.3
					50	50									710 x 630.4
800 x 400		600	200	300	63	63	50	80	80	680	280	340	683	48/50 x 250	800 x 400.1
					50	63									800 x 400.2
					63	50									800 x 400.3
					50	50									800 x 400.4
800 x 500		600	300	400	63	63	50	80	80	680	380	440	683	48/50 x 250	800 x 500.1
					50	63									800 x 500.2
					63	50									800 x 500.3
					50	50									800 x 500.4
800 x 630		600	430	530	63	63	50	80	80	680	510	570	683	48/50 x 250	800 x 630.1
					50	63									800 x 630.2
					63	50									800 x 630.3
					50	50									800 x 630.4

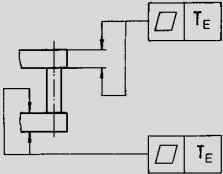
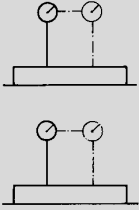
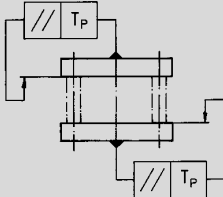
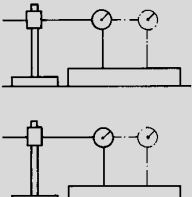
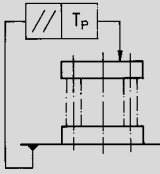
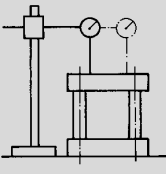
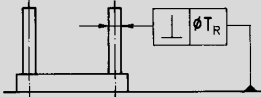
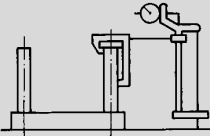
Acceptance specifications

for die sets made of steel and aluminium

similar to DIN 9811 part 1

Sizes without tolerances
for machined surfaces: DIN 7168 – middle

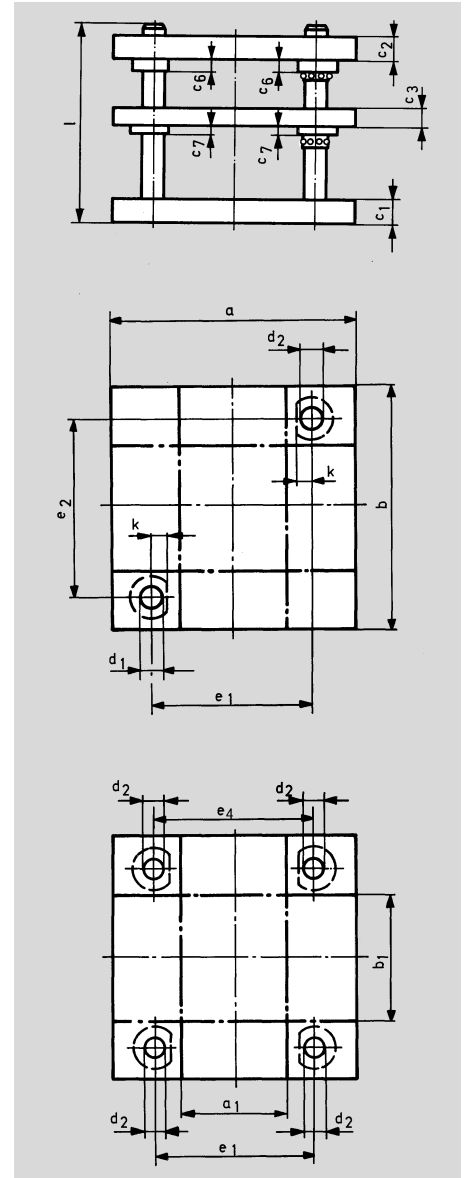
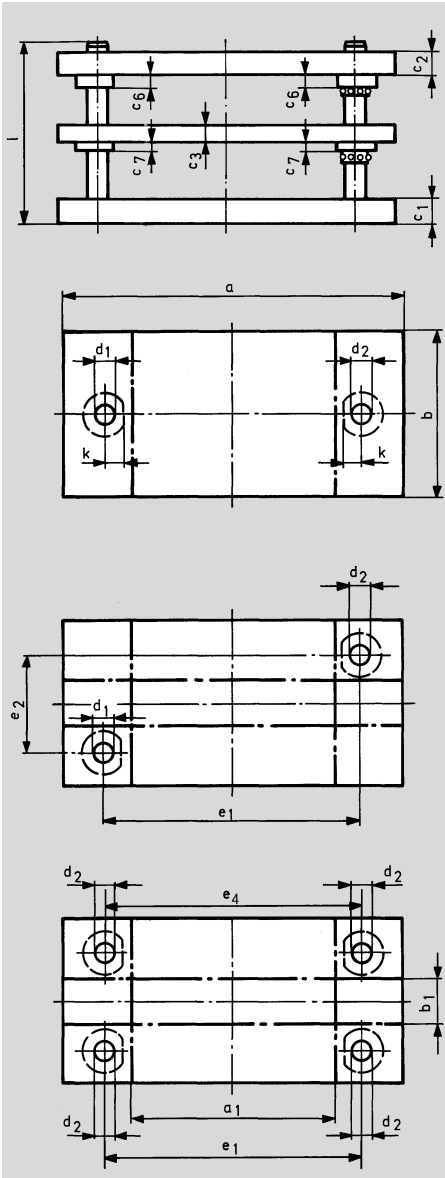
Tolerances of flatness, parallelism and squareness

	Test specimen	Testing position	Max. overall length of working surface l		Tolerances T_p, T_E, T_R
			over	to	
Flatness of surface			—	—	0,005 per 100 mm length of working surface *)
Parallelism of working surfaces			0	100	0,005
			100	200	0,008
			200	300	0,011
			300	400	0,014
			400	500	0,017
			500	600	0,020
Parallelism of contact surfaces			0	100	0,008
			100	200	0,012
			200	300	0,018
			300	400	0,024
			400	500	0,030
			500	600	0,036
Squareness of guide pillars			—	—	0,005 per 100 mm length of pillars *)

*) When testing larger or smaller lengths, multiply tolerance value accordingly with the relevant factor.

Die sets ST 35..

with stripper plate



Rectangular working area
2 or 4 pillars

Material: 1.0570 (St 52.3), Aluminium on request

The plates are cleanly flame cut and normalized. Upon request edges finished. Please state expressly on your order.

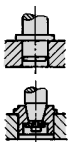
Position of bushings

Normally the positions of bushings will be as shown. If different positions are required please indicate on your order.

DIN 9868

Different Guide pillars length on request

Lifting devices see under accessories

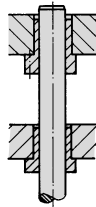


Sliding guide

hardened steel bushing, bronze-plated with flange ST 7429

Upper plate: Guide bushings medium or long version according to combination of plates

Stripper plate: Guide bushings short version



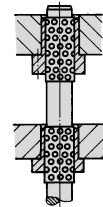
Ball guide

Guide bushings with flange ST 7422

Upper plate: Guide bushings medium or long version according to combination of plates

Stripper plate: Guide bushings short version

Cage travel = 1/2 length of stroke



Removable pillars upon request

ST 7120
ST 7181/82

Add size and combination of plates to order number



Order no. **ST 3579.**

Order no. **ST 3572.**

x



Order no. **ST 3589.**

Order no. **ST 3582.**

x



Order no. **ST 3599.**

Order no. **ST 3592.**

x

Die sets ST 35..

with stripper plate

STEINEL[®]
NORMALIEN

Order example: Die sets with stripper plate
and 4 guide pillars, with ball guide

ST 3592

Size a x b = 500 x 500

c₁ = 50, c₂ = 50

Add **500 x 500.1**

Order number **ST 3592. 500 x 500.1**

Add
size and combination
of plates
to order number

□ x □

a x b	a ₁	b ₁	c ₁ ^{+0.5} _{-0.2}	c ₂ ^{+0.5} _{-0.2}	c ₃ ^{+0.5} _{-0.2}	c ₆	c ₇	k	e ₁	e ₂	e ₄	ST 7100. d ₁ /d ₂ x l	▲
160 x 80	60	-	32	32	25	15	15	18	100	-	-	19/20 x 180	160 x 080
160 x 100	60	-	32	32	25	15	15	18	100	-	-	19/20 x 180	160 x 100
160 x 125	60	-	32	32	25	15	15	18	100	-	-	19/20 x 180	160 x 125
160 x 160	60	60	32	32	25	15	15	18	100	100	103	19/20 x 180	160 x 160
200 x 100	70	-	40	40	25	25	15	23	120	-	-	24/25 x 200	200 x 100.1
			32	40									200 x 100.2
			40	32									200 x 100.3
			32	32									200 x 100.4
200 x 125	70	-	40	40	25	25	15	23	120	-	-	24/25 x 200	200 x 125.1
			32	40									200 x 125.2
			40	32									200 x 125.3
			32	32									200 x 125.4
200 x 160	70	-	40	40	25	25	15	23	120	-	-	24/25 x 200	200 x 160.1
			32	40									200 x 160.2
			40	32									200 x 160.3
			32	32									200 x 160.4
200 x 200	70	70	40	40	25	25	15	23	120	120	123	24/25 x 200	200 x 200.1
			32	40									200 x 200.2
			40	32									200 x 200.3
			32	32									200 x 200.4
250 x 125	120	-	40	40	25	25	15	23	170	-	-	24/25 x 200	250 x 125.1
			32	40									250 x 125.2
			40	32									250 x 125.3
			32	32									250 x 125.4
250 x 160	120	-	40	40	25	25	15	23	170	-	-	24/25 x 200	250 x 160.1
			32	40									250 x 160.2
			40	32									250 x 160.3
			32	32									250 x 160.4
250 x 200	120	70	40	40	25	25	15	23	170	120	173	24/25 x 200	250 x 200.1
			32	40									250 x 200.2
			40	32									250 x 200.3
			32	32									250 x 200.4
250 x 250	120	120	40	40	25	25	15	23	170	170	173	24/25 x 200	250 x 250.1
			32	40									250 x 250.2
			40	32									250 x 250.3
			32	32									250 x 250.4
315 x 160	165	-	50	50	32	25	15	28	225	-	-	30/32 x 224	315 x 160.1
			40	50									315 x 160.2
			50	40									315 x 160.3
			40	40									315 x 160.4
315 x 200	165	50	50	50	32	25	15	28	225	110	228	30/32 x 224	315 x 200.1
			40	50									315 x 200.2
			50	40									315 x 200.3
			40	40									315 x 200.4
315 x 250	165	100	50	50	32	25	15	28	225	160	228	30/32 x 224	315 x 250.1
			40	50									315 x 250.2
			50	40									315 x 250.3
			40	40									315 x 250.4
315 x 315	165	165	50	50	32	25	15	28	225	225	228	30/32 x 224	315 x 315.1
			40	50									315 x 315.2
			50	40									315 x 315.3
			40	40									315 x 315.4
400 x 200	250	50	50	50	32	25	15	28	310	110	313	30/32 x 224	400 x 200.1
			40	50									400 x 200.2
			50	40									400 x 200.3
			40	40									400 x 200.4
400 x 250	250	100	50	50	32	25	15	28	310	160	313	30/32 x 224	400 x 250.1
			40	50									400 x 250.2
			50	40									400 x 250.3
			40	40									400 x 250.4

Die sets ST 35..

with stripper plate

Order example: Die sets with stripper plate
and 4 guide pillars, with ball guide

ST 3592

Size a x b = 500 x 500

c₁ = 50, c₂ = 50

Add **500 x 500.1**

Order number **ST 3592. 500 x 500.1**

Add
size and combination
of plates
to order number

□ x □

a	x b	a ₁	b ₁	c ₁ ^{+0,5} _{+0,2}	c ₂ ^{+0,5} _{+0,2}	c ₃ ^{+0,5} _{+0,2}	c ₆	c ₇	k	e ₁	e ₂	e ₄	ST 7100. d ₁ /d ₂ x l	▲
400 x 315	250	165	50	50	32	25	15	28	310	225	313	30/32 x 224	400 x 315.1	
			40	50									400 x 315.2	
			50	40									400 x 315.3	
			40	40									400 x 315.4	
400 x 400	250	250	50	50	32	25	15	28	310	310	313	30/32 x 224	400 x 400.1	
			40	50									400 x 400.2	
			50	40									400 x 400.3	
			40	40									400 x 400.4	
500 x 250	330	80	50	50	32	30	25	33	400	150	403	38/40 x 224	500 x 250.1	
			40	50									500 x 250.2	
			50	40									500 x 250.3	
			40	40									500 x 250.4	
500 x 315	330	145	50	50	32	30	25	33	400	215	403	38/40 x 224	500 x 315.1	
			40	50									500 x 315.2	
			50	40									500 x 315.3	
			40	40									500 x 315.4	
500 x 400	330	230	50	50	32	30	25	33	400	300	403	38/40 x 224	500 x 400.1	
			40	50									500 x 400.2	
			50	40									500 x 400.3	
			40	40									500 x 400.4	
500 x 500	330	330	50	50	32	30	25	33	400	400	403	38/40 x 224	500 x 500.1	
			40	50									500 x 500.2	
			50	40									500 x 500.3	
			40	40									500 x 500.4	
630 x 315	430	115	63	63	40	42	25	38	510	195	513	48/50 x 280	630 x 315.1	
			50	63									630 x 315.2	
			63	50									630 x 315.3	
			50	50									630 x 315.4	
630 x 400	430	200	63	63	40	42	25	38	510	280	513	48/50 x 280	630 x 400.1	
			50	63									630 x 400.2	
			63	50									630 x 400.3	
			50	50									630 x 400.4	
630 x 500	430	300	63	63	40	42	25	38	510	380	513	48/50 x 280	630 x 500.1	
			50	63									630 x 500.2	
			63	50									630 x 500.3	
			50	50									630 x 500.4	
630 x 630	430	430	63	63	40	42	25	38	510	510	513	48/50 x 280	630 x 630.1	
			50	63									630 x 630.2	
			63	50									630 x 630.3	
			50	50									630 x 630.4	
710 x 400	510	200	63	63	40	42	25	38	590	280	593	48/50 x 280	710 x 400.1	
			50	63									710 x 400.2	
			63	50									710 x 400.3	
			50	50									710 x 400.4	
710 x 500	510	300	63	63	40	42	25	38	590	380	593	48/50 x 280	710 x 500.1	
			50	63									710 x 500.2	
			63	50									710 x 500.3	
			50	50									710 x 500.4	
710 x 630	510	430	63	63	40	42	25	38	590	510	593	48/50 x 280	710 x 630.1	
			50	63									710 x 630.2	
			63	50									710 x 630.3	
			50	50									710 x 630.4	
800 x 400	600	200	63	63	40	42	25	38	680	280	683	48/50 x 280	800 x 400.1	
			50	63									800 x 400.2	
			63	50									800 x 400.3	
			50	50									800 x 400.4	
800 x 500	600	300	63	63	40	42	25	38	680	380	683	48/50 x 280	800 x 500.1	
			50	63									800 x 500.2	
			63	50									800 x 500.3	
			50	50									800 x 500.4	
800 x 630	600	430	63	63	40	42	25	38	680	510	683	48/50 x 280	800 x 630.1	
			50	63									800 x 630.2	
			63	50									800 x 630.3	
			50	50									800 x 630.4	

Stamping Block ST 3730



There is still a single tool available for the manufacture of metal parts from strip or coiled material. In order to achieve a simplified tool construction and shorten the delivery-time, it is practical to use prefabricated tooling components. This is the reason that STEINEL NORMALIEN offers stamping blocks in several standard sizes to manufacture simple stamped parts.

The stamping blocks are manufactured to the well known STEINEL precision. All plates are ground with square angles on 4 sides, so they can be used as reference edges.

The set edges, depending on their size, are 50 – 100 mm longer than the die block and are provided with a cross plate.

The punch holder is the same width as the stamping block lower plate, which offers an optimal use of the work area.

The plate dimensions are according to DIN and ISO standards, as stated in our catalogue.

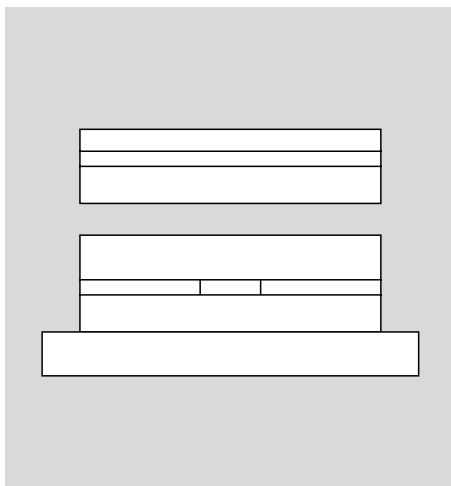
Tip: STEINEL-stamping blocks can also be made to your specifications, such as with radius corner set edges, tapped holes for clamping, etc.

Order example: Stamping block complete **ST 3730**

Stamping block size a x b = 196 x 96

Add **196 x 096**

Order number **ST 3730.196 x 096**



Ground parallel:

Plate length until 250 mm ± 0,015 mm

Plate length until 400 mm ± 0,025 mm

Tolerances:

Plate size – 0,2 mm

Plate thickness – 0,2 mm

Screws in die block:

until 246 mm length = 4 screws

from 311 mm length = 6 screws

Screws in punch holder:

until 246 mm length, 1-piece punch back-up plate = 4 screws

from 311 mm length, 1-piece punch back-up plate = 8 screws

from 396 mm length, 2-piece punch back-up plate = 8 screws

a	b						
	076	096	121	156	196	246	311
096	x	x					
156	x	x	x	x			
196		x	x	x	x		
246		x	x	x	x	x	
311				x	x	x	x
396							x

Material

Punch holder

Material number

Top plate 1.1730

Punch back-up plate 1.2379

Punch holder plate 1.1730

Die block

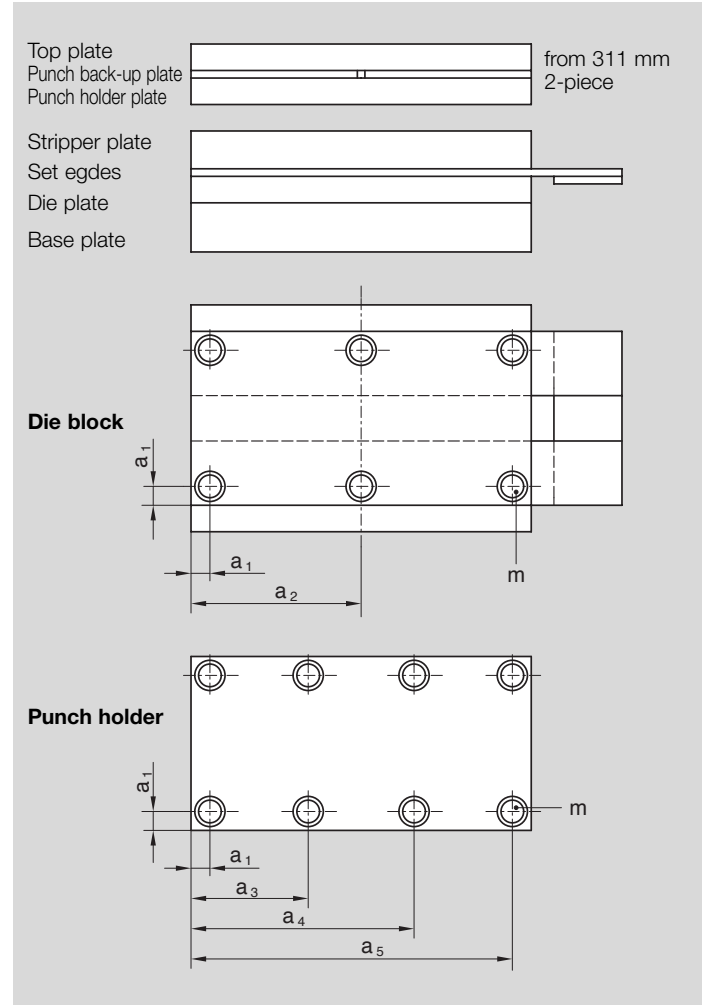
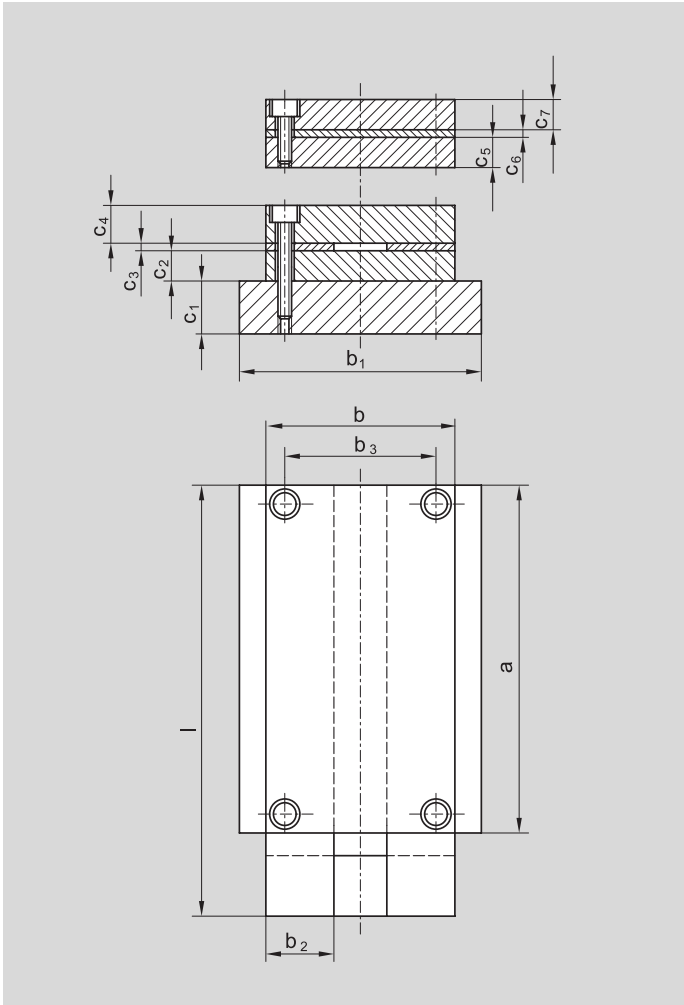
Stripper plate 1.1730

Set edges 1.1730

Die plate 1.2379

Base plate 1.1730

Stamping Block ST 3730



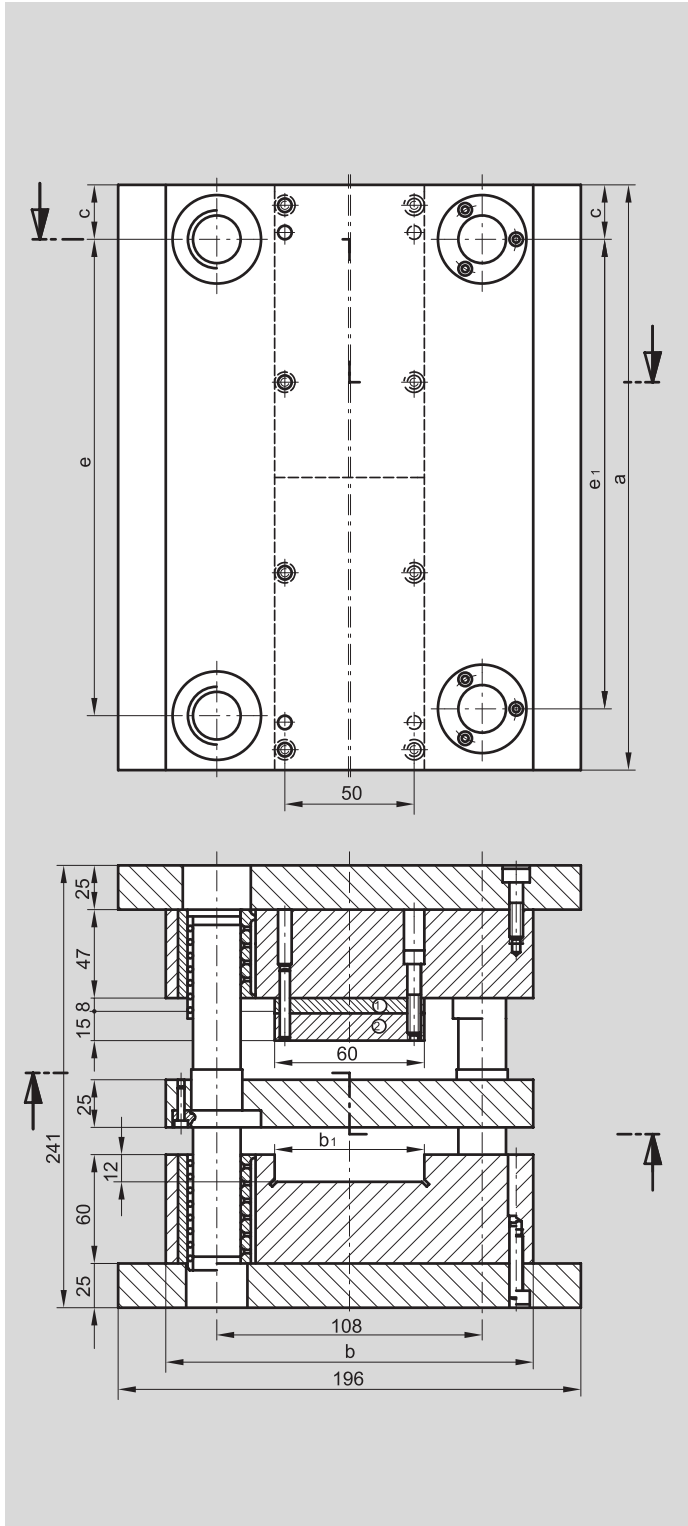
Add size to order number

Order number **ST 3730.** x

a x b	b ₁	b ₂	b ₃	l	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	a ₁	a ₂	a ₃	a ₄	a ₅	m	▲
96 x 76	121	30	41	150	25	23	6	23	18	6	18	12				84	M8	096 x 076
156 x 76				240												144		156 x 076
96 x 96	156	40	61	150	25	23	6	23	18	6	18	12				84	M8	096 x 096
156 x 96				240												144		156 x 096
196 x 96				300												184		196 x 096
246 x 96				350												234		246 x 096
156 x 121	156	50	86	240	32	27	8	28	18	8	28	12				144	M8	156 x 121
196 x 121				300												184		196 x 121
246 x 121				350												234		246 x 121
156 x 156	196	70	111	240	32	27	8	28	18	8	28	16				140	M10	156 x 156
196 x 156				300												180		196 x 156
246 x 156				350												230		246 x 156
311 x 156				415												295		311 x 156
196 x 196	246	70	151	300	40	33	10	28	28	10	28	16				180	M10	196 x 196
246 x 196				350												230		246 x 196
311 x 196				415												295		311 x 196
246 x 246	311	80	201	350	40	38	10	38	28	10	28	16				230	M10	246 x 246
311 x 246				415												295		311 x 246
311 x 311	396	100	251	415	40	38	10	38	28	10	28	22	155,5	111	200	289	M12	311 x 311
396 x 311				500									198	139	257	374		396 x 311

Die sets ST 3712, ST 3719

for progressive and compound tools



Progressive and compound tools size: 1

Materials: plates ① and ② 1.2842 (90 Mn Cr V 8). All other plates 1.0570 (St 52-3).

Soft pressure plate: upon request can also be delivered hardened. (Please indicate on your order. "With hardened pressure plate").

For segmentation: Precision steel plate on request.

Tip: Steinel also delivers special design column mounts to fit your requirements. The plate sizes correspond to DIN/ISO standards, as they are listed in our catalog.

The column mounts are constructed according to the mechanical assembly technique and are guaranteed to offer an economical application to our clients.

You can use our bearing mounting spring units as your spring system. You have the choice among four different load bearing types (SZ 8565).

These columns can be weighted more than standard columns by a factor of eight since the central mounting of the columns in the guide plate reduces the length of the stress application point by half in the upper and lower part of the tool.

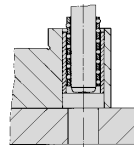
Sliding guides: can be connected with central lubrication (M 8 x 1).

Order example: Column mount for progressive and compound tools with bronze plated steel sliding guide **ST 3719**.

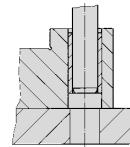
Mount size a x b = 246 x 156

Add **246 x 156**

Order number **ST 3719.246 x 156**



Ball guide
retainer length
= 1/2 length of stroke



Sliding guide
hardened
bronze plated
steel bushing

Add
size to
order number

Order number **ST 3712**

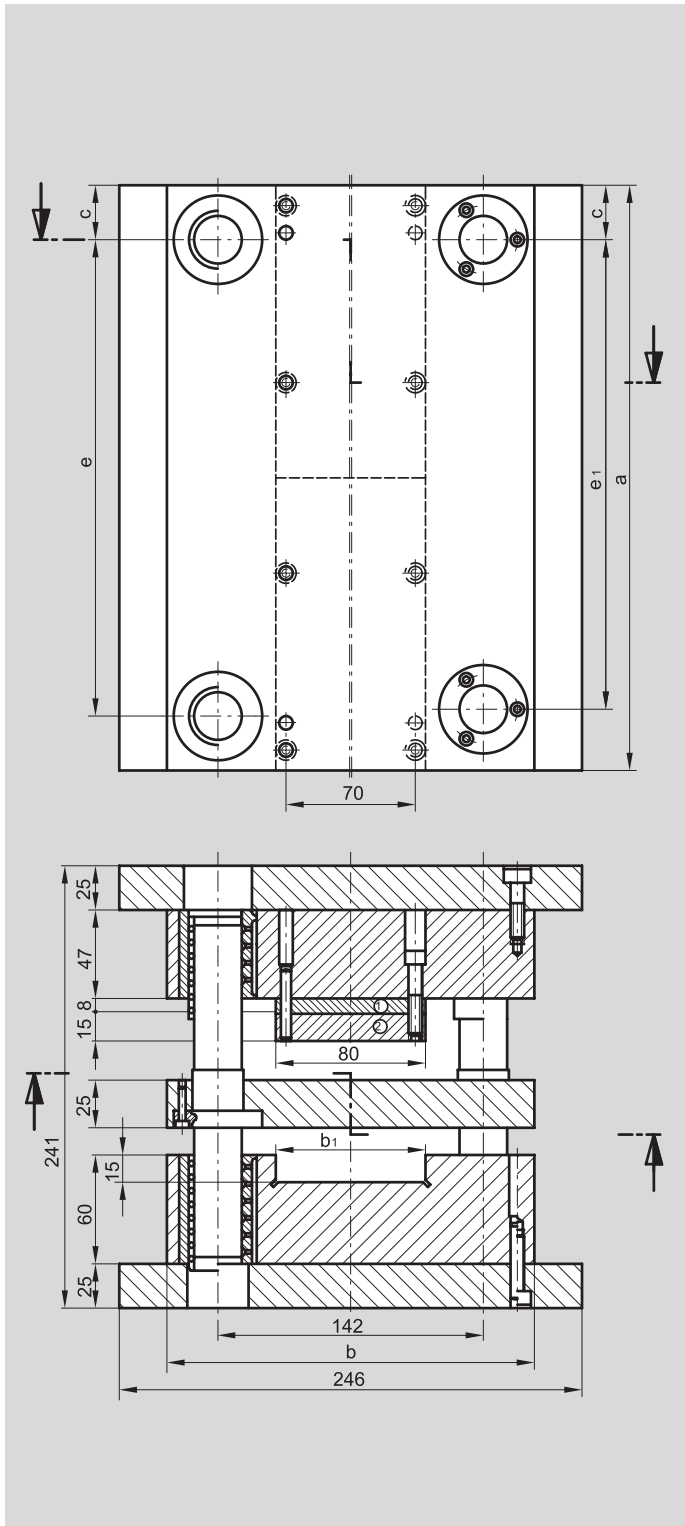
Order number **ST 3719**

x

Outside Dimensions a x b	Slot width b ₁	c	e	e ₁	Pillars ST 7117. d ₁ x l	▲
196 x 156	60	24	148	145	19 x 180	196 x 156
246 x 156	60	24	198	195	19 x 180	246 x 156
311 x 156	60	24	263	260	19 x 180	311 x 156

Die sets ST 3712, ST 3719

for progressive and compound tools



Progressive and compound tools size: 2

Materials: plates ① and ② 1.2842 (90 Mn Cr V 8). All other plates 1.0570 (St 52-3).

Soft pressure plate: upon request can also be delivered hardened. (Please indicate on your order. "With hardened pressure plate").

For segmentation: Precision steel plate on request.

Tip: Steinel also delivers special design column mounts to fit your requirements. The plate sizes correspond to DIN/ISO standards, as they are listed in our catalog.

The column mounts are constructed according to the mechanical assembly technique and are guaranteed to offer an economical application to our clients.

You can use our bearing mounting spring units as your spring system. You have the choice among four different load bearing types (SZ 8565).

These columns can be weighted more than standard columns by a factor of eight since the central mounting of the columns in the guide plate reduces the length of the stress application point by half in the upper and lower part of the tool.

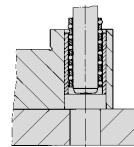
Sliding guides: can be connected with central lubrication (M 8 x 1).

Order example: Column mount for progressive and compound tools with bronze plated steel sliding guide **ST 3719**.

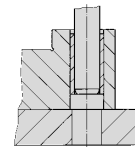
Mount size a x b = 311 x 196

Add **311 x 196**

Order number **ST 3719.311 x 196**



Ball guide
retainer length
= 1/2 length of stroke



Sliding guide
hardened
bronze plated
steel bushing

Add
size to
order number

Order number **ST 3712**

Order number **ST 3719**

x

Outside Dimensions a x b	Slot width b ₁	c	e	e ₁	Pillars ST 7117. d ₁ x l	▲
246 x 196	80	27	192	189	25 x 180	246 x 196
311 x 196	80	27	257	254	25 x 180	311 x 196
396 x 196	80	27	342	339	25 x 180	396 x 196

Die sets ST 3712, ST 3719

for progressive and compound tools

Progressive and compound tools size: 3

Materials: plates ① and ② 1.2842 (90 Mn Cr V 8). All other plates 1.0570 (St 52-3).

Soft pressure plate: upon request can also be delivered hardened. (Please indicate on your order. "With hardened pressure plate").

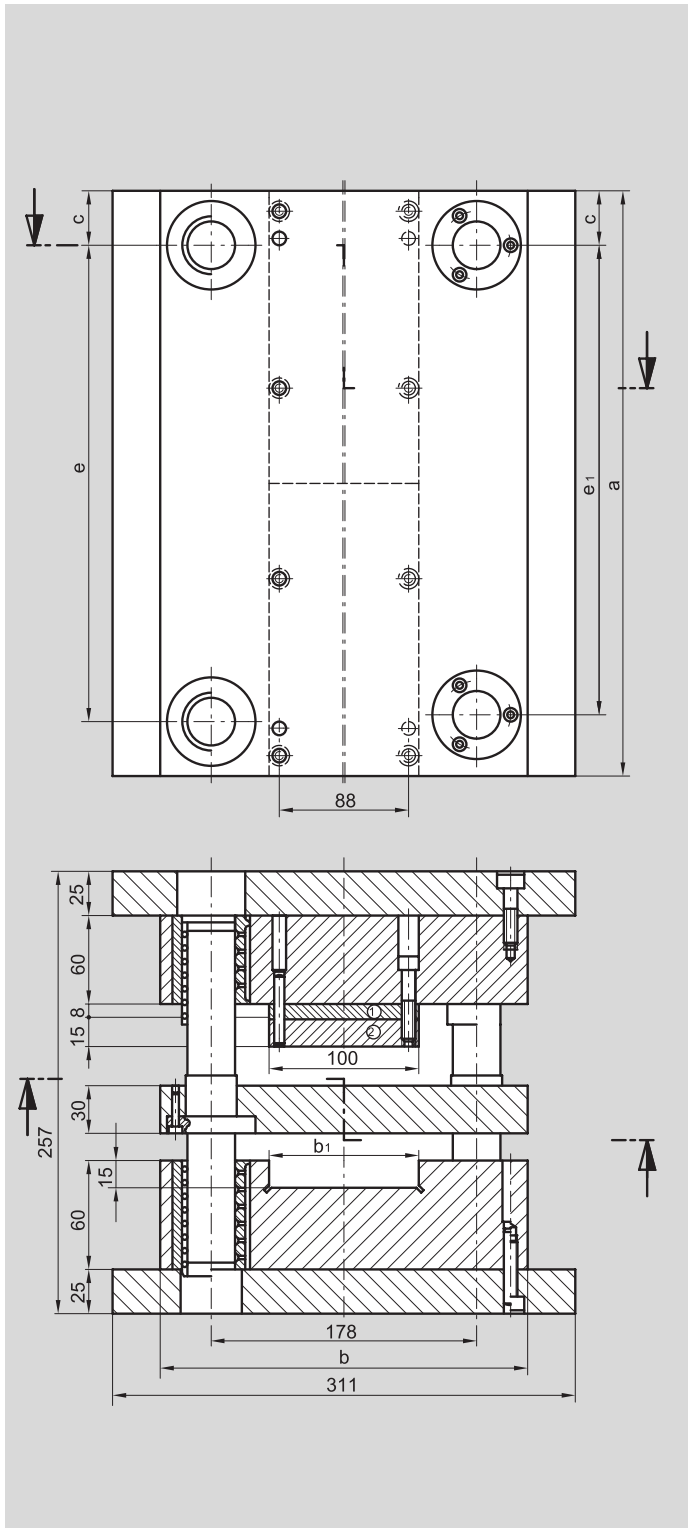
For segmentation: Precision steel plate on request.

Tip: Steinel also delivers special design column mounts to fit your requirements. The plate sizes correspond to DIN/ISO standards, as they are listed in our catalog.

The column mounts are constructed according to the mechanical assembly technique and are guaranteed to offer an economical application to our clients.

You can use our bearing mounting spring units as your spring system. You have the choice among four different load bearing types (SZ 8565).

These columns can be weighted more than standard columns by a factor of eight since the central mounting of the columns in the guide plate reduces the length of the stress application point by half in the upper and lower part of the tool.



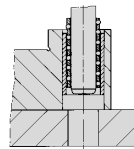
Sliding guides: can be connected with central lubrication (M 8 x 1).

Order example: Column mount for progressive and compound tools with bronze plated steel sliding guide **ST 3719**.

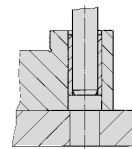
Mount size a x b = 311 x 246

Add **311 x 246**

Order number **ST 3719.311 x 246**



Ball bearing
retainer length
= 1/2 length of stroke



Sliding guide
hardened
bronze plated
steel bushing

Add
size to
order number

Order number **ST 3712**

Order number **ST 3719**

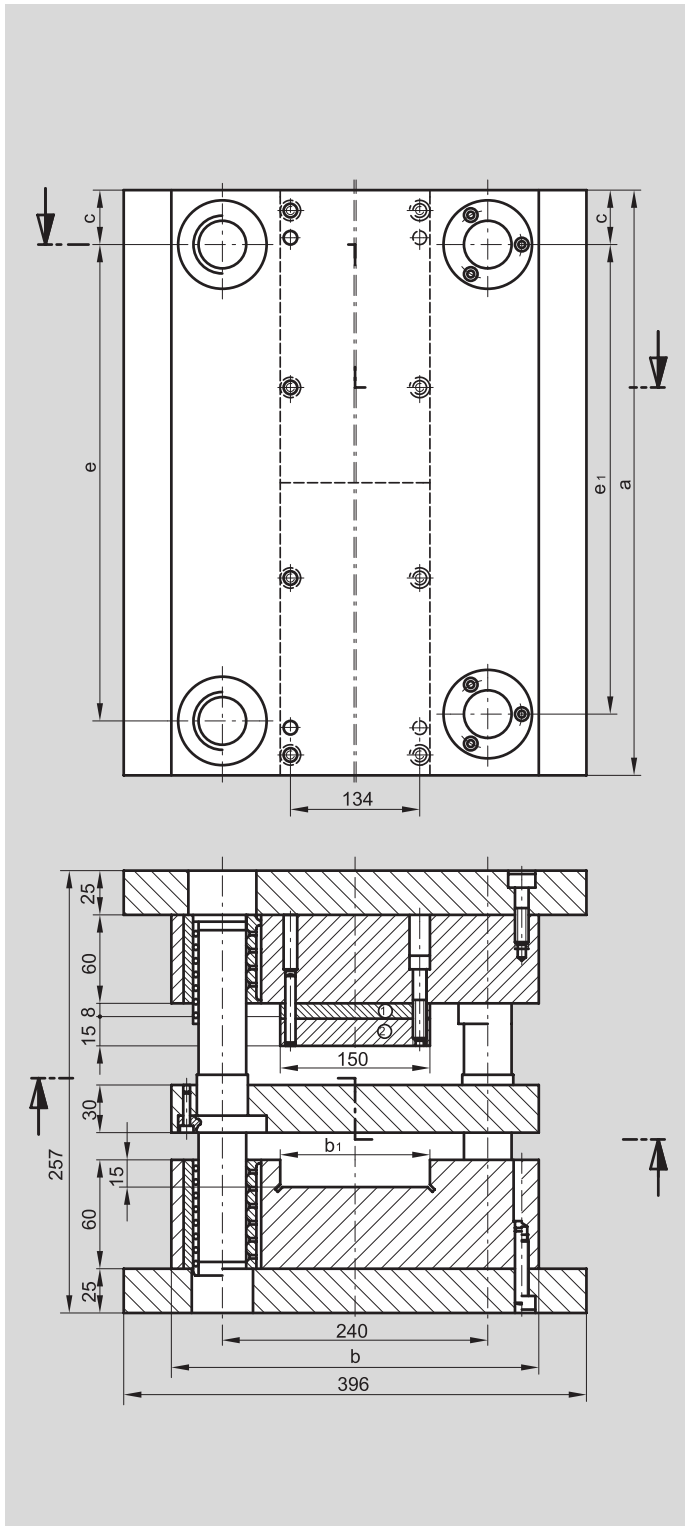
x

Outside Dimensions a x b	Slot width b ₁	c	e	e ₁	Pillars ST 7117. d ₁ x l	▲
311 x 246	100	34	243	240	32 x 210	311 x 246
396 x 246	100	34	328	325	32 x 210	396 x 246
496 x 246	100	34	428	425	32 x 210	496 x 246

From length a = 396 mm = 2-piece pressure plate

Die sets ST 3712 ST 3719

for progressive and compound tools



Progressive and compound tools size: 4

Materials: plates ① and ② 1.2842 (90 Mn Cr V 8). All other plates 1.0570 (St 52-3).

Soft pressure plate: upon request can also be delivered hardened. (Please indicate on your order. "With hardened pressure plate").

For segmentation: Precision steel plate on request.

Tip: Steinel also delivers special design column mounts to fit your requirements. The plate sizes correspond to DIN/ISO standards, as they are listed in our catalog.

The column mounts are constructed according to the mechanical assembly technique and are guaranteed to offer an economical application to our clients.

You can use our bearing mounting spring units as your spring system. You have the choice among four different load bearing types (SZ 8565).

These columns can be weighted more than standard columns by a factor of eight since the central mounting of the columns in the guide plate reduces the length of the stress application point by half in the upper and lower part of the tool.

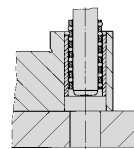
Sliding guides: can be connected with central lubrication (M 8 x 1).

Order example: Column mount for progressive and compound tools with bronze plated steel sliding guide **ST 3719**.

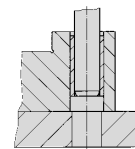
Mount size a x b = 496 x 311

Add **496 x 311**

Order number **ST 3719.496 x 311**



Ball bearing
retainer length
= 1/2 length of stroke



Sliding guide
hardened
bronze plated
steel bushing

Add
size to
order number

Order number **ST 3712**

Order number **ST 3719**

x

Outside Dimensions a x b	Slot width b ₁	c	e	e ₁	Pillars ST 7117. d ₁ x l	▲
396 x 311	150	35	326	323	32 x 210	396 x 311
496 x 311	150	35	426	423	32 x 210	496 x 311
626 x 311	150	35	556	553	32 x 210	626 x 311

From length a = 396 mm = 2-piece pressure plate

Order sheet for Progressive and compound tools (Die Sets)

Material: Plates ① and ② 1.2842 (90 Mn Cr V 8).
All other plates 1.0570 (ST 52-3).

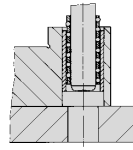
Soft pressure plate, upon request can also be delivered hardened.
(Please indicate on your order: "With hardened pressure plate").

Fill in the required dimensions in the drawing below and mark off which type of guidance.

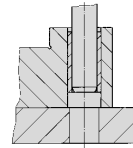
When choosing guide elements/units, please note the catalogue dimensions given in section 3.

As a spring system, our system spring units available from stock can be used. There is a choice of 4 different load types (SZ 8565)

These columns/pillars can be weighted more than standard pillars by a factor of eight, since the central mounting of the pillars in the guide plate reduces the length of the stress application point by half in the upper and lower part of the tool.



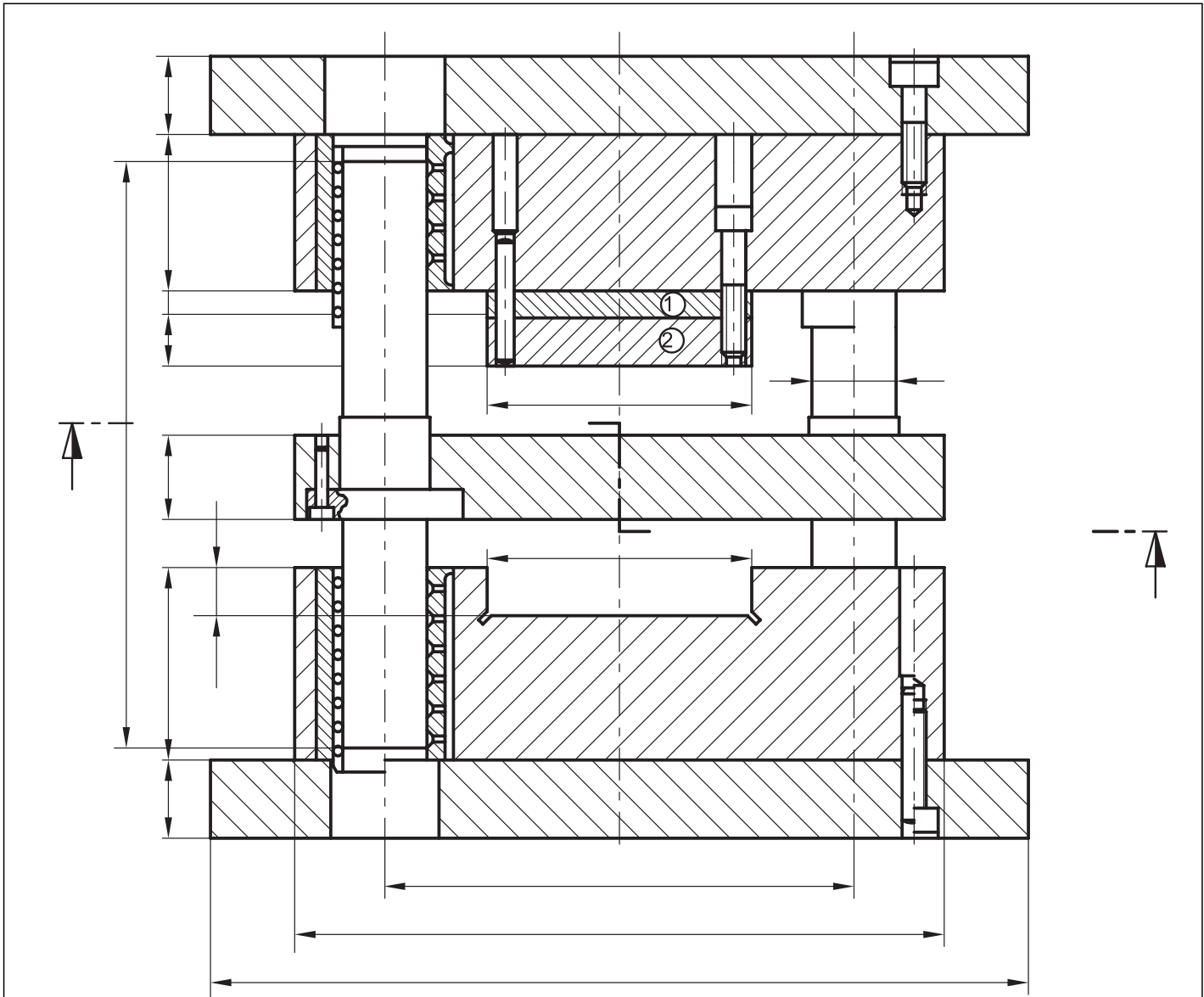
Ball guide
Cage travel
= 1/2 length of stroke



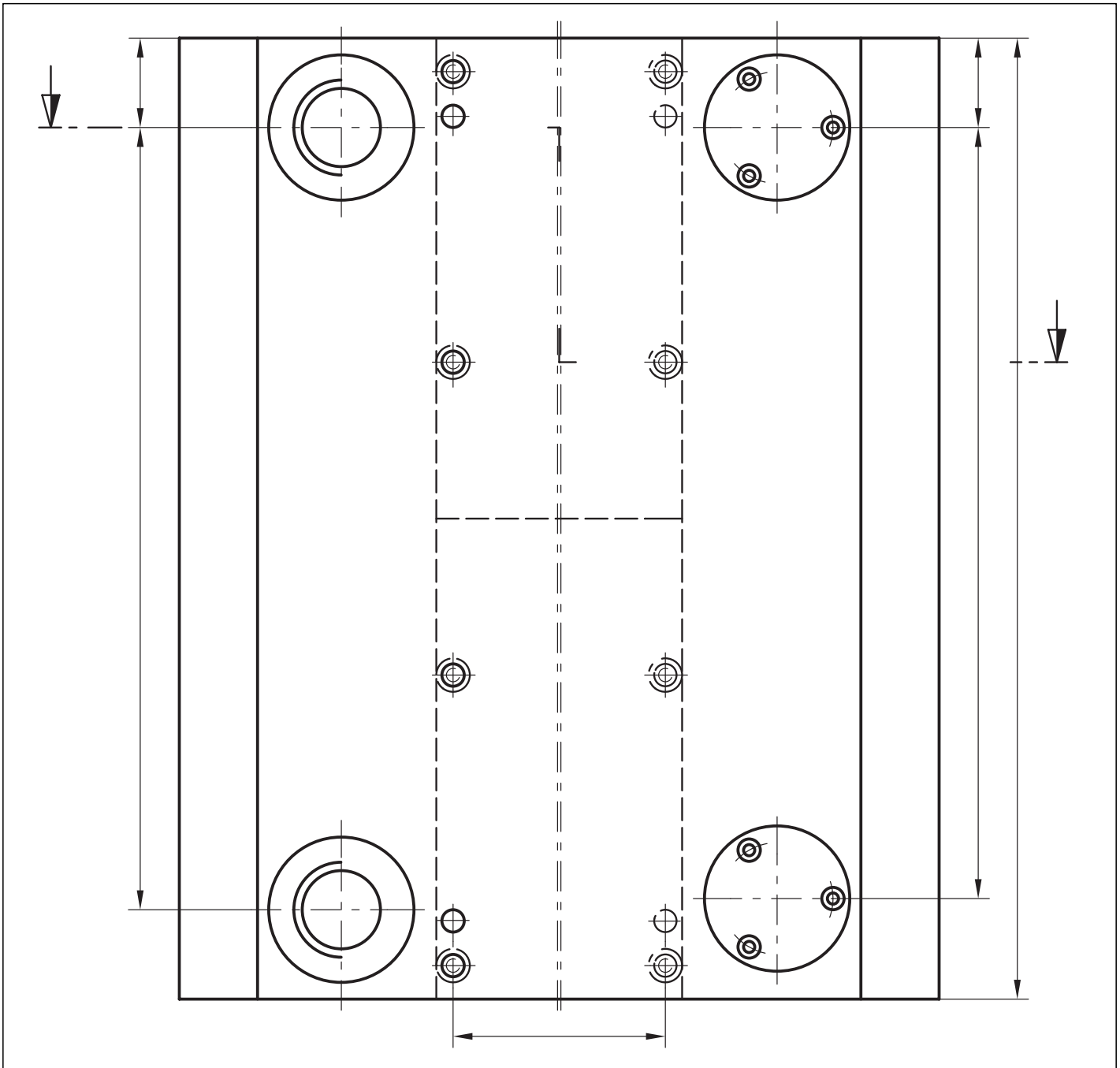
Sliding guide
hardened
steel bushing
bronze-plated



Progressive and compound tools can be supplied in special designs according to your specifications.



Order sheet for Progressive and compound tools (Die Sets)



Room/Space for messages/information and notes

Company:

Street address:

City, State, Zip Code:

Contact Person:

Telephone Number.:

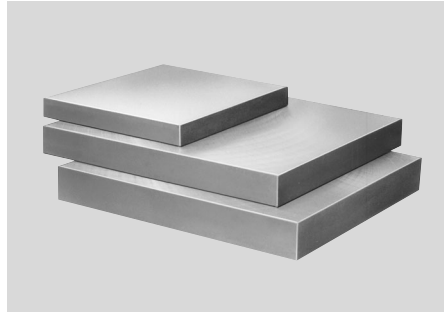
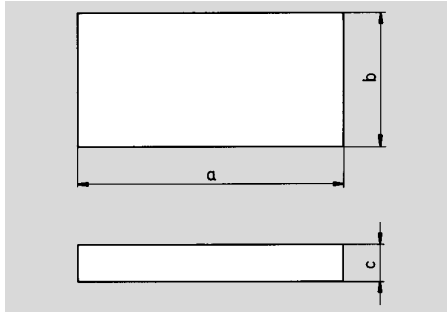
Fax Number.:

Date:

Steel plates ST 3500

for die sets

STEINEL[®]
NORMALIEN



DIN 9873, ISO 6753

Material: 1.0570 (St. 52.3), other materials for example super heat treated or aluminium 3.4365.71 (Al Zn Mg Cu 1.5) are available upon request. All cleanly flame-cut sizes and normalized, both sides plane-parallel machined to max. 2000 x 800 mm ground. Please state on order.

Larger steel plates can be manufactured short-dated according to your instructions within the max. size of 2000 x 1000 mm and thickness of 20 to 150 mm in each size and form.

Order example: steel plate **ST 3500**

Size a x b x c = 200 x 100 x 32

Add **200 x 100 x 32**

Order number **ST 3500.200 x 100 x 32**

Order number **ST 3500.** x x Add size to order number

a x b	c ^{+0,5} / _{-0,2}	▲
160 x 080	25 32	160 x 080 x 25 160 x 080 x 32
160 x 100	25 32	160 x 100 x 25 160 x 100 x 32
160 x 125	25 32	160 x 125 x 25 160 x 125 x 32
160 x 160	25 32	160 x 160 x 25 160 x 160 x 32
200 x 100	25 32 40	200 x 100 x 25 200 x 100 x 32 200 x 100 x 40
200 x 125	25 32 40	200 x 125 x 25 200 x 125 x 32 200 x 125 x 40
200 x 160	25 32 40	200 x 160 x 25 200 x 160 x 32 200 x 160 x 40
200 x 200	25 32 40	200 x 200 x 25 200 x 200 x 32 200 x 200 x 40
250 x 125	25 32 40	250 x 125 x 25 250 x 125 x 32 250 x 125 x 40
250 x 160	25 32 40	250 x 160 x 25 250 x 160 x 32 250 x 160 x 40
250 x 200	25 32 40	250 x 200 x 25 250 x 200 x 32 250 x 200 x 40
250 x 250	25 32 40	250 x 250 x 25 250 x 250 x 32 250 x 250 x 40

Order number **ST 3500.** x x Add size to order number

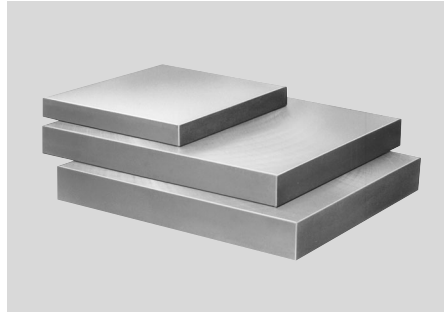
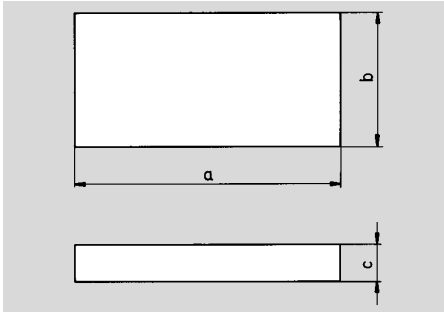
a x b	c ^{+0,5} / _{-0,2}	▲
315 x 160	32 40 50	315 x 160 x 32 315 x 160 x 40 315 x 160 x 50
315 x 200	32 40 50	315 x 200 x 32 315 x 200 x 40 315 x 200 x 50
315 x 250	32 40 50	315 x 250 x 32 315 x 250 x 40 315 x 250 x 50
315 x 315	32 40 50	315 x 315 x 32 315 x 315 x 40 315 x 315 x 50
400 x 200	32 40 50	400 x 200 x 32 400 x 200 x 40 400 x 200 x 50
400 x 250	32 40 50	400 x 250 x 32 400 x 250 x 40 400 x 250 x 50
400 x 315	32 40 50	400 x 315 x 32 400 x 315 x 40 400 x 315 x 50
400 x 400	32 40 50	400 x 400 x 32 400 x 400 x 40 400 x 400 x 50
500 x 250	32 40 50	500 x 250 x 32 500 x 250 x 40 500 x 250 x 50
500 x 315	32 40 50	500 x 315 x 32 500 x 315 x 40 500 x 315 x 50
500 x 400	32 40 50	500 x 400 x 32 500 x 400 x 40 500 x 400 x 50

Order number **ST 3500.** x x Add size to order number

a x b	c ^{+0,5} / _{-0,2}	▲
500 x 500	32 40 50	500 x 500 x 32 500 x 500 x 40 500 x 500 x 50
630 x 315	40 50 63	630 x 315 x 40 630 x 315 x 50 630 x 315 x 63
630 x 400	40 50 63	630 x 400 x 40 630 x 400 x 50 630 x 400 x 63
630 x 500	40 50 63	630 x 500 x 40 630 x 500 x 50 630 x 500 x 63
630 x 630	40 50 63	630 x 630 x 40 630 x 630 x 50 630 x 630 x 63
710 x 400	40 50 63	710 x 400 x 40 710 x 400 x 50 710 x 400 x 63
710 x 500	40 50 63	710 x 500 x 40 710 x 500 x 50 710 x 500 x 63
710 x 630	40 50 63	710 x 630 x 40 710 x 630 x 50 710 x 630 x 63
800 x 400	40 50 63	800 x 400 x 40 800 x 400 x 50 800 x 400 x 63
800 x 500	40 50 63	800 x 500 x 40 800 x 500 x 50 800 x 500 x 63
800 x 630	40 50 63	800 x 630 x 40 800 x 630 x 50 800 x 630 x 63

Steel plate ST 3502

Machined type



DIN 9873

Material: 1.0570 (ST 52-3)

The plane parallel plates are uniformly finished, spot-facing is at right angles. Other dimensions or materials are available upon demand.

Tip: These plates are particularly well suited for the inner area of punching tools as well as for die sets.

Order example: Steel plate **ST 3502**

Size a x b x c = 246 x 156 x 32

Add **246 x 156 x 32**

Order number **ST 3502.246 x 156 x 32**

Order number ST 3502.	<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/>	Add size to order number	
$a^{+0,4} \times b^{+0,4}$	$c^{+0,5}_{+0,2}$	▲	
156 x 076	25 32	156 x 076 x 25 156 x 076 x 32	
156 x 096	25 32	156 x 096 x 25 156 x 096 x 32	
156 x 121	25 32	156 x 121 x 25 156 x 121 x 32	
156 x 156	25 32	156 x 156 x 25 156 x 156 x 32	
196 x 096	25 32 40	196 x 096 x 25 196 x 096 x 32 196 x 096 x 40	
196 x 121	25 32 40	196 x 121 x 25 196 x 121 x 32 196 x 121 x 40	
196 x 156	25 32 40	196 x 156 x 25 196 x 156 x 32 196 x 156 x 40	
196 x 196	25 32 40	196 x 196 x 25 196 x 196 x 32 196 x 196 x 40	
246 x 121	25 32 40	246 x 121 x 25 246 x 121 x 32 246 x 121 x 40	
246 x 156	25 32 40	246 x 156 x 25 246 x 156 x 32 246 x 156 x 40	
246 x 196	25 32 40	246 x 196 x 25 246 x 196 x 32 246 x 196 x 40	
246 x 246	25 32 40	246 x 246 x 25 246 x 246 x 32 246 x 246 x 40	

Order number ST 3502.	<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/>	Add size to order number	
$a^{+0,4} \times b^{+0,4}$	$c^{+0,5}_{+0,2}$	▲	
311 x 156	32 40 50	311 x 156 x 32 311 x 156 x 40 311 x 156 x 50	
311 x 196	32 40 50	311 x 196 x 32 311 x 196 x 40 311 x 196 x 50	
311 x 246	32 40 50	311 x 246 x 32 311 x 246 x 40 311 x 246 x 50	
311 x 311	32 40 50	311 x 311 x 32 311 x 311 x 40 311 x 311 x 50	
396 x 196	32 40 50	396 x 196 x 32 396 x 196 x 40 396 x 196 x 50	
396 x 246	32 40 50	396 x 246 x 32 396 x 246 x 40 396 x 246 x 50	
396 x 311	32 40 50	396 x 311 x 32 396 x 311 x 40 396 x 311 x 50	
396 x 396	32 40 50	396 x 396 x 32 396 x 396 x 40 396 x 396 x 50	
496 x 246	32 40 50	496 x 246 x 32 496 x 246 x 40 496 x 246 x 50	
496 x 311	32 40 50	496 x 311 x 32 496 x 311 x 40 496 x 311 x 50	
496 x 396	32 40 50	496 x 396 x 32 496 x 396 x 40 496 x 396 x 50	
496 x 496	32 40 50	496 x 496 x 32 496 x 496 x 40 496 x 496 x 50	

Order number ST 3502.	<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/>	Add size to order number	
$a^{+0,4} \times b^{+0,4}$	$c^{+0,5}_{+0,2}$	▲	
626 x 311	40 50 63	626 x 311 x 40 626 x 311 x 50 626 x 311 x 63	
626 x 396	40 50 63	626 x 396 x 40 626 x 396 x 50 626 x 396 x 63	
626 x 496	40 50 63	626 x 496 x 40 626 x 496 x 50 626 x 496 x 63	
626 x 626	40 50 63	626 x 626 x 40 626 x 626 x 50 626 x 626 x 63	
706 x 396	40 50 63	706 x 396 x 40 706 x 396 x 50 706 x 396 x 63	
706 x 496	40 50 63	706 x 496 x 40 706 x 496 x 50 706 x 496 x 63	
706 x 626	40 50 63	706 x 626 x 40 706 x 626 x 50 706 x 626 x 63	
796 x 396	40 50 63	796 x 396 x 40 796 x 396 x 50 796 x 396 x 63	
796 x 496	40 50 63	796 x 496 x 40 796 x 496 x 50 796 x 496 x 63	
796 x 626	40 50 63	796 x 626 x 40 796 x 626 x 50 796 x 626 x 63	

Die sets made of steel and aluminium according to drawing

Steinel steel or aluminium columnar frames can be rapidly manufactured according to your specifications or drawings in any desired dimensions or forms within the maximal production limits.

Plate machining

Burned or machine clean on all sides, heated tension-free, polish plano-parallel up to a maximum of:

2000 x 800 mm

Larger plates finally milled up to:

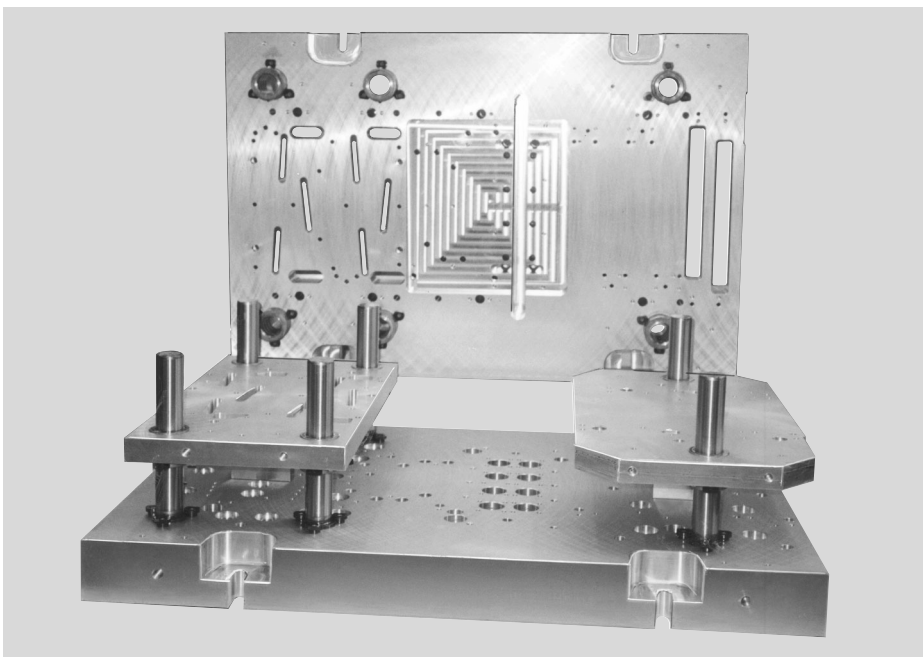
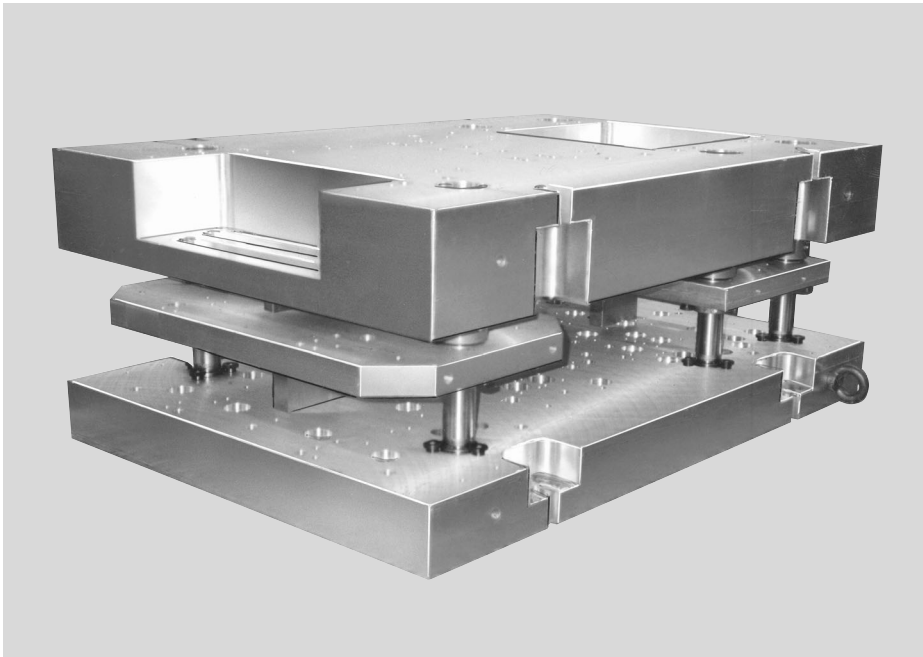
2500 x 1250 mm

Plate thicknesses up to: **20 – 250 mm.**

Further dimensions available on request.

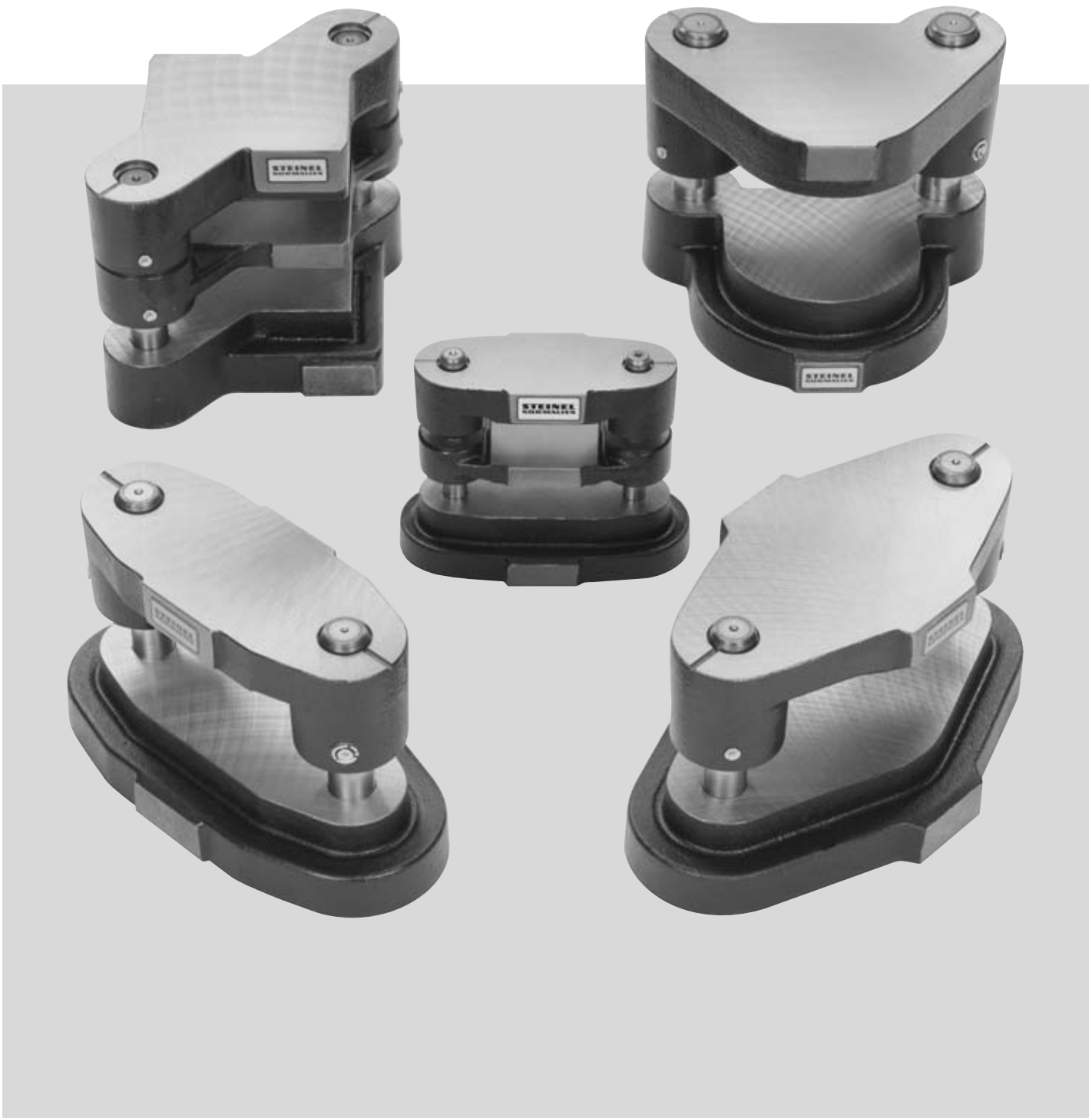
Machining services

Breakthroughs, countersinks, hollowing, drilling patterns, coordinate grinding, eroding etc. can be done according to your specifications or sketches.



Die sets made of special grey cast iron

- In numerous standard sizes on stock
- Die sets made of special grey cast iron GGI, alloy (best cutting property) and ultrasonically tested, accordingly without shrinkage, cavities, cracks or inclusions.
- Sliding guides directly in the grey cast iron or guide bushes made of hardened steel with bronze plated running surface.
- Ball guides
- Roller guides



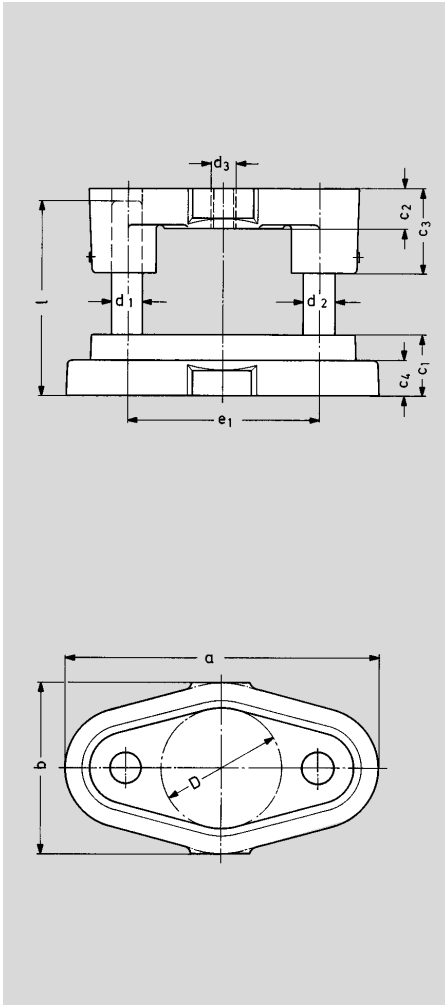
ST 100. page 2.03 **ST 120.** page 2.04 **ST 140.** page 2.05 **ST 160.** page 2.06 **ST 170.** page 2.07 **ST 20..** page 2.08



ST 286. page 2.09



Die sets ST 100.



Circular working area
Centrally located pillars
Thin upper plate

DIN 9812

Form D: Upper plate without thread
Form DG: Upper plate with thread

Material: Special grey cast iron GGL alloy ultrasonically tested.

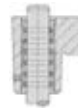
Full scale drawings are available for all die sets sizes at net cost.

For clamping sockets see the appropriate pages.

Order example: Die set with sliding guide, steel bronze plated.
Upper plate without thread **ST 1001**
Working area D = 125 mm
Add **125**
Order number **ST 1001.125**



Sliding guide
with
lubricant



Sliding guide
Hardened
steel bush
bronze plated



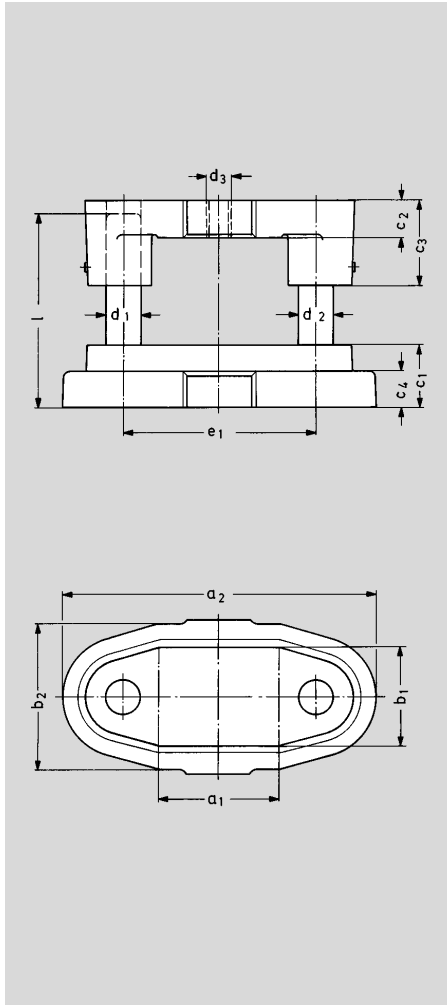
Ball guide
Cage travel
= 1/2 length of stroke

Add
size to
order no.

Upper plate without thread	Order no. ST 1006.	Order no. ST 1001.	Order no. ST 1002.	<input type="checkbox"/>
Upper plate with thread	Order no. ST 1007.	Order no. ST 1004.	Order no. ST 1005.	<input type="checkbox"/>

D	a	b	c ₁	c ₂	c ₃	c ₄	d ₃	e ₁	ST 7100. d ₁ /d ₂ x l	▲
63	171	92	40	25	50	20	M 16 x 1,5	100	15/16 x 140	063
80	217	114	50	30	63	30	M 20 x 1,5	131	19/20 x 160	080
100	263	144	50	30	63	30	M 20 x 1,5	159	24/25 x 160	100
125	288	169	50	30	63	30	M 20 x 1,5	184	24/25 x 160	125
160	345	204	56	40	80	30	M 24 x 1,5	229	30/32 x 180	160
180	366	224	56	40	80	30	M 24 x 1,5	250	30/32 x 180	180
200	385	244	56	40	80	30	M 24 x 1,5	269	30/32 x 200	200
224	448	278	56	50	80	30	M 30 x 2	310	38/40 x 200	224
250	473	304	56	50	80	30	M 30 x 2	335	38/40 x 200	250
280	504	335	63	50	80	30	M 30 x 2	366	38/40 x 224	280
315	539	370	63	50	80	30	M 30 x 2	401	38/40 x 224	315

Die sets ST 120.



Rectangular working area
Centrally located pillars
Thin upper plate

DIN 9812

Form C: Upper plate without thread
Form CG: Upper plate with thread

Material: Special grey cast iron GGL alloy ultrasonically tested.

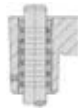
Full scale drawings are available for all die sets sizes at net cost.

For clamping sockets see appropriate pages.

Order example: Die set with sliding guide, steel bronze plated.
Upper plate without thread **ST 1201**
Working area $a_1 \times b_1 = 250 \times 200$ mm
Add **250 x 200**
Order number **ST 1201.250 x 200**



Sliding guide
with
lubricant



Sliding guide
Hardened
steel bushing
bronze plated



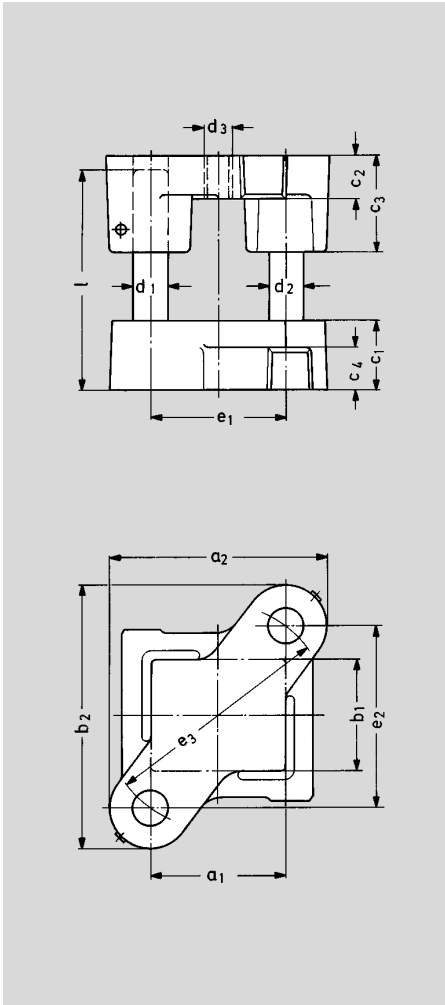
Ball guide
Cage travel
= 1/2 length of stroke

Add
size to
order no.

Upper plate without thread	Order no. ST 1206.	Order no. ST 1201.	Order no. ST 1202.	<input type="checkbox"/> x <input type="checkbox"/>
Upper plate with thread	Order no. ST 1207.	Order no. ST 1204.	Order no. ST 1205.	<input type="checkbox"/> x <input type="checkbox"/>

$a_1 \times b_1$	a_2	b_2	c_1	c_2	c_3	c_4	d_3	e_1	ST 7100. $d_1/d_2 \times l$	▲
63 x 50	177	74	40	25	50	20	M 16 x 1,5	106	15/16 x 140	063 x 050
80 x 63	217	93	50	30	63	30	M 20 x 1,5	131	19/20 x 160	080 x 063
100 x 63	237	93	50	30	63	30	M 20 x 1,5	151	19/20 x 160	100 x 063
125 x 63	262	93	50	30	63	30	M 20 x 1,5	176	19/20 x 160	125 x 063
100 x 80	263	120	50	30	63	30	M 20 x 1,5	159	24/25 x 160	100 x 080
125 x 80	288	120	50	30	63	30	M 20 x 1,5	184	24/25 x 160	125 x 080
160 x 80	323	120	50	30	63	30	M 20 x 1,5	219	24/25 x 160	160 x 080
125 x 100	288	140	50	40	80	30	M 24 x 1,5	184	24/25 x 180	125 x 100
160 x 100	323	140	50	40	80	30	M 24 x 1,5	219	24/25 x 180	160 x 100
200 x 100	385	140	56	40	80	30	M 24 x 1,5	269	30/32 x 180	200 x 100
160 x 125	345	165	56	40	80	30	M 24 x 1,5	229	30/32 x 180	160 x 125
200 x 125	385	165	56	40	80	30	M 24 x 1,5	269	30/32 x 180	200 x 125
250 x 125	435	165	56	40	80	30	M 24 x 1,5	319	30/32 x 180	250 x 125
200 x 160	385	200	56	50	80	30	M 30 x 2	269	30/32 x 200	200 x 160
250 x 160	435	200	56	50	80	30	M 30 x 2	319	30/32 x 200	250 x 160
315 x 160	545	210	63	50	80	30	M 30 x 2	401	38/40 x 224	315 x 160
250 x 200	479	250	63	50	80	30	M 30 x 2	335	38/40 x 224	250 x 200

Die sets ST 140.



Rectangular working area
Diagonally located pillars
Thin upper plate

DIN 9819

Form C: Upper plate without thread
Form CG: Upper plate with thread

Material: Special grey cast iron GGL alloy ultrasonically tested.

Full scale drawings are available for all die sets sizes at net cost.

For clamping sockets see appropriate pages.

Order example: Die set with sliding guide, steel bronze plated
Upper plate without thread **ST 1401**
Working area $a_1 \times b_1 = 200 \times 125$ mm
Add **200 x 125**
Order number **ST 1401.200 x 125**



Sliding guide
with
lubricant



Sliding guide
Hardened
steel bushing
bronze plated



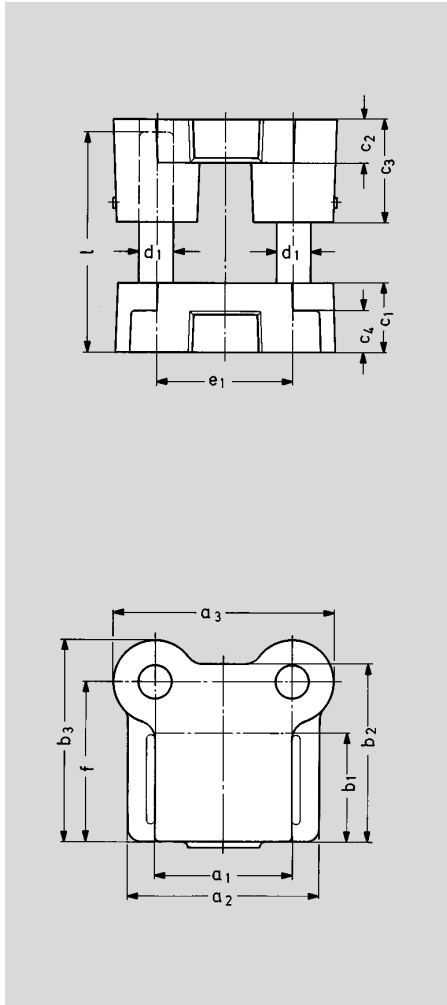
Ball guide
Cage travel
= 1/2 length of stroke

Add
size to
order no.

Upper plate without thread	Order no. ST 1406.	Order no. ST 1401.	Order no. ST 1402.	<input type="checkbox"/> x <input type="checkbox"/>
Upper plate with thread	Order no. ST 1407.	Order no. ST 1404.	Order no. ST 1405.	<input type="checkbox"/> x <input type="checkbox"/>

$a_1 \times b_1$	a_2	b_2	c_1	c_2	c_3	c_4	d_3	e_1	e_2	e_3	ST 7100. $d_1/d_2 \times l$	▲
63 x 50	109	131	40	25	50	20	M 16 x 1,5	63,1	85,2	106	15/16 x 140	063 x 050
80 x 63	136	164	50	30	63	30	M 20 x 1,5	80	108	134,4	19/20 x 160	080 x 063
100 x 80	164	197	50	30	63	30	M 20 x 1,5	100	133	166,4	24/25 x 160	100 x 080
125 x 80	189	197	50	30	63	30	M 20 x 1,5	125	133	182,5	24/25 x 160	125 x 080
125 x 100	189	217	50	40	80	30	M 24 x 1,5	125,1	153	197,6	24/25 x 180	125 x 100
160 x 100	225	227	50	40	80	30	M 24 x 1,5	160,9	163	229	24/25 x 180	160 x 100
200 x 100	276	239	56	40	80	30	M 24 x 1,5	200	163	258	30/32 x 180	200 x 100
160 x 125	236	268	56	40	80	30	M 24 x 1,5	160,1	192	250	30/32 x 180	160 x 125
200 x 125	276	264	56	40	80	30	M 24 x 1,5	200	188	274,5	30/32 x 180	200 x 125
250 x 125	326	264	56	40	80	30	M 24 x 1,5	250	188	312,8	30/32 x 180	250 x 125
200 x 160	275	299	56	50	80	30	M 30 x 2	198,7	222,6	298,4	30/32 x 200	200 x 160
250 x 160	326	299	56	50	80	30	M 30 x 2	250	223	335	30/32 x 200	250 x 160
250 x 200	340	370	63	50	80	30	M 30 x 2	250,1	280	375,4	38/40 x 224	250 x 200

Die sets ST 160



Rectangular working area
Pillars located at rear
Thin upper plate

DIN 9822, form C

Material: Special grey cast iron GGL alloy ultrasonically tested.

Full scale drawings are available for all die sets sizes at net cost.

For clamping sockets see appropriate pages.

Order example: Die set with ball cage guide **ST 1602**

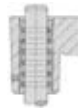
Working area $a_1 \times b_1 = 160 \times 125$ mm

Add **160 x 125**

Order number **ST 1602.160 x 125**



Sliding guide
with
lubricant



Sliding guide
Hardened
steel bushing
bronze plated



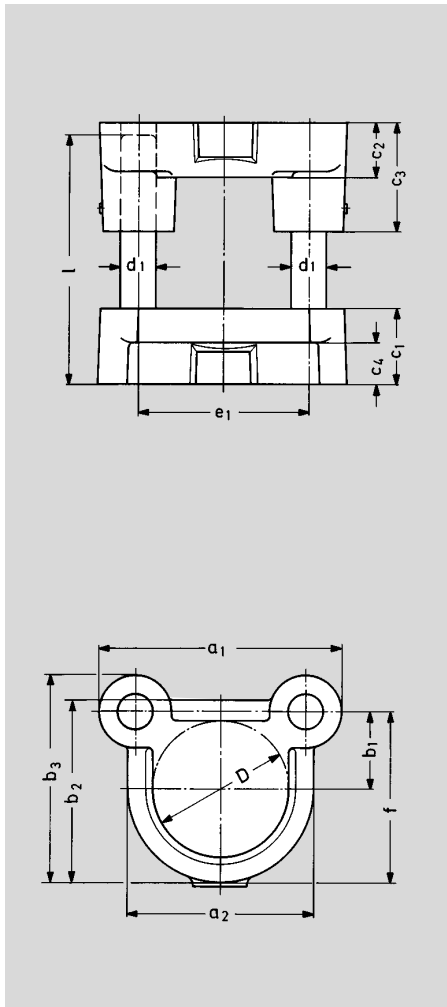
Ball guide
Cage travel
= 1/2 length of stroke

Add
size to
order no.

Upper plate without thread Order no. **ST 1606.** Order no. **ST 1601.** Order no. **ST 1602.** x

$a_1 \times b_1$	a_2	a_3	b_2	b_3	C_1	C_2	C_3	C_4	e_1	f	ST 7100. $d_1 \times l$	▲
50 x 40	84	118	69	87	36	20	50	20	72	62	16 x 112	050 x 040
63 x 50	97	118	84	102	40	25	50	25	72	77	16 x 125	063 x 050
80 x 50	114	126	84	102	40	25	50	25	80	77	16 x 125	080 x 050
80 x 63	123	136	104	125	45	32	63	30	80	95	19 x 140	080 x 063
100 x 63	143	156	104	125	45	32	63	30	100	95	19 x 140	100 x 063
125 x 63	168	181	104	125	45	32	63	30	125	95	19 x 140	125 x 063
100 x 80	143	164	130	151	50	32	80	30	100	117	25 x 160	100 x 080
125 x 80	168	189	130	151	50	32	80	30	125	117	25 x 160	125 x 080
160 x 80	203	224	130	151	50	32	80	30	160	117	25 x 160	160 x 080
125 x 100	168	201	155	182	56	40	96	30	125	142	32 x 180	125 x 100
160 x 100	203	236	155	182	56	40	96	30	160	142	32 x 180	160 x 100
200 x 100	243	276	155	182	56	40	96	30	200	142	32 x 180	200 x 100
160 x 125	203	236	180	207	56	40	96	30	160	167	32 x 180	160 x 125
200 x 125	243	276	180	207	56	40	96	30	200	167	32 x 180	200 x 125
250 x 125	293	326	180	207	56	40	96	30	250	167	32 x 180	250 x 125
200 x 160	253	288	227	259	63	50	121	30	200	213	40 x 200	200 x 160
250 x 160	303	338	227	259	63	50	121	30	250	213	40 x 200	250 x 160
250 x 200	303	352	266	303	63	50	121	30	250	250	50 x 224	250 x 200
315 x 250	368	412	321	355	63	50	121	30	310	302	50 x 224	315 x 250

Die sets ST 170.



Circular working area
Pillars located at rear
Thin upper plate

DIN 9822, form C

Material: Special grey cast iron GGL alloy ultrasonically tested.

Full scale drawings are available for all die sets sizes at net cost.

For clamping sockets see appropriate pages.

Order example: Die set with sliding guide of full bronze with solid lubrication **ST 1706**
Working area $D = 180$ mm.
Add **180**
Order number **ST 1706.180**



Sliding guide
with
lubricant



Sliding guide
Hardened
steel bushing
bronze plated

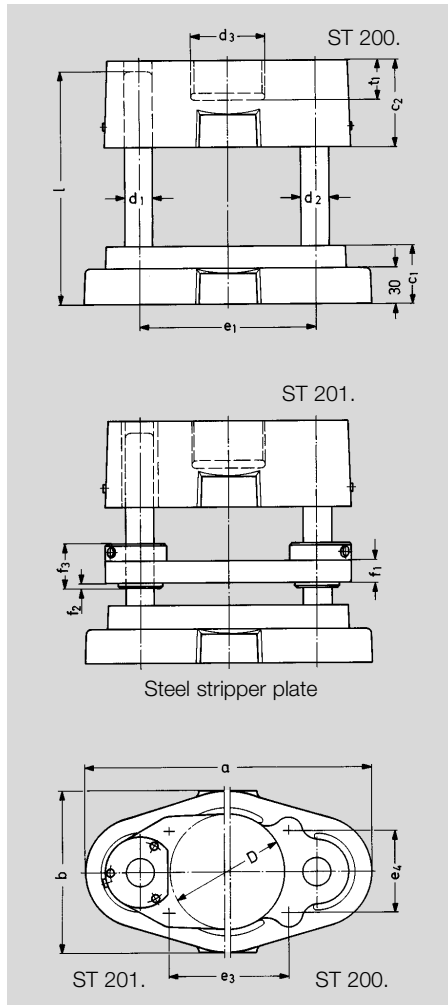


Ball guide
Cage travel
 $= \frac{1}{2}$ length of stroke

Add
size to
order no.

Upper plate without thread	Order no. ST 1706.	Order no. ST 1701.	Order no. ST 1702.	<input type="checkbox"/>
----------------------------	---------------------------	---------------------------	---------------------------	--------------------------

D	a ₁	a ₂ ~	b ₁	b ₂ ~	b ₃ ~	C ₁	C ₂	C ₃	C ₄	e ₁	f	ST 7100. d ₁ x l	▲
63	136	95	40	92	115	45	32	63	25	80	87	19 x 125	063
80	164	112	50	112	138	50	32	63	30	100	106	25 x 140	080
100	189	138	56	134	157	56	40	80	30	125	125	25 x 160	100
125	236	168	63	164	185	56	40	80	30	160	147	32 x 180	125
160	288	204	80	202	226	56	50	100	30	200	182	40 x 200	160
180	307	224	85	222	241	63	50	100	30	219	197	40 x 200	180



Circular working area
Centrally located pillars
Thick upper plate
Moveable stripper plate available upon request

Similar DIN 9816

Form D: without stripper plate
Form DF: with stripper plate

Material: Special grey cast iron GGL alloy ultrasonically tested.

Full scale drawings are available for all die sets sizes at net cost.

For clamping sockets see appropriate pages.

Order example: Die set with sliding guide, steel bronze plated with steel stripper plate
 Upper plate without thread **ST 2011**
 Working area $D = 125$ mm
 Add **125**
 Order number **ST 2011.125**



Sliding guide
with lubricant



Sliding guide
Hardened steel bushing bronze plated in upper plate and stripper plate



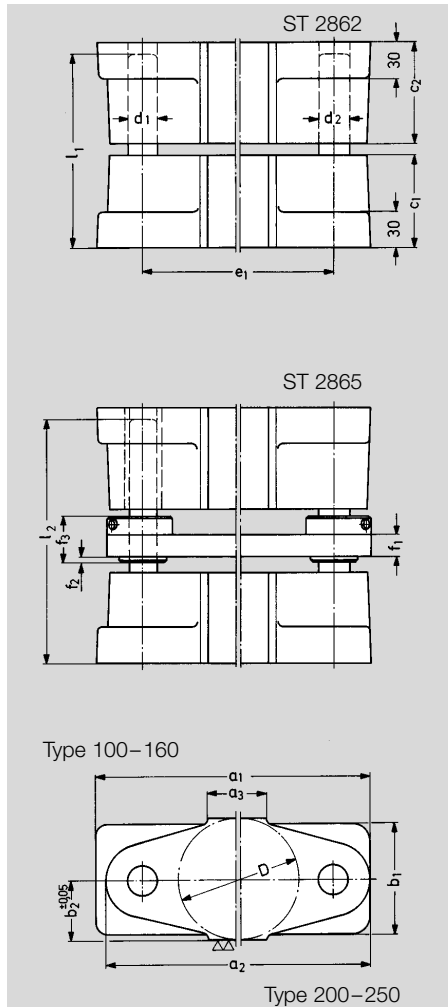
Ball guide
in upper plate and stripper plate
Cage travel = 1/2 length of stroke

Stripper plate	Upper plate													Add size to order no.
–	without thread	Order no. ST 2006.	Order no. ST 2001.	Order no. ST 2002.										<input type="checkbox"/>
–	with thread	Order no. ST 2007.*)	Order no. ST 2004.*)	Order no. ST 2005.*)										<input type="checkbox"/>
Steel	without thread	–	Order no. ST 2011.	Order no. ST 2012.										<input type="checkbox"/>
Steel	with thread	–	Order no. ST 2014.*)	Order no. ST 2015.*)										<input type="checkbox"/>

D	a	b	c ₁	c ₂	d ₃ *)	e ₁	e ₃	e ₄	f ₁	f ₂	f ₃	t ₁	ST 7100. d ₁ /d ₂ x l	▲
80	218	125	50	63	–	122	85	60	16	7	38	–	19/20 x 200	080
100	258	144	50	80	M 64 x 4	154	105	70	18	5	38	35	24/25 x 200	100
125	283	169	56	80	M 84 x 4	179	135	80	18	5	38	41	24/25 x 224	125
160	345	204	63	100	M 104 x 4	229	170	90	22	8	45	50	30/32 x 250	160

*) available with pocket for spring acc. to d₃ at surcharge.

Die sets ST 286.



Circular working area
Centrally located pillars
Bearing surface lateral

Fine-blanking die set

Application: execution **without stripper plate ST 2862** for construction of fine-blanking tools with moveable punches.
Execution **with stripper plate ST 2865** for construction of fine blanking tools with fixed punches. Deliverable with recesses upon request.

Material: Special grey cast iron GGL alloy ultrasonically tested.

Full scale drawings are available for all die sets sizes at cost price, see appropriate pages.

Order example: Die set with ball guide without stripper plate **ST 2862**
Working area D = 200 mm
Add **200**
Order number **ST 2862.200**



Ball guide

in upper plate and stripper plate
Cage travel = 1/2 length of stroke

Add size to order no.

Stripper plate	Upper plate	Order no.	Order no.
–	without thread	Order no. ST 2862.	<input type="checkbox"/>
Steel	without thread	Order no. ST 2865.	<input type="checkbox"/>

D	a ₁	a ₂	a ₃	b ₁	b ₂	c ₁	c ₂	e ₁	f ₁	f ₂	f ₃	ST 7100. d ₁ /d ₂ x l ₁	ST 7100. d ₁ /d ₂ x l ₂	▲
100	237	219	50	92	50	75	80	159	18	5	38	24/25 x 160	24/25 x 200	100
125	262	244	60	107	62,5	75	80	184	18	5	38	24/25 x 160	24/25 x 200	125
160	328	301	70	142	80	75	80	229	22	8	45	30/32 x 160	30/32 x 200	160
200	347	341	90	167	100	80	100	269	22	8	45	30/32 x 200	30/32 x 224	200
250	425	419	100	222	125	85	100	335	28	2	55	38/40 x 200	38/40 x 250	250

Acceptance specifications

for die sets made of special grey cast iron

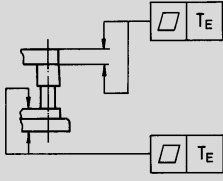
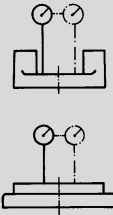
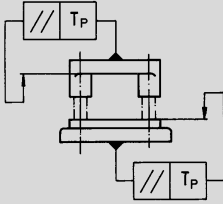
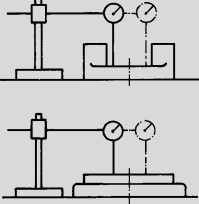
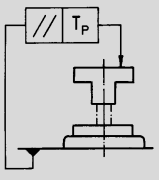
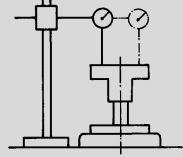
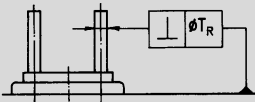
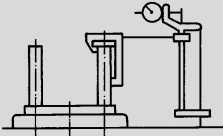
DIN 9811 part 1

Dimensions without tolerance declaration

For cast unfinished surfaces:
DIN 1686 – GTB 17

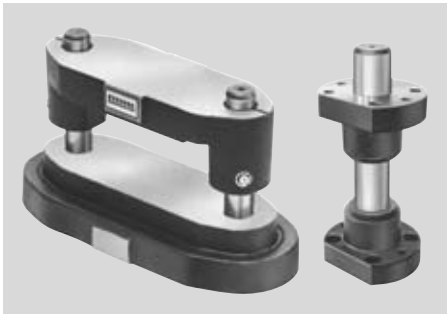
For finished surfaces:
DIN 7168 – middle

Tolerances of planeness, parallelism and rectangularity

	Test piece	Testing position	Largest length of the working area		Testing data T_P, T_E, T_R
			over	to	
Flatness of surface			—	—	0,005 to 100 mm length of the working area *)
Parallelism of surface pairs			0	100	0,005
			100	200	0,008
			200	300	0,011
			300	400	0,014
			400	500	0,017
			500	600	0,020
Parallelism of bearing surfaces			0	100	0,008
			100	200	0,012
			200	300	0,018
			300	400	0,024
			400	500	0,030
			500	600	0,036
Squareness of guide pillars			—	—	0,005 to 100 mm length of the working area *)

*)When testing larger or smaller lengths, multiply tolerance value accordingly with the relevant factor.

Steinel precision sliding guides with solid lubricant



Fields of application

Steinel precision sliding guides with "solid lubricant" can be used for tool and fixture manufacturing in various fitting positions for longitudinal motions.

Structure

The Steinel precision sliding guide "with solid lubricant" is composed of:
Guide pillar and die set upper plate made of grey cast iron of special type resp. guide bearing with built-in solid lubricant bushes.



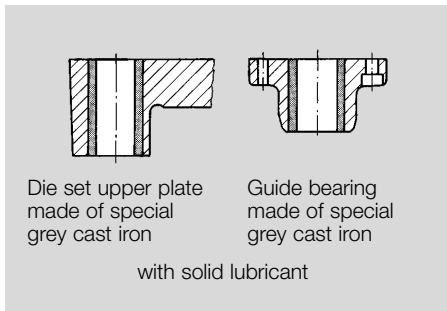
Material:

Steel with lubricant cups

These sliding guides are self-lubricating due to the presence of built in lubrication cups, thereby also increasing their pressure tolerance.

Our maintenance-free, self-lubricating bearing bush is complex and highly wear resistant. It has embedded in it various lubricating materials such as molybdenum, disulfate and graphite in appropriate form.

It thereby differs from other sinter bearing bushes, which are commonly considered oil-free bearings.



Lubrication with solid lubricant

The lubrication with solid lubricant is designated as state of lubrication where solid lubricant particles having a low cutting resistance in their crystalline structure exist between two surfaces and their adopt the lubrication function.

Sliding speed

The max. sliding speed is at 30 m / min.

With ideal lubrication, ideal guide clearance and length of stroke, ideal radial load and heat dissipation the Steinel precision sliding guide "with solid lubricant" allows stroke speeds of 600 – 800 strokes/min.

Guide clearance

The guide clearance is 2 – 7 µm. If you require more clearance, please specify in your order f.e. "Honed for easy slide fit".

Advantages:

In the automatic systems you avoid corrodors which can arise due to a lack of maintenance.

The maintenance is generally eased because there is simply no longer a lubrication required.

Safety and cleanliness in the environment of production are essentially increased as there is no lubrication made any more.

Reduction of the number of required parts on the devices due to the discontinuance of the central lubrication systems whereby the costs for mounting resp. assembling are reduced.

You can save time already during constructions when you no longer require the lubricating system.

Hints for installation:

1st Glue into fixing bore hole ISO H6
(see to conc. page for bonding agent)

2nd Avoid to press in lest inner diameter becomes more narrow.

Guidance diameter ISO H6 precision turned
Fixing bore hole ISO j6 precision turned.

Guide units

- Guide units for tools, instruments and machinery
- Guide pillars according to ISO, DIN, Steinel norm or your drawings
- Quick change guide pillars
- Pillar bearings
- Guide bushes made of hardened steel bronze-plated, for exceptionally high stress
- Guide bushes made of solid bronze with solid lubrication inserts
- Ball guide bushes and ball cages for radial and axial movement
- Roller cages for axial movement
- Guide plates with solid lubrication inserts



ST 7190 page 3.06	ST 7191 page 3.07	ST 7192 page 3.07	ST 7100 page 3.08	ST 7106/7/8 p. 3.10	ST 7117 page 3.12
ST 7118 page 3.13	ST 7120 page 3.14	ST 7126 page 3.15	ST 7181 page 3.16	ST 7182 page 3.17	ST 7111/12 p. 3.18
ST 7366 page 3.19	ST 7360 page 3.19	ST 7160 page 3.20	ST 746. page 3.21	ST 9833 page 3.22	ST 9834 page 3.23
ST 9825 page 3.24	ST 9831 page 3.25	ST 9827 page 3.26	ST 7130 page 3.26	ST 7170 page 3.27	ST 7171 page 3.28
ST 7140 page 3.29	ST 7150 page 3.30	ST 7151 page 3.31	ST 7152 page 3.32	ST 7133 page 3.33	ST 7173 page 3.34
ST 7174 page 3.35	ST 7134 page 3.36	ST 7135 page 3.37	ST 7132 page 3.38	ST 720. page 3.38	ST 721. page 3.39
ST 72.. page 3.40	ST 7319 page 3.41	ST 7409 page 3.42	ST 7411 page 3.43	ST 7491 page 3.44	ST 7451 page 3.45

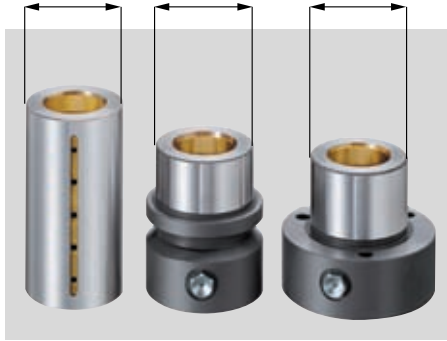
Guide units

ST 7402 page 3.46	ST 7406 page 3.47	ST 7403 page 3.47	ST 7404 page 3.48	ST 7405 page 3.49	ST 7412 page 3.50
					
ST 7416 page 3.52	ST 7413 page 3.52	ST 7414 page 3.54	ST 7415 page 3.56	ST 7419 page 3.58	ST 7471 page 3.60
					
ST 7431 page 3.62	ST 7422 page 3.64	ST 7426 page 3.64	ST 7423 page 3.66	ST 7424 page 3.68	ST 7425 page 3.70
					
ST 7429 page 3.72	ST 7481 page 3.74	ST 7441 page 3.76	ST 7367 page 3.78	ST 7377 page 3.78	ST 7571 page 3.79
					
ST 7561 page 3.80					
					

Guide bushings DIN 9831/ISO 9448

New: Standardized outside diameter
Advantage: Reciprocal interchangeability

Steel sliding guide bronze plated



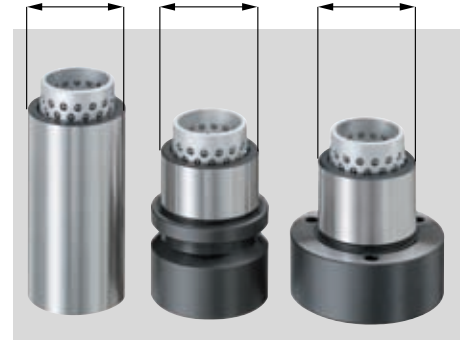
ST 7409 ST 7419 ST 7429

Interchangeability of all guide bushings

For each bore, you can use:
Two different inside diameters, for example 30/32
Seven different types of guidance, for example: three sliding guide and four ball guide types
Three different bushing types, for example: shoulder, flange or smooth bushings
Three different bushing lengths (for inside diameters from 19 to 80)

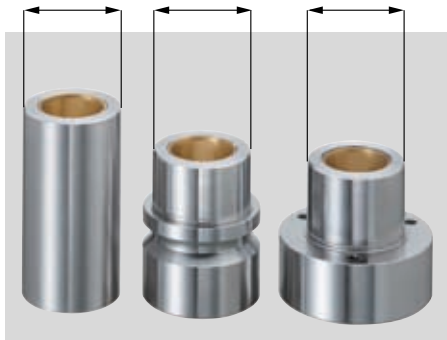
Therefore, it is possible to use $2 \times 7 \times 3 \times 3 = 126$ different guide bushings for each bore.

Ball guide aluminium



ST 7402 ST 7412 ST 7422

Sliding guide with solid lubricant

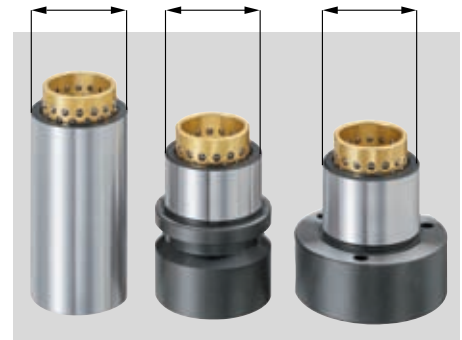


ST 7491 ST 7471 ST 7481

Mounting diameter ISO j6 or js4

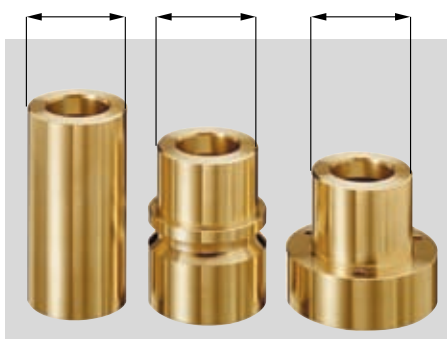
Pillar diameter d_1	Mounting diameter
10	22
12	
15	28
16	
19	32
20	
24	40
25	
30	48
32	
38	58
40	
48	70
50	
60	85
63	
80	105

Ball guide brass

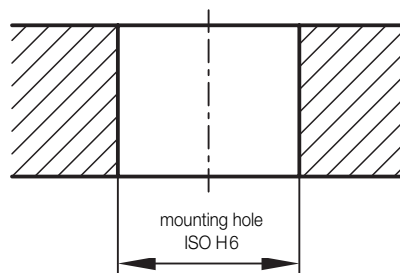


ST 7404 ST 7414 ST 7424

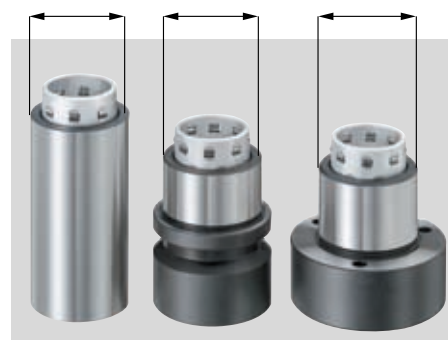
Sliding guide with solid lubricant bands



ST 7451 ST 7431 ST 7441

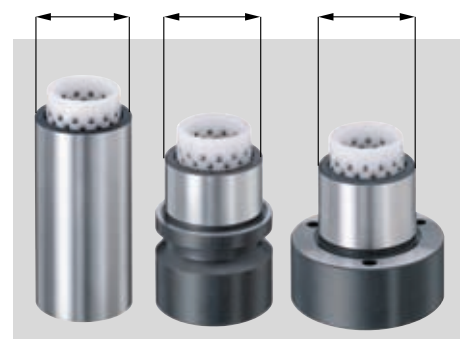


Roller guide



ST 7403 ST 7413 ST 7423

Ball guide plastic



ST 7405 ST 7415 ST 7425

Fields of Application:

Steinel precision guide units can be utilized in the manufacture of tools, fixtures, machines, measuring instruments, medical devices and automobiles. They are characterized by their high load capacity and resistance to wear.

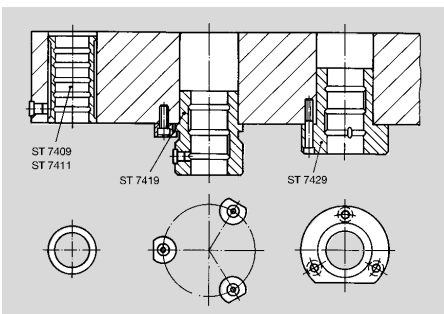
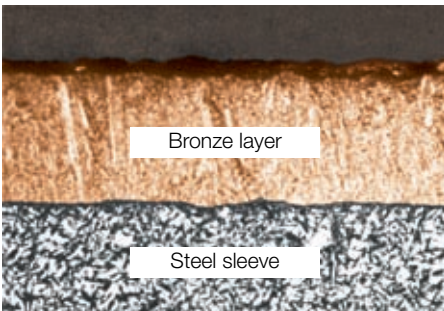
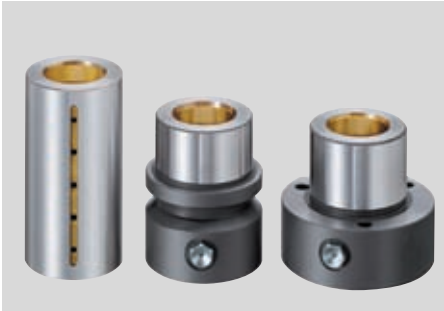
Advantages:

Due to the standardized outside diameter, all guide bushings are interchangeable. A die set with a sliding guide can be changed to using a ball or roller guide without any additional work, simply by exchanging the guide bushings.

Steinel precision sliding guides

steel bronze plated or with solid lubricant

Steel sliding guide bronze plated



The guide bushings ST 7419 and ST 7429 have an M 8 x 1 threaded hole that enables them to be connected to a central lubrication system.

Fields of application

Steinel precision sliding guides "steel bronze plated" or with "solid lubricant" are used for longitudinal motion in the manufacture of tools, fixtures, machines, medical devices and automobiles. They are characterized by their high load capacity and resistance to wear.

Component arrangement

The Steinel precision sliding guide "steel bronze plated" or with "solid lubricant" is composed of a guide pillar and guide bushing with honed clearance.

Bronze plating

The hardened steel sleeve absorbs strong lateral forces and prevents the guide bushing from deforming when it is being compressed strongly across its edges.

The galvanized bronze plating is very hard, wear-resistant and honed to highest surface finish quality. In addition to its excellent long running wear factor it also has very good heat dissipation characteristics that ensures the rapid dispersion of excessive frictional heat.

Lubrication

All Steinel precision sliding guides "steel bronze plated" are supplied with an internal lubrication system, where the parallel lubrication rills across the grooves are connected with axial channels. As a result, an equal distance to all lubrication points is ensured. At the same time, the internal lubrication system guarantees a shielding effect against dirt. The internal lubrication system must be supplied with high-quality oil or high-quality grease several times a day, depending on sliding speed.

Sliding speed

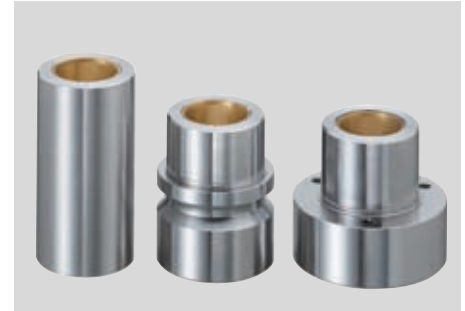
The recommended sliding speed is 15 – 30 m/min.

Under ideal conditions of lubrication, guide clearance, stroke length, radial load and heat dissipation, very high stroke speeds of 600 – 800 strokes/min. can be achieved with the Steinel precision sliding guide "steel bronze plated".

Guide clearance

The guide bushings are precision turned and honed. An additional compression of the sliding surface takes place at the tool start-up, resulting in better sliding characteristics. The clearance is 2 – 7 µm. If more clearance is required, please indicate it on the order as "honed for easy slide fit".

Sliding guide with solid lubricant



Maintenance-free guide bushings

As a result of the moving parts, the solid lubricant produces a tightly clinging, consistent lubrication film between the guiding elements. This film also adheres to the surfaces when the parts are not moving or when they first start moving, which prevents corrosion between the guide bushing and guide pillar. Our lubricant and maintenance-free guide bushings are complex, highly wear-resistant slide elements of the highest precision. Even after long continual use, our guide bushings do not undergo any deformation due to the long-enduring strength of the fundamental materials.

Lubrication

The solid lubricant construction, the particles of the solid lubricant have a low shearing resistance in their crystalline structure. They are between two surfaces and take over the lubricating function.

Sliding speed

The maximum sliding speed is 30 m/min.

Under ideal conditions of guide clearance, stroke length, radial load and heat dissipation stroke speeds of 300 – 400 strokes/min. can be achieved with the Steinel precision sliding guide with solid lubricant.

Guide clearance

The clearance is 2 – 7 µm. If more clearance is required, please indicate it on the order as "honed for easy slide fit".

Sliding guide with solid lubricant bands



Steinel precision guides

Ball guides

Special features of Steinel precision ball guides

Precision due to the microfinished contact surfaces and uniformly selected precision steel balls.

Friction-free movement due to the rolling motion of the balls.

Clearance-free guidance due to the optimal preloaded rolling motion of the balls between the guide pillar and guide bushing.

Long lifespan due to the free-wheeling mounting and helical positioning of the balls, so that each ball has its own track.

High-load capacities, precision guidance and high stroke speeds are achieved due to the highest precision of the uniformly selected precision steel balls, honed guide bushings and superfine ground guide pillars. The large number of balls in the cage as well as an even force distribution in the guidance system allow high stroke speeds of 30 – 40 m/min and more.

Interchangeability is ensured due to the uniformly selected precision steel balls.

Special designs can be manufactured according to your drawings.

Loading capacities

Guide pillar diameter d_1	Ball diameter d_k	F (stat.) in N/cm carrying guide length
10/12	2	450
15/16	3	580
19/20	3	800
24/25	3	950
30/32	4	1350
38/40	4	1900
48/50	4	2400
60/63	5	3000
80	6	3300

Load capacities – preload

The radial load capacity of the ball guide grows with the increasing preload while simultaneously decreasing the friction-free movement. Extremely high preloading will overstrain the ball guide due to the excessive surface pressure on the balls.

The preload in a paired ball depends on the guide diameter:

- from $\varnothing 10 - 12 = 3 - 5 \mu\text{m}$
- from $\varnothing 15 - 20 = 4 - 6 \mu\text{m}$
- from $\varnothing 24 - 32 = 6 - 9 \mu\text{m}$
- from $\varnothing 38 - 50 = 9 - 12 \mu\text{m}$
- from $\varnothing 60 - 80 = 11 - 14 \mu\text{m}$

Ball cage with safety part and screw

Special characteristic: guide pillars mounted in the upper plate and the possibility for the ball cage to come completely out of the guide bushing.

Limiting sleeve

Special characteristic: Prevents the ball cage from shifting down.

Low maintenance is needed for the practically maintenance-free ball guides. Lubrication with a high-performance grease when mounting is sufficient for continuous operation.

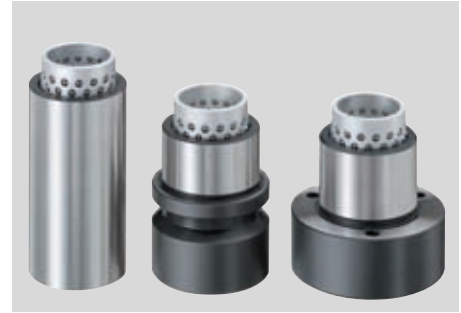
Component arrangement and function

The Steinel precision ball guide is composed of a guide pillar, guide bushing and ball cage, which are tensionally paired by preloading.

Due to the tensional structure of the balls within the cage, the ball cage only travels at half the speed of the ball guide motion. The travel length of the ball cage is always half of the stroke of the guide bushing or the guide pillar.

Fields of application

Steinel precision ball guides are used for longitudinal and rotary motion in the manufacture of tools, fixtures, machines, measuring instruments, medical devices and automobiles.



Aluminium ball cages are distinguished by having less mass than compared to brass.

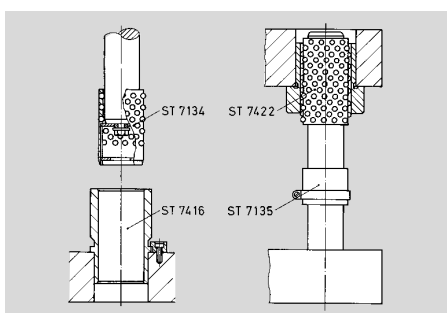
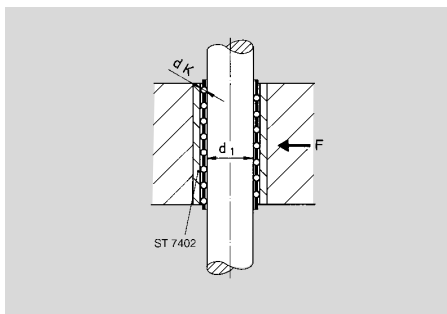
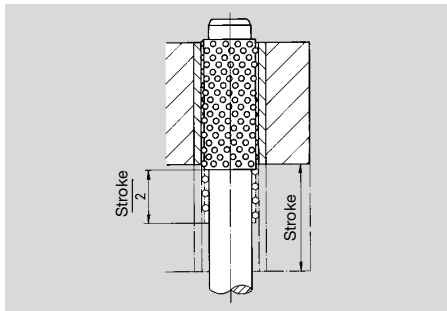
Since the only function of the cage is to act as a carrier, every bit of weight reduction means reduced energy loss with the same stability of the cage, especially at the return of the stroke.



Brass ball cages can be used universally. They have a high mechanical strength, superior sliding properties as well as a high wear resistance and stability. Due to their high-temperature strength, they are suitable for temperatures over 80 °C. Their sturdiness makes them ideal for use in machines and tools with high precision demands.

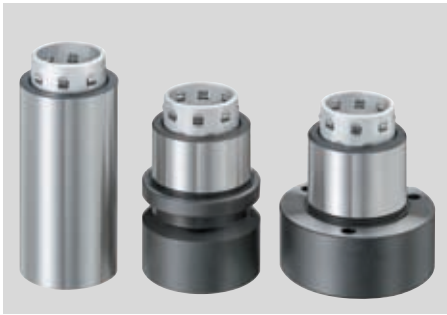


Plastic ball cages are distinguished by having less mass than compared to other materials. They are used where high stroke speeds are reached. The plastic is also suitable for use in aggressive surroundings.



Steinel precision guides

Roller guides



Fields of application

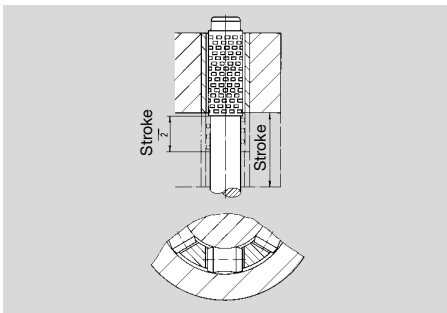
Steinel precision roller guides are used for longitudinal motion in the manufacture of tools, fixtures, machines, measuring instruments, medical devices and automobiles. Rotary motion is not possible!

A profile roller can absorb six times the load of the same-sized ball before it will begin to deform.

The contact radii of the roller's saddle shape are manufactured in such a way that critical loadings on the edge area will be avoided, which results in an extended life of the roller cage.

The bending as a result of the load in the middle surface to the outer track will result in a deflection below 0.05 µm, which can be neglected.

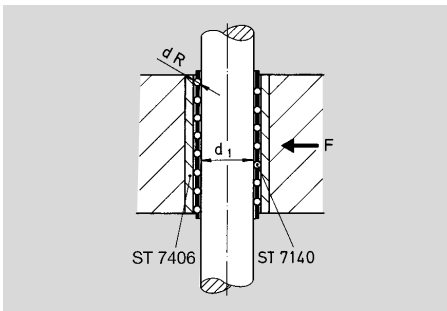
The relatively higher costs compared to the standard ball guide will be more than compensated by the superior performance achieved.



Component arrangement and function

The Steinel precision roller guide is composed of a guide pillar, guide bushing and roller cage, which are tensionally paired by preloading.

Due to the tensional structure of the rollers within the cage, the roller cage only travels at half the speed of the roller guide motion. The travel length of the roller cage is always half of the stroke of the guide bushing or the guide pillar.



Load capabilities – preload:

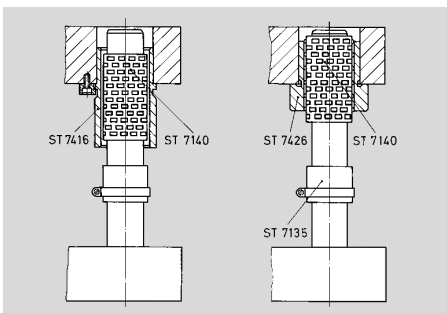
The radial load capability of the roller guide grows with the increasing preload while simultaneously decreasing the friction-free movement. Extremely high preloading will overstrain the roller guide due to the excessive surface pressure on the rollers.

Loading capacities

Guide pillar diameter d ₁	Roller diameter dR	F (stat.) in N/cm per roller cage
19/20	3	1700
24/25	3	2250
30/32	4	3450
38/40	4	4700
48/50	4	4700
60/63	5	5900
80	6	8750

The preload in a paired roller guide depends on the guide pillar diameter:

- from Ø 19 – 20 = 2 – 4 µm
- from Ø 24 – 32 = 4 – 5 µm
- from Ø 38 – 50 = 5 – 7 µm
- from Ø 60 – 80 = 7 – 9 µm



Limiting sleeve

Special characteristic:
Prevents the ball cage from shifting down.

Stroke speeds

With optimal use, the stroke speeds can reach up to 40m/min and more.

Special features of the Steinel precision roller guides

Precision due to the microfinished contact surfaces and uniformly selected precision profile rollers.

Friction free movement due to the rolling motion of the rollers.

Clearance free guidance due to the optimal preloaded rolling motion of the profile rollers between the guide pillar and guide bushing.

Long lifespan due to the free-wheeling mounting and helical positioning of the profile rollers, so that each roller has its own track.

Aluminium roller cages are distinguished by having less mass than compared to other materials. Since the only function of the cage is to act as a carrier, every bit of weight reduction means reduced energy loss with the same stability of the cage, especially at the return of the stroke. Due to the large stroke movements, an unwanted slipping effect of the roller cage will be considerably reduced by the aluminium cage, thus extending the working life of the guide.

Low maintenance is needed for the practically maintenance-free roller guides. Lubrication with a high-performance grease when mounting is sufficient for continuous operation.

High-load capacities, precision guidance and high stroke speeds are achieved due to the highest precision of the uniformly selected profile rollers, honed guide bushings and superfine ground guide pillars. The large number of supporting rollers in the running surface as well as an even force distribution in the guidance system allow high stroke speeds.

Interchangeability is ensured due to the uniformly selected precision profile rollers.

Special designs can be manufactured according to your drawings.

Guide pillars ST 7190

Mini-series

STEINEL[®]
NORMALIEN



Material:
Ø d 4 – 6 mm steel 1.2379 hardened,
hardness 60+3 HRC

from Ø d 8 mm steel, 1.7131
induction hardened,
depth of hardening 0,8 –
1,2 mm, depends on Ø,
hardness 60 – 64 HRC

Steinel-guide pillars are ground on all sides.
The guide diameter is super-fine ground finish
and lapped to tolerance ISO h3. Roundness
and cylindricity within ISO h1.
Mount into mounting holes ISO P6.

Order example: Guide pillar **ST 7190**

d₁ = 8, l = 80 mm

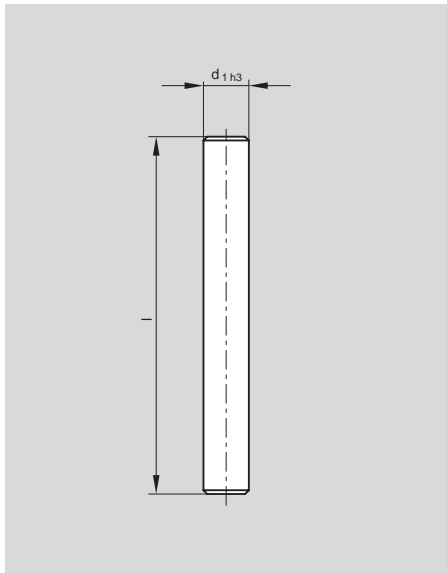
Add **08 x 080**

Order number **ST 7190.08 x 080**

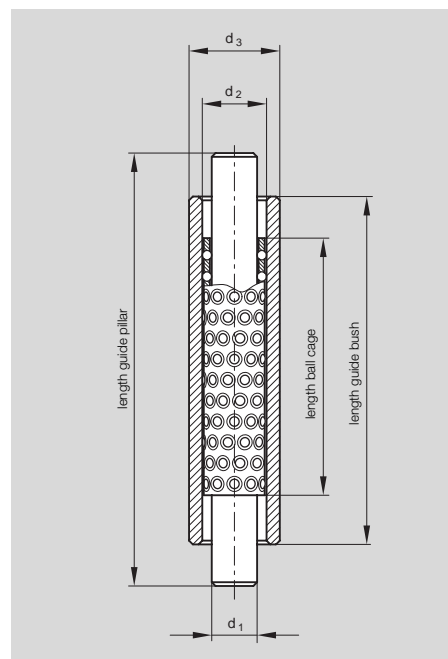
Add
size to
order number

Order number **ST 7190.**

x



d _{1h3}	l	▲
3	30	03 x 030
	40	03 x 040
	60	03 x 060
	80	03 x 080
4	50	04 x 050
	60	04 x 060
	80	04 x 080
	100	04 x 100
5	50	05 x 050
	60	05 x 060
	80	05 x 080
	100	05 x 100
6	60	06 x 060
	80	06 x 080
	100	06 x 100
	125	06 x 125
8	80	08 x 080
	100	08 x 100
	125	08 x 125
	160	08 x 160
10	80	10 x 080
	100	10 x 100
	125	10 x 125
	160	10 x 160



Ball bearings – Mini series

Steinel ball-bearings are distinguished by exceptional precision and friction-free movement. Therefore they find a wide acceptance as a construction element for electrical and optical measuring instruments and measuring systems. They will be used successfully in machines, instruments and technical equipment of high precision.

Special features of Steinel precision ball guides

Friction-free movement due to the roll motion.

Zero clearance guiding is achieved due to the precision preloaded rolling motion on the balls between guide pillar and bush.

Interchangeability will be achieved by uniformly selected steel balls.

Special designs can be manufactured according to your drawing.

Guide bushes ST 7191

Mini-series



Material:
steel 1.3505 (100 Cr 6) hardened,
hardness 61 – 63 HRC

Explanation:
Steinel-guide bushes are ground on all sides.
The guide diameter (bore) is super-fine honed
and will be matched with the pillar to ensure an
optimal preload.
Roundness and cylindrically within ISO h1.

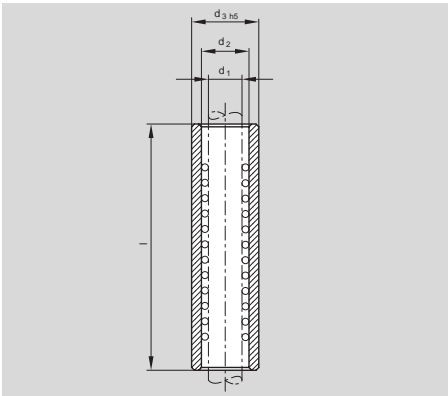
Order example: Guide bush **ST 7191**
 $d_1 = 8, l = 30$ mm
Add **08 x 030**
Order number **ST 7191.08 x 30**

Mounting instructions:
If possible avoid press fit. Fit in tensionfree
into the mounting bore hole ISO H6 and
secure it with glue.

Add
size to
order number

Order number **ST 7191.** x

d_{1h3}	d_2	d_{3h5}	l	▲
3	5	7	10	03 x 10
			20	03 x 20
			30	03 x 30
4	6	8	10	04 x 10
			20	04 x 20
			30	04 x 30
5	7	10	10	05 x 10
			20	05 x 20
			30	05 x 30
6	9	12	20	06 x 20
			30	06 x 30
			40	06 x 40
8	11	15	20	08 x 20
			30	08 x 30
			40	08 x 40
10	13	19	20	10 x 20
			30	10 x 30
			40	10 x 40



Ball cages ST 7192

Mini-series



Material: Ball cages made of brass,
balls of steel, hardened, grade 1, sorted.

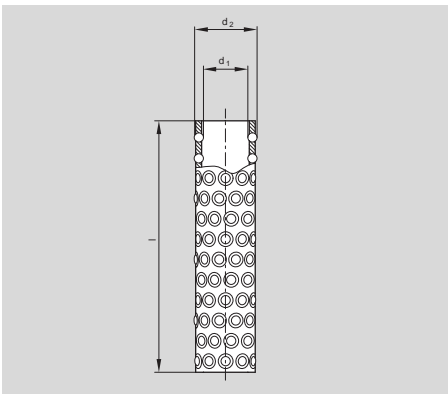
Explanation:
The Steinel-ball cages will be assembled
absolutely tensionfree and are freely movable.
The careful production and control guarantee
an exceedingly friction-free axial and radial
movement.

Order example: Ball cage **ST 7192**
made of brass
 $d_1 = 8, l = 30$ mm
Add **08 x 030**
Order number **ST 7192.08 x 30**

Add
size to
order number

Order number **ST 7192.** x

d_1	d_2	l	▲
3	5	10	03 x 10
		20	03 x 20
		30	03 x 30
4	6	10	04 x 10
		20	04 x 20
		30	04 x 30
5	7	10	05 x 10
		20	05 x 20
		30	05 x 30
6	9	20	06 x 20
		30	06 x 30
		40	06 x 40
8	11	20	08 x 20
		30	08 x 30
		40	08 x 40
10	13	20	10 x 20
		30	10 x 30
		40	10 x 40



Guide pillars ST 7100

precision ground for press fitting



DIN 9825, ISO 9182

Material: Steel 1.11221 (Ck60)
induction hardened, hardness 62-64 HRC

Guide diameter ISO h3 superfinish ground
and microfinished
mounting into mounting-holes ISO R6

Application: Due to the high precision of the
guide pillars ST 7100 they are suitable to all
Steinel guide bushes for sliding, ball and roller
guides.

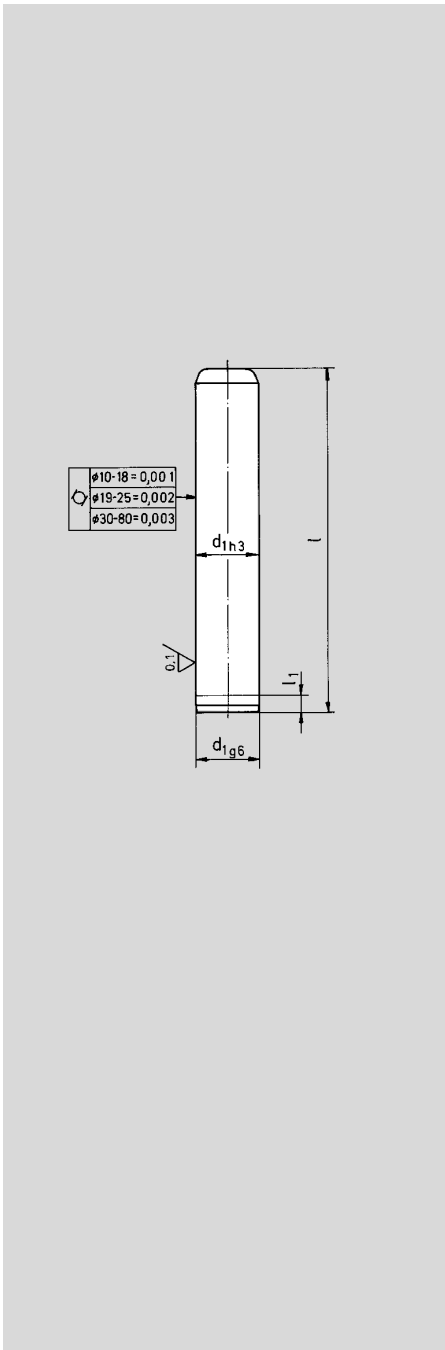
Upon request also available grooved for holding
ring. Please add part number description "with
groove and holding ring ST 7105" to your order.

Order example: Guide pillar **ST 7100**

$d_1 = 25, l = 180$ mm

Add **25 x 180**

Order number **ST 7100.25 x 180**



Add
size to
order number

Order number **ST 7100.** x

d_{1h3}	l	l_1	▲
10	90	4	10 x 090
	100		10 x 100
	112		10 x 112
	125		10 x 125
	140		10 x 140
12	90	4	12 x 090
	100		12 x 100
	112		12 x 112
	125		12 x 125
	140		12 x 140
15	90	5	15 x 090
	100		15 x 100
	112		15 x 112
	125		15 x 125
	140		15 x 140
	160		15 x 160
	180		15 x 180
	200		15 x 200
	224		15 x 224
	250		15 x 250
16	90	5	16 x 090
	100		16 x 100
	112		16 x 112
	125		16 x 125
	140		16 x 140
	160		16 x 160
	180		16 x 180
	200		16 x 200
	224		16 x 224
	250		16 x 250

Add
size to
order number

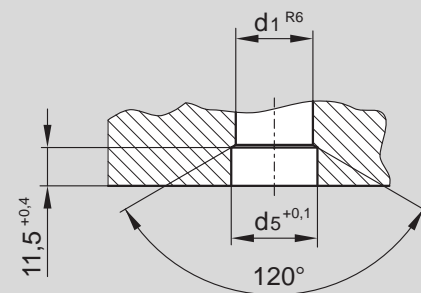
Order number **ST 7100.** x

d_{1h3}	l	l_1	▲
19	100	5	19 x 100
	112		19 x 112
	125		19 x 125
	140		19 x 140
	160		19 x 160
	180		19 x 180
	200		19 x 200
	224		19 x 224
20	250	5	19 x 250
	280		19 x 280
	100		20 x 100
	112		20 x 112
	125		20 x 125
	140		20 x 140
	160		20 x 160
	180		20 x 180
24	200	6	20 x 200
	224		20 x 224
	250		20 x 250
	280		20 x 280
	112		24 x 112
	125		24 x 125
	140		24 x 140
	160		24 x 160
	180		24 x 180
	200		24 x 200
25	224	6	24 x 224
	250		24 x 250
	280		24 x 280
	315		24 x 315
	355		24 x 355
	400		24 x 400
	112		25 x 112
	125		25 x 125
	140		25 x 140
	160		25 x 160
180	25 x 180		

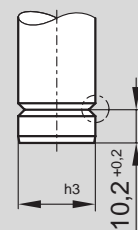
Special lengths: special lengths available upon request. Induction hardened, super-fine ground finish ISO h4, max. lengths according to table:

Diameter	10/12	15/16	19/20	24/25	30/32	38/40	48/50	60/63	80
Max.lengths	200	350	400	500	750	1000	1000	1200	1500

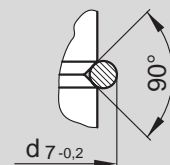
Design for guide pillars with holding ring ST 7105



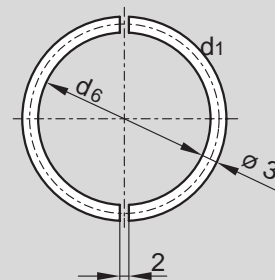
Drawing for guide pillar holding plates



Drawing for guide pillars



Order example: ST 7105.25



d ₁	d ₅	d ₆	d ₇
10	13	7	13
12	15	9	15
15	18	12	18
16	19	13	19
19	22	16	22
20	23	17	23
24	27	21	27
25	28	22	28
30	33	27	33
32	35	29	35
38	41	35	41
40	43	37	43
48	51	45	51
50	53	47	53
60	63	57	63
63	66	60	66
80	83	77	83

Add size to order number

Order number **ST 7100.** x

d _{1h3}	l	l ₁	▲
30	125	7	30 x 125
	140		30 x 140
	160		30 x 160
	180		30 x 180
	200		30 x 200
	224		30 x 224
	250		30 x 250
	280		30 x 280
	315		30 x 315
	355		30 x 355
	400		30 x 400
32	125	7	32 x 125
	140		32 x 140
	160		32 x 160
	180		32 x 180
	200		32 x 200
	224		32 x 224
	250		32 x 250
	280		32 x 280
	315		32 x 315
	355		32 x 355
	400		32 x 400
38	160	7	38 x 160
	180		38 x 180
	200		38 x 200
	224		38 x 224
	250		38 x 250
	280		38 x 280
	315		38 x 315
	355		38 x 355
	400		38 x 400
	450		38 x 450
40	160	7	40 x 160
	180		40 x 180
	200		40 x 200
	224		40 x 224
	250		40 x 250
	280		40 x 280
	315		40 x 315
	355		40 x 355
	400		40 x 400
	450		40 x 450

Add size to order number

Order number **ST 7100.** x

d _{1h3}	l	l ₁	▲
48	180	7	48 x 180
	200		48 x 200
	224		48 x 224
	250		48 x 250
	280		48 x 280
	315		48 x 315
	355		48 x 355
	400		48 x 400
	450		48 x 450
	500		48 x 500
50	180	7	50 x 180
	200		50 x 200
	224		50 x 224
	250		50 x 250
	280		50 x 280
	315		50 x 315
	355		50 x 355
	400		50 x 400
	450		50 x 450
	500		50 x 500
60	180	7	60 x 180
	200		60 x 200
	224		60 x 224
	250		60 x 250
	280		60 x 280
	315		60 x 315
	355		60 x 355
	400		60 x 400
	450		60 x 450
	500		60 x 500
60	224	8	60 x 224
	250		60 x 250
	280		60 x 280
	315		60 x 315
	355		60 x 355
	400		60 x 400
	450		60 x 450
	500		60 x 500
63	224	8	63 x 224
	250		63 x 250
	280		63 x 280
	315		63 x 315
	355		63 x 355
	400		63 x 400
	450		63 x 450
	500		63 x 500
80	280	8	80 x 280
	315		80 x 315
	355		80 x 355
	400		80 x 400
	450		80 x 450
	500		80 x 500

Guide pillars ST 7106 – ST 7108

precision ground for press fitting with internal thread

STEINEL[®]
NORMALIEN



Similar to DIN 9825/ ISO 9182

Material: Steel 1.11221 (Ck 60)
induction hardened, hardness 62-64 HRC

Guide diameter ISO h3 superfinish ground
and microfinished
mounting into mounting-holes ISO R6

Application: Due to the high precision of the
guide pillars ST 710, they are suitable to all
Steinel guide bushes for sliding, ball and roller
guides. Especially in connection with ball cages
ST 7134.

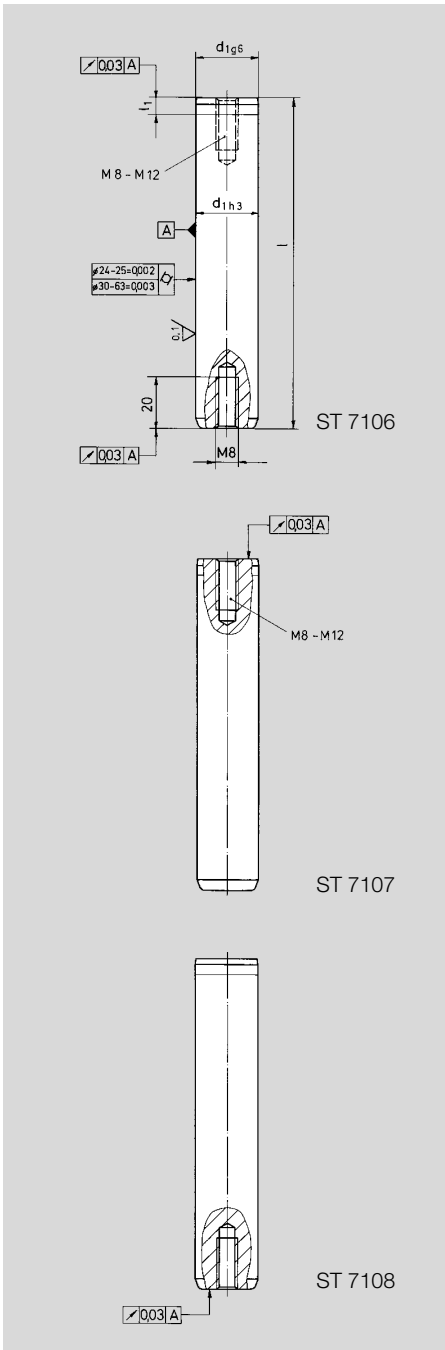
Smooth guide pillars with internal thread are
manufactured in 3 types: guide pillar with
2 internal threads, guide pillar with internal
thread on the press-in side, guide pillar with in-
ternal thread on the guide side.

Order example: Guide pillar **ST 7108**

$d_1 = 25, l = 180$ mm

Add **25 x 180**

Order number **ST 7108.25 x 180**



Internal thread	order number	Add size to
both sides	Order number ST 7106. <input type="checkbox"/> x <input type="checkbox"/>	
press-in side	Order number ST 7107. <input type="checkbox"/> x <input type="checkbox"/>	
guide side	Order number ST 7108. <input type="checkbox"/> x <input type="checkbox"/>	

d_{1h3}	l	l_1	▲
19	100	5	19 x 100
	112		19 x 112
	125		19 x 125
	140		19 x 140
	160		19 x 160
	180		19 x 180
	200		19 x 200
	224		19 x 224
20	250		19 x 250
	280		19 x 280
	100	5	20 x 100
	112		20 x 112
	125		20 x 125
	140		20 x 140
	160		20 x 160
	180		20 x 180
24	200		20 x 200
	224		20 x 224
	250		20 x 250
	280		20 x 280
	112	6	24 x 112
	125		24 x 125
	140		24 x 140
	160		24 x 160
25	180		24 x 180
	200		24 x 200
	224		24 x 224
	250		24 x 250
	280		24 x 280
	315		24 x 315
	355		24 x 355
	400		24 x 400
32	125	7	32 x 125
	140		32 x 140
	160		32 x 160
	180		32 x 180
	200		32 x 200
	224		32 x 224
	250		32 x 250
	280		32 x 280
38	315		32 x 315
	355		32 x 355
	400		32 x 400
	160	7	38 x 160
	180		38 x 180
	200		38 x 200
	224		38 x 224
	250		38 x 250
40	280		38 x 280
	315		38 x 315
	355		38 x 355
	400		38 x 400
	450		38 x 450
	160	7	40 x 160
	180		40 x 180
	200		40 x 200
25	224		40 x 224
	250		40 x 250
	280		40 x 280
	315		40 x 315
	355		40 x 355
	400		40 x 400
	450		40 x 450

thread press-in side

Ø 19 – 32 = M 8

Ø 38 – 50 = M 10

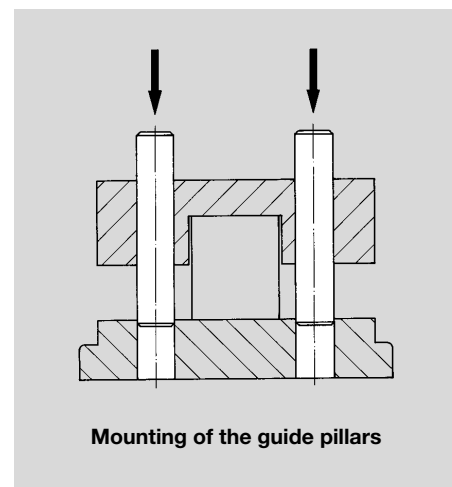
Ø 60 – 80 = M 12

Internal thread	order number	Add size to
both sides	Order number ST 7106. <input type="checkbox"/> x <input type="checkbox"/>	
press-in side	Order number ST 7107. <input type="checkbox"/> x <input type="checkbox"/>	
guide side	Order number ST 7108. <input type="checkbox"/> x <input type="checkbox"/>	

d_{1h3}	l	l_1	▲
30	125	7	30 x 125
	140		30 x 140
	160		30 x 160
	180		30 x 180
	200		30 x 200
	224		30 x 224
	250		30 x 250
	280		30 x 280
32	315		30 x 315
	355		30 x 355
	400		30 x 400
	125	7	32 x 125
	140		32 x 140
	160		32 x 160
	180		32 x 180
	200		32 x 200
38	224		32 x 224
	250		32 x 250
	280		32 x 280
	315		32 x 315
	355		32 x 355
	400		32 x 400
	450		32 x 450
	160	7	38 x 160
40	180		38 x 180
	200		38 x 200
	224		38 x 224
	250		38 x 250
	280		38 x 280
	315		38 x 315
	355		38 x 355
	400		38 x 400
25	450		38 x 450
	160	7	40 x 160
	180		40 x 180
	200		40 x 200
	224		40 x 224
	250		40 x 250
	280		40 x 280
	315		40 x 315
25	355		40 x 355
	400		40 x 400
	450		40 x 450

Special lengths: special lengths available upon request. Induction hardened, super-fine ground finish ISO h4, max. lengths according to table:

Diameter	19/20	24/25	30/32	38/40	48/50	60/63	80
Max.lengths	400	500	750	1000	1000	1200	1500



Mounting of the guide pillars

Internal thread	Order number	Add size to
both sides	Order number ST 7106.	<input type="checkbox"/> x <input type="checkbox"/>
press-in side	Order number ST 7107.	<input type="checkbox"/> x <input type="checkbox"/>
guide side	Order number ST 7108.	<input type="checkbox"/> x <input type="checkbox"/>

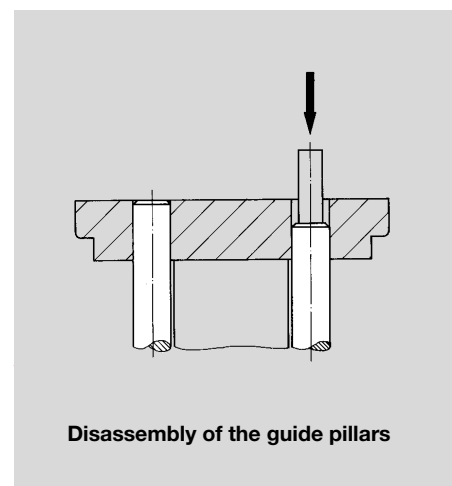
d _{1h3}	l	l ₁	▲
48	180	7	48 x 180
	200		48 x 200
	224		48 x 224
	250		48 x 250
	280		48 x 280
	315		48 x 315
	355		48 x 355
	400		48 x 400
	450		48 x 450
500	48 x 500		
50	180	7	50 x 180
	200		50 x 200
	224		50 x 224
	250		50 x 250
	280		50 x 280
	315		50 x 315
	355		50 x 355
	400		50 x 400
	450		50 x 450
500	50 x 500		

Internal thread	Order number	Add size to
both sides	Order number ST 7106.	<input type="checkbox"/> x <input type="checkbox"/>
press-in side	Order number ST 7107.	<input type="checkbox"/> x <input type="checkbox"/>
guide side	Order number ST 7108.	<input type="checkbox"/> x <input type="checkbox"/>

d _{1h3}	l	l ₁	▲
60	224	8	60 x 224
	250		60 x 250
	280		60 x 280
	315		60 x 315
	355		60 x 355
	400		60 x 400
63	224	8	63 x 224
	250		63 x 250
	280		63 x 280
	315		63 x 315
	355		63 x 355
	400		63 x 400
80	280	8	80 x 280
	315		80 x 315
	355		80 x 355
	400		80 x 400
	450		80 x 450
	500		80 x 500

Mounting of the guide pillars

Before inserting the pillars into the upper plate, clean the holes thoroughly and oil lightly (no grease). Do the same with the holes in the lower plate. Put parallel bars between upper and lower plate. Drive the pillars about 3 mm into the lower plate (use rubber mallet). Complete the press fit of the pillars using a hydraulic or hand screw press (once pillar fit ISO h3 and hole fit ISO R6 is achieved the press fit is guaranteed).



Disassembly of the guide pillars

Disassembly of the guide pillars

Always press out towards the top of the lower plate, never press out towards the bottom, because the high surface quality could then be destroyed.

Guide pillars ST 7117

with middle mount shoulder

STEINEL[®]
NORMALIEN



Material:

steel 1.1221 (Ck 60) induction hardened,
hardness 62 – 64 HRC

Guide diameter ISO h3 super-fine ground finish
Mounting diameter ISO js4
Mount into mounting hole ISO H6

Application: Guide pillars with middle mount shoulder are matchable to all Steinel guide bushes for sliding and ball guides.

The pillars with middle mount shoulder improve the side load capacity of tools using guide plate.

Due to the mid-point fastening of the pillars on the guide plate, they have only half the length of application point of force as conventionally mounted pillars. These pillars consequently have eight fold increase in loading capacity.

On pillar diameters of 32 or greater there is a free bore with these to reduce changes in weight of the moving mass.

Order example: Guide pillar **ST 7117**

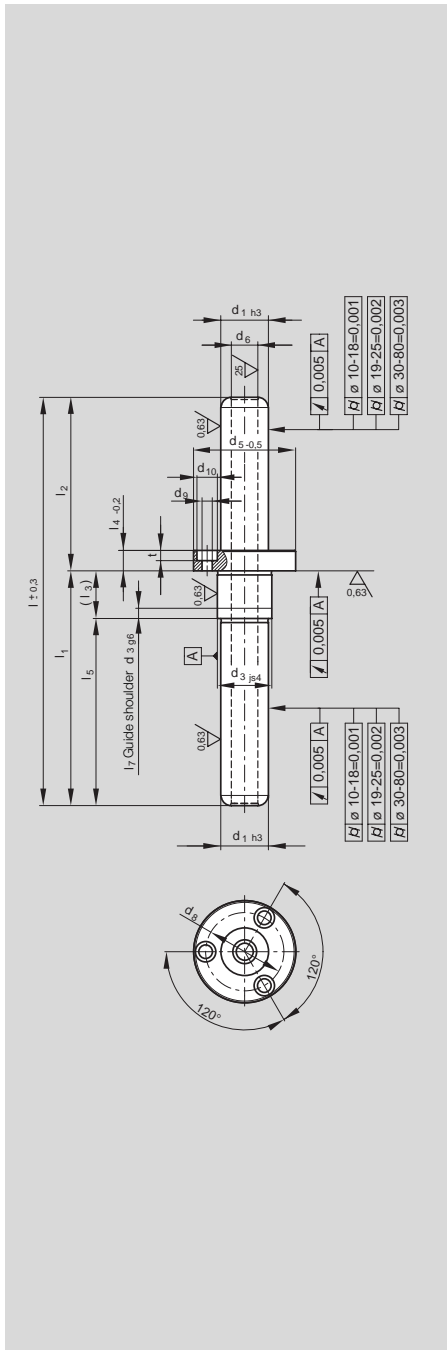
with middle mount shoulder
d₁ = 25, l₁ = 110 mm, l₂ = 90 mm
Add **25 x 110 x 090**

Order number **ST 7117.25 x 110 x 090**

Add size to order number

Order number **ST 7117.**

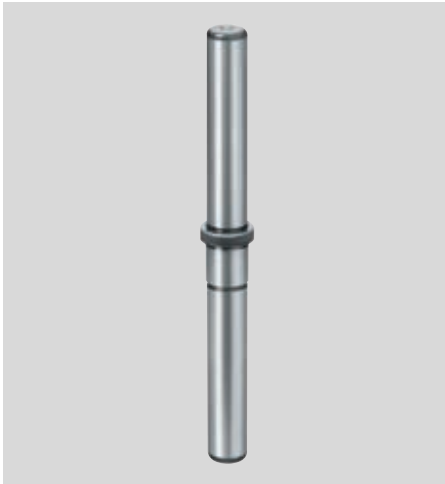
x x



d _{1h3}	d _{3js4}	d ₅	d ₆	d ₈	d ₉	d ₁₀	l	l ₁	l ₂	l ₃	l ₄	l ₅	l ₇	t	▲
12	13	28	-	20	3.4	6	90	50	40	12	6	38	4	3.4	12 x 050 x 040
							100	60	40			48			12 x 060 x 040
							110	60	50			48			12 x 060 x 050
							120	70	50			58			12 x 070 x 050
							130	70	60			58			12 x 070 x 060
							140	70	70			58			12 x 070 x 070
							*200	100	100			88			12 x 100 x 100
16	18	38	-	28	4.5	8	140	80	60	16	8	64	5	4.6	16 x 080 x 060
							150	90	60			74			16 x 090 x 060
							160	90	70			74			16 x 090 x 070
							170	100	70			84			16 x 100 x 070
							180	100	80			84			16 x 100 x 080
							190	100	90			84			16 x 100 x 090
							*270	140	130			124			16 x 140 x 130
19	22	42	-	32	4.5	8	160	90	70	20	8	70	5	4.6	19 x 090 x 070
							170	100	70			80			19 x 100 x 070
							180	100	80			80			19 x 100 x 080
							190	110	80			90			19 x 110 x 080
							200	110	90			90			19 x 110 x 090
							210	110	100			90			19 x 110 x 100
							*310	160	150			140			19 x 160 x 150
25	26	48	-	38	4.5	8	180	100	80	22	8	78	6	4.6	25 x 100 x 080
							190	110	80			88			25 x 110 x 080
							200	110	90			88			25 x 110 x 090
							210	120	90			98			25 x 120 x 090
							220	120	100			98			25 x 120 x 100
							230	120	110			98			25 x 120 x 110
							*330	170	160			148			25 x 170 x 160
32	34	60	20	48	5.5	10	180	100	80	25	10	75	7	5.7	32 x 100 x 080
							190	110	80			85			32 x 110 x 080
							200	110	90			85			32 x 110 x 090
							210	120	90			95			32 x 120 x 090
							220	120	100			95			32 x 120 x 100
							230	130	100			105			32 x 130 x 100
							240	130	110			105			32 x 130 x 110
							250	140	110			115			32 x 140 x 110
							*350	190	160			165			32 x 190 x 160
40	42	70	20	56	6.6	11	200	110	90	27	12	83	7	6.8	40 x 110 x 090
							210	120	90			93			40 x 120 x 090
							220	120	100			93			40 x 120 x 100
							230	130	100			103			40 x 130 x 100
							240	130	110			103			40 x 130 x 110
							250	140	110			113			40 x 140 x 110
							260	140	120			113			40 x 140 x 120
							*380	200	180			173			40 x 200 x 180
50	52	80	20	66	6.6	11	260	150	110	37	15	113	7	6.8	50 x 150 x 110
							280	160	120			123			50 x 160 x 120
							300	170	130			133			50 x 170 x 130
							320	180	140			143			50 x 180 x 140
							360	200	160			163			50 x 200 x 160
							400	220	180			183			50 x 220 x 180
							*520	280	240			243			50 x 280 x 240

Guide pillars ST 7118

with small middle mount shoulder



Material:

steel 1.1221 (Ck 60) induction hardened,
hardness 62 – 64 HRC

Guide diameter ISO h3 super-fine ground finish
Mounting diameter ISO js4
Mount into mounting hole ISO H6

Guide pillars with small middle mount
Shoulder are secured with three holding
clamps ST 7367 (included).

Order example: Guide pillar **ST 7118**

with middle mount shoulder
 $d_1 = 25$, $l_1 = 110$ mm, $l_2 = 90$ mm

Add **25 x 110 x 090**

Order number **ST 7118.25 x 110 x 090**

Application: Guide pillars with middle mount
shoulder are matchable to all Steinel guide
bushes for sliding and ball guides.

The pillars with middle mount shoulder improve
the side load capacity of tools using guide plate.

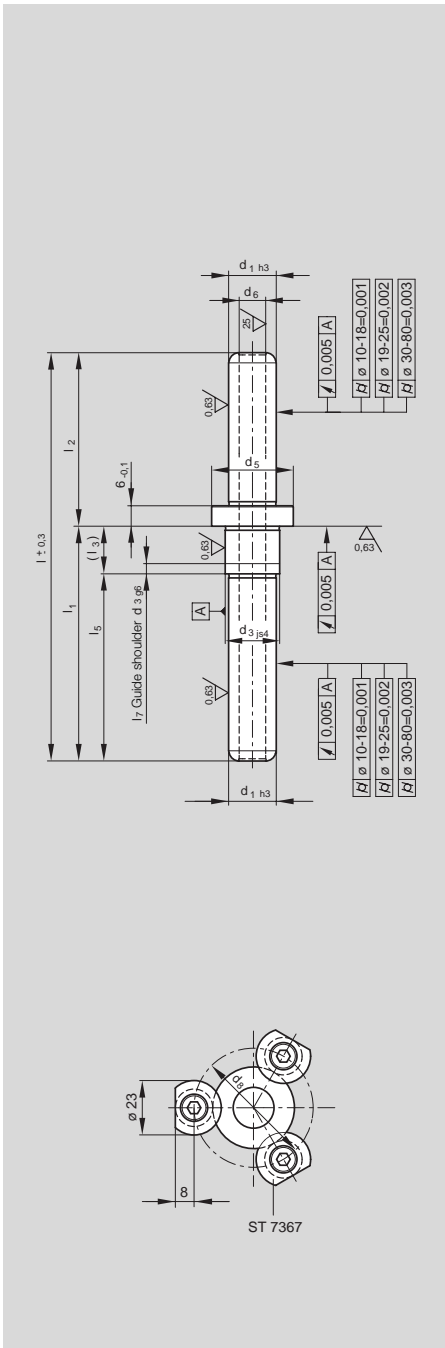
Due to the mid-point fastening of the pillars on
the guide plate, they have only half the length of
application point of force as conventionally
mounted pillars. These pillars consequently have
eight fold increase in loading capacity.

On pillar diameters of 32 or greater there is a
free bore within these to reduce changes in
weight of the moving mass.

Add
size to
order number

Order number **ST 7118.**

x x



d_{1h3}	d_{3js4}	d_5	d_6	d_8	l	l_1	l_2	l_3	l_5	l_7	▲
12	13	18	-	35	90	50	40	12	38	4	12 x 050 x 040
					100	60	40	48	12 x 060 x 040		
					110	60	50	48	12 x 060 x 050		
					120	70	50	58	12 x 070 x 050		
					130	70	60	58	12 x 070 x 060		
					140	70	70	58	12 x 070 x 070		
					*200	100	100	88	12 x 100 x 100		
16	17	22	-	39	140	80	60	16	64	5	16 x 080 x 060
					150	90	60	74	16 x 090 x 060		
					160	90	70	74	16 x 090 x 070		
					170	100	70	84	16 x 100 x 070		
					180	100	80	84	16 x 100 x 080		
					190	100	90	84	16 x 100 x 090		
					*270	140	130	124	16 x 140 x 130		
19	20	25	-	42	160	90	70	20	70	5	19 x 090 x 070
					170	100	70	80	19 x 100 x 070		
					180	100	80	80	19 x 100 x 080		
					190	110	80	90	19 x 110 x 080		
					200	110	90	90	19 x 110 x 090		
					210	110	100	90	19 x 110 x 100		
					*310	160	150	140	19 x 160 x 150		
25	26	32	-	49	180	100	80	22	78	6	25 x 100 x 080
					190	110	80	88	25 x 110 x 080		
					200	110	90	88	25 x 110 x 090		
					210	120	90	98	25 x 120 x 090		
					220	120	100	98	25 x 120 x 100		
					230	120	110	98	25 x 120 x 110		
					*330	170	160	148	25 x 170 x 160		
32	33	40	20	57	180	100	80	25	75	7	32 x 100 x 080
					190	110	80	85	32 x 110 x 080		
					200	110	90	85	32 x 110 x 090		
					210	120	90	95	32 x 120 x 090		
					220	120	100	95	32 x 120 x 100		
					230	130	100	105	32 x 130 x 100		
					240	130	110	105	32 x 130 x 110		
250	140	110	115	32 x 140 x 110							
*350	190	160	165	32 x 190 x 160							
40	41	50	20	67	200	110	90	27	83	7	40 x 110 x 090
					210	120	90	93	40 x 120 x 090		
					220	120	100	93	40 x 120 x 100		
					230	130	100	103	40 x 130 x 100		
					240	130	110	103	40 x 130 x 110		
					250	140	110	113	40 x 140 x 110		
					260	140	120	113	40 x 140 x 120		
*380	200	180	173	40 x 200 x 180							
50	51	63	20	80	260	150	110	37	113	7	50 x 150 x 110
					280	160	120	123	50 x 160 x 120		
					300	170	130	133	50 x 170 x 130		
					320	180	140	143	50 x 180 x 140		
					360	200	160	163	50 x 200 x 160		
					400	220	180	183	50 x 220 x 180		
					*520	280	240	243	50 x 280 x 240		

Guide pillars ST 7120, ST 7126 with shoulder



ST 7120



ST 7126

Made of solid material

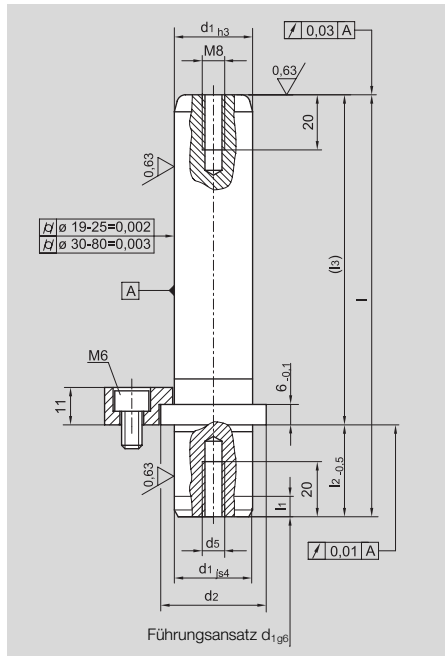
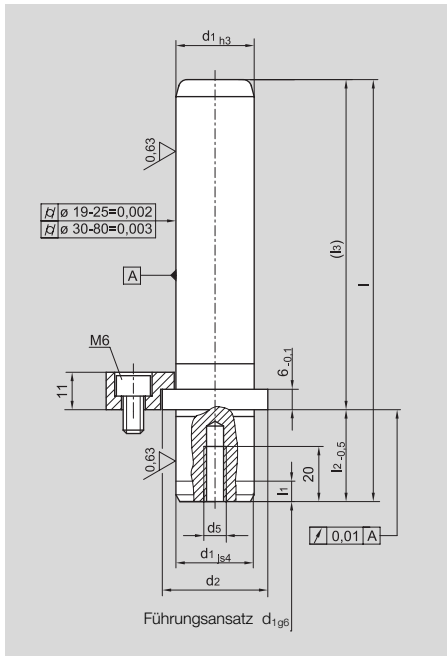
DIN 9825/ISO 9182

Material: Steel 1.11221 (Ck 60)
induction hardened, hardness 62-64 HRC

Guide diameter ISO h3 super-fine ground finish
Mounting diameter ISO js4
Mounting into mounting holes ISO H6

Guide pillars with shoulder enable an easy and quick assembly and disassembly of the pillars, as for example in the case where you wish to sharpen cutting tools with a surface grinder.

Guide pillars with shoulder are secured with three holding clamps ST 7367 (included). **(Fig. 1)**



Alternative the guide pillars can be fixed with the holding disc (Fig. 2) ST 7387 (order separately).

Application: Guide pillars with shoulder are suitable to all Steinel guide bushes for sliding, ball and roller guides.

Order example: Guide pillar **ST 7120** with shoulder
 $d_1 = 19$, $l_3 = 140$ mm, $l = 163$ mm
Add **19 x 140 x 163**
Order number **ST 7120.19 x 140 x 163**

Order example: Guide pillar **ST 7126** with shoulder and 2 internal threads
 $d_1 = 24$, $l_3 = 200$ mm, $l = 227$ mm
Add **24 x 200 x 227**
Order number **ST 7126.24 x 200 x 227**

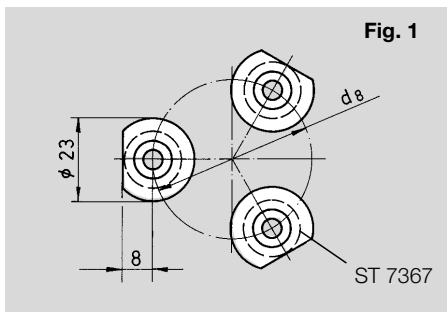


Fig. 1

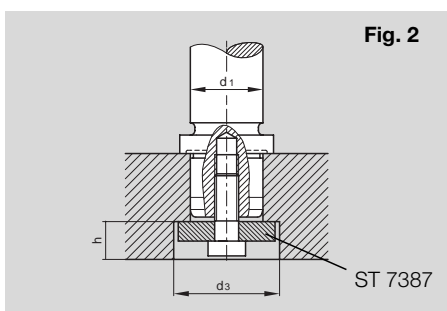
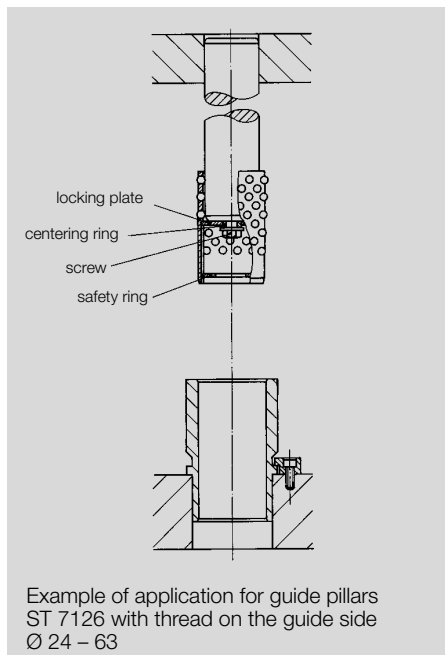
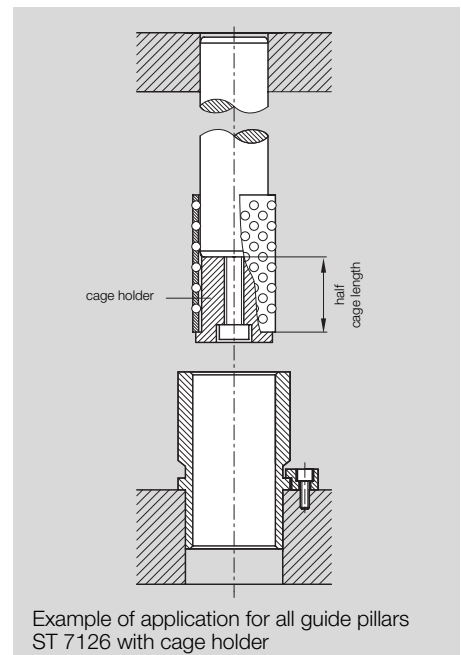


Fig. 2



Example of application for guide pillars ST 7126 with thread on the guide side $\text{Ø } 24 - 63$



Example of application for all guide pillars ST 7126 with cage holder

Guide pillars ST 7120, ST 7126

with shoulder

Add
size to
order number

Add
size to
order number

ST 7120. □ x □ x □																
ST 7126. □ x □ x □																
d _{1h3} *)	d ₂	d ₅	d ₈	l	l ₁	l _{2-0,5}	l ₃₋₁	▲								
15	21	M8	38	110	5	20	90	15 x 090 x 110								
				120				15 x 100 x 120								
				132				15 x 112 x 132								
				145				15 x 125 x 145								
				160				15 x 140 x 160								
				180				15 x 160 x 180								
				200				15 x 180 x 200								
				220				15 x 200 x 220								
				16				21	M8	38	110	5	20	90	16 x 090 x 110	
											120				16 x 100 x 120	
132	16 x 112 x 132															
145	16 x 125 x 145															
160	16 x 140 x 160															
180	16 x 160 x 180															
200	16 x 180 x 200															
220	16 x 200 x 220															
19	25	M8	42		123	5	23				100				19 x 100 x 123	
					135										19 x 112 x 135	
				148	19 x 125 x 148											
				163	19 x 140 x 163											
				183	19 x 160 x 183											
				203	19 x 180 x 203											
				223	19 x 200 x 223											
				247	19 x 224 x 247											
				273	19 x 250 x 273											
				20	25			M8	42	123		5	23	100	20 x 100 x 123	
135	20 x 112 x 135															
148	20 x 125 x 148															
163	20 x 140 x 163															
183	20 x 160 x 183															
203	20 x 180 x 203															
223	20 x 200 x 223															
247	20 x 224 x 247															
273	20 x 250 x 273															
24	32	M8	49			127	6			27	100				24 x 100 x 127	
				139	24 x 112 x 139											
				152	24 x 125 x 152											
				167	24 x 140 x 167											
				187	24 x 160 x 187											
				207	24 x 180 x 207											
				227	24 x 200 x 227											
				251	24 x 224 x 251											
				277	24 x 250 x 277											
				307	24 x 280 x 307											
342	24 x 315 x 342															
25	32	M8	49	127	6	27	100	25 x 100 x 127								
				139				25 x 112 x 139								
				152				25 x 125 x 152								
				167				25 x 140 x 167								
				187				25 x 160 x 187								
				207				25 x 180 x 207								
				227				25 x 200 x 227								
				251				25 x 224 x 251								
				277				25 x 250 x 277								
				307				25 x 280 x 307								
342	25 x 315 x 342															
30	40	M8	57	149	7	37	112	30 x 112 x 149								
				162				30 x 125 x 162								
				177				30 x 140 x 177								
				197				30 x 160 x 197								
				217				30 x 180 x 217								
				237				30 x 200 x 237								
				261				30 x 224 x 261								
				287				30 x 250 x 287								
				317				30 x 280 x 317								
				352				30 x 315 x 352								
392	30 x 355 x 392															
32	40	M8	57	149	7	37	112	32 x 112 x 149								
				162				32 x 125 x 162								
				177				32 x 140 x 177								
				197				32 x 160 x 197								
				217				32 x 180 x 217								
				237				32 x 200 x 237								
				261				32 x 224 x 261								
				287				32 x 250 x 287								
				317				32 x 280 x 317								
				352				32 x 315 x 352								
392	32 x 355 x 392															

ST 7120. □ x □ x □																
ST 7126. □ x □ x □																
d _{1h3} *)	d ₂	d ₅	d ₈	l	l ₁	l _{2-0,5}	l ₃₋₁	▲								
38	50	M10	67	162	7	37	125	38 x 125 x 162								
				177				38 x 140 x 177								
				197				38 x 160 x 197								
				217				38 x 180 x 217								
				237				38 x 200 x 237								
				261				38 x 224 x 261								
				287				38 x 250 x 287								
				317				38 x 280 x 317								
				352				38 x 315 x 352								
				392				38 x 355 x 392								
437	38 x 400 x 437															
40	50	M10	67	162	7	37	125	40 x 125 x 162								
				177				40 x 140 x 177								
				197				40 x 160 x 197								
				217				40 x 180 x 217								
				237				40 x 200 x 237								
				261				40 x 224 x 261								
				287				40 x 250 x 287								
				317				40 x 280 x 317								
				352				40 x 315 x 352								
				392				40 x 355 x 392								
437	40 x 400 x 437															
48	63	M10	80	187	7	47	140	48 x 140 x 187								
				207				48 x 160 x 207								
				227				48 x 180 x 227								
				247				48 x 200 x 247								
				271				48 x 224 x 271								
				297				48 x 250 x 297								
				327				48 x 280 x 327								
				362				48 x 315 x 362								
				402				48 x 355 x 402								
				447				48 x 400 x 447								
497	48 x 450 x 497															
50	63	M10	80	187	7	47	140	50 x 140 x 187								
				207				50 x 160 x 207								
				227				50 x 180 x 227								
				247				50 x 200 x 247								
				271				50 x 224 x 271								
				297				50 x 250 x 297								
				327				50 x 280 x 327								
				362				50 x 315 x 362								
				402				50 x 355 x 402								
				447				50 x 400 x 447								
497	50 x 450 x 497															
60	80	M12	97	247	8	47	200	60 x 200 x 247								
				271				60 x 224 x 271								
				297				60 x 250 x 297								
				327				60 x 280 x 327								
				362				60 x 315 x 362								
				402				60 x 355 x 402								
				447				60 x 400 x 447								
				497				60 x 450 x 497								
				63				80	M12	97	247	8	47	200	63 x 200 x 247	
											271				63 x 224 x 271	
297	63 x 250 x 297															
327	63 x 280 x 327															
362	63 x 315 x 362															
402	63 x 355 x 402															
447	63 x 400 x 447															
497	63 x 450 x 497															
80	95	M12	112		310	8	60				250				80 x 250 x 310	
					340										80 x 280 x 340	
				375	80 x 315 x 375											
				415	80 x 355 x 415											
				460	80 x 400 x 460											
				510	80 x 450 x 510											
				560	80 x 500 x 560											

*) guide diameter d_{1h3}
mounting diameter d_{1js4}

Quick-change guide pillars ST 7181

with disc and screw

STEINEL[®]
NORMALIEN



Material: steel 1.1221 (Ck 60)
induction hardened, hardness 62 – 64 HRC

DIN 9825/ISO 9182

Guide diameter ISO h3 super-fine ground finish, taper shank ground, complete with disc SZ 7368 and cylindrical screw with hexagonal recessed hole SZ 8512.

Application: Quick-change guide pillars with taper shank enable a quick exchange of pillars. Where the pillars often have to be removed in order to sharpen the die, the working time of the tool make is drastically reduced by the use of quick-change guide pillars.

The hardened and precision ground taper of the guide pillar guarantees the perfect remounting into the same position. Mismatch and angle error are not occurring. The light taper in connection with disc and screw ensure the absolutely fixe chucking of the pillars.

Quick-change guide pillars are suitable to all Steinel guide bushes for slide, ball and roller guide.

Upon request all Steinel die-sets can be furnished with quick-change guide pillars and holding bushings.

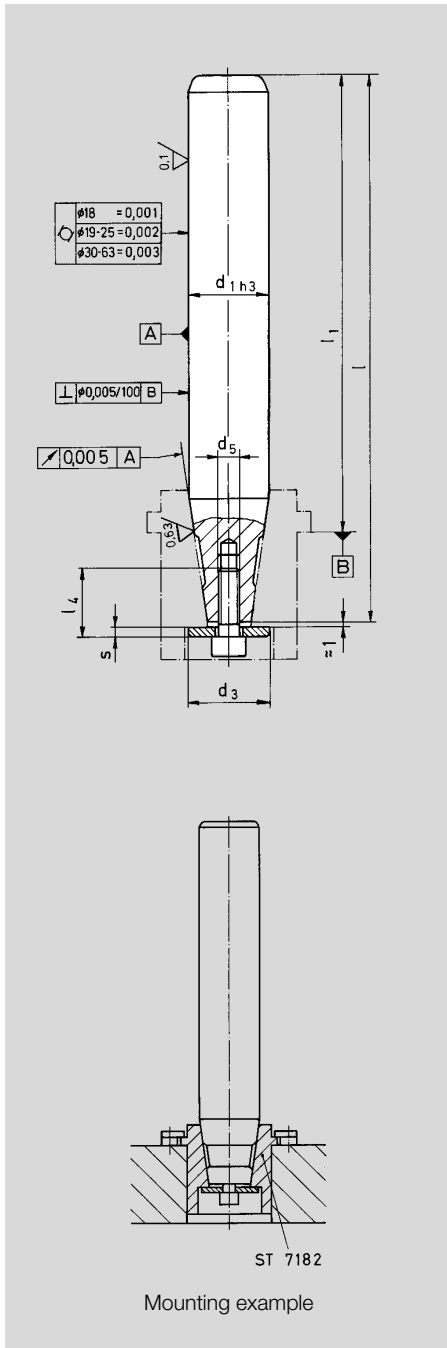
Matching holding bushes: ST 7182

Order example: quick change guide pillar **ST 7181**

$d_1 = 30, l_1 = 200 \text{ mm}, l = 226 \text{ mm}$

Add **30 x 200 x 226**

Order number **ST 7181.30 x 200 x 226**



Order number **ST 7181.** x x Add size to order number

d_{1h3}	d_3	d_5	s	l	l_1	l_4	▲
19	18	M5	4	130.4	112	16	19 x 112 x 130
				143.4	125		19 x 125 x 143
				158.4	140		19 x 140 x 158
				178.4	160		19 x 160 x 178
				198.4	180		19 x 180 x 198
20	18	M5	4	130.4	112	16	20 x 112 x 130
				143.4	125		20 x 125 x 143
				158.4	140		20 x 140 x 158
				178.4	160		20 x 160 x 178
				198.4	180		20 x 180 x 198
24	24	M6	5	151.4	125	20	24 x 125 x 151
				166.4	140		24 x 140 x 166
				186.4	160		24 x 160 x 186
				206.4	180		24 x 180 x 206
				226.4	200		24 x 200 x 226
				250.4	224		24 x 224 x 250
				276.4	250		24 x 250 x 276
25	24	M6	5	151.4	125	20	25 x 125 x 151
				166.4	140		25 x 140 x 166
				186.4	160		25 x 160 x 186
				206.4	180		25 x 180 x 206
				226.4	200		25 x 200 x 226
				250.4	224		25 x 224 x 250
				276.4	250		25 x 250 x 276
30	30	M6	5	151.4	125	20	30 x 125 x 151
				166.4	140		30 x 140 x 166
				186.4	160		30 x 160 x 186
				206.4	180		30 x 180 x 206
				226.4	200		30 x 200 x 226
				250.4	224		30 x 224 x 250
				276.4	250		30 x 250 x 276
				306.4	280		30 x 280 x 306
32	30	M6	5	151.4	125	20	32 x 125 x 151
				166.4	140		32 x 140 x 166
				186.4	160		32 x 160 x 186
				206.4	180		32 x 180 x 206
				226.4	200		32 x 200 x 226
				250.4	224		32 x 224 x 250
				276.4	250		32 x 250 x 276
				306.4	280		32 x 280 x 306

Order number **ST 7181.** x x Add size to order number

d_{1h3}	d_3	d_5	s	l	l_1	l_4	▲
38	40	M8	6	174.4	140	25	38 x 140 x 174
				194.4	160		38 x 160 x 194
				214.4	180		38 x 180 x 214
				234.4	200		38 x 200 x 234
				258.4	224		38 x 224 x 258
				284.4	250		38 x 250 x 284
				314.4	280		38 x 280 x 314
40	40	M8	6	174.4	140	25	40 x 140 x 174
				194.4	160		40 x 160 x 194
				214.4	180		40 x 180 x 214
				234.4	200		40 x 200 x 234
				258.4	224		40 x 224 x 258
				284.4	250		40 x 250 x 284
				314.4	280		40 x 280 x 314
48	50	M10	6	192.3	160	30	48 x 160 x 192
				212.3	180		48 x 180 x 212
				232.3	200		48 x 200 x 232
				256.3	224		48 x 224 x 256
				282.3	250		48 x 250 x 282
				312.3	280		48 x 280 x 312
				347.3	315		48 x 315 x 347
50	50	M10	6	192.3	160	30	50 x 160 x 192
				212.3	180		50 x 180 x 212
				232.3	200		50 x 200 x 232
				256.3	224		50 x 224 x 256
				282.3	250		50 x 250 x 282
				312.3	280		50 x 280 x 312
				347.3	315		50 x 315 x 347
60	56	M12	6	229.8	180	30	60 x 180 x 230
				249.8	200		60 x 200 x 250
				273.8	224		60 x 224 x 274
				299.8	250		60 x 250 x 300
				329.8	280		60 x 280 x 330
				364.8	315		60 x 315 x 365
				404.8	355		60 x 355 x 405
63	56	M12	6	229.8	180	30	63 x 180 x 230
				249.8	200		63 x 200 x 250
				273.8	224		63 x 224 x 274
				299.8	250		63 x 250 x 300
				329.8	280		63 x 280 x 330
				364.8	315		63 x 315 x 365
				404.8	355		63 x 355 x 405

Pillar holding bushes ST 7182

with holding clamps



Material:
steel 1.7131 (16 Mn Cr 5) case hardened,
hardness 58 – 60 HRC
inside taper ground
mounting diameter ISO j6, ground

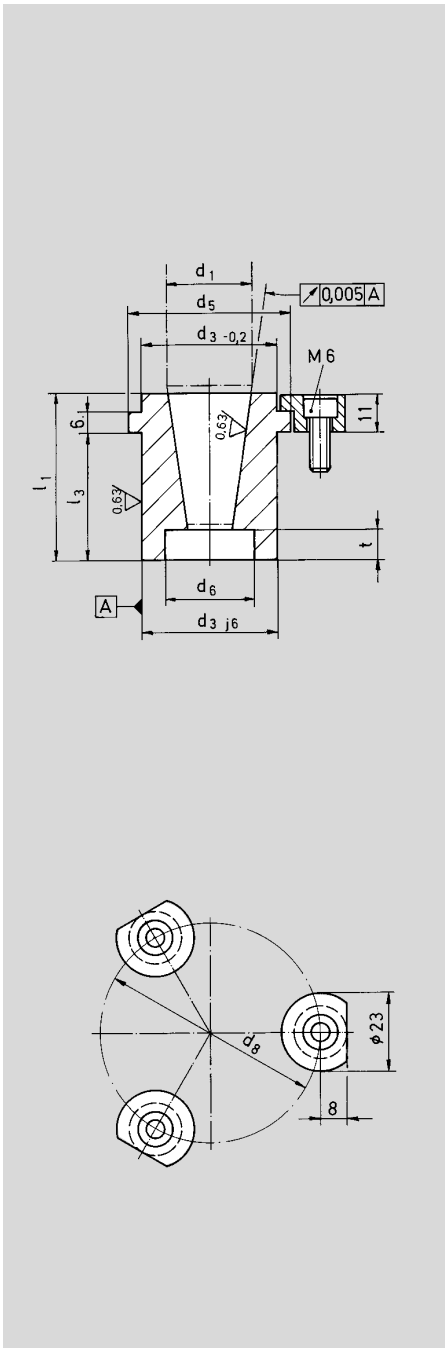
Suitable to quick-change guide pillars ST 7181

Mounting instructions:
Mount into mounting hole ISO H6, secured with
3 holding clamps ST 7367 (included).
Mounting diameter d3 corresponds with
diameter of guide bushes with flange ST 742,
and with shoulder ST 741.
Advantage: same mounting holes in all plates.

Holding clamps:
when reordering the holding clamps,
please indicate 1 set = 3 pieces
Order number ST 7367

Order example: Pillar holding bushes **ST 7182**
d₁ = 24 bzw. 25, l₃ = 37 mm
Add **25 x 37**
Order number **ST 7182.25 x 37**

DIN 9825/ISO 9182



Order number **ST 7182.**

Add
size to
order number

x

d _{1h3}	d _{3j6}	d ₅	d ₆	d ₈	l ₁	l ₃	t	▲
19 and 20	32	40	20	59	39 49	27 37	7.5 17.5	20 x 27 20 x 37
24 and 25	40	48	26	65	49 59	37 47	9 19	25 x 37 25 x 47
30 and 32	48	56	32	73	52 62	37 47	9 19	32 x 37 32 x 47
38 and 40	58	66	42	83	62 72	47 57	11 21	40 x 47 40 x 57
48 and 50	70	80	52	97	65 75	47 57	13 23	50 x 47 50 x 57
60 and 63	85	95	58	112	85 95	67 77	15 25	63 x 67 63 x 77

Guide pillars ST 7111, ST 7112

with head, with or without oil grooves

STEINEL[®]
NORMALIEN



Material:

steel 1.1221 (Ck 60) induction hardened,
hardness 62 – 64 HRC

Guide diameter ISO h6, super-fine ground
finish, mounting into mounting hole ISO N7
(press fit) or ISO H7, if pillars are secured against
glide out.

similar to ISO 9182

Matching Guide bushes:

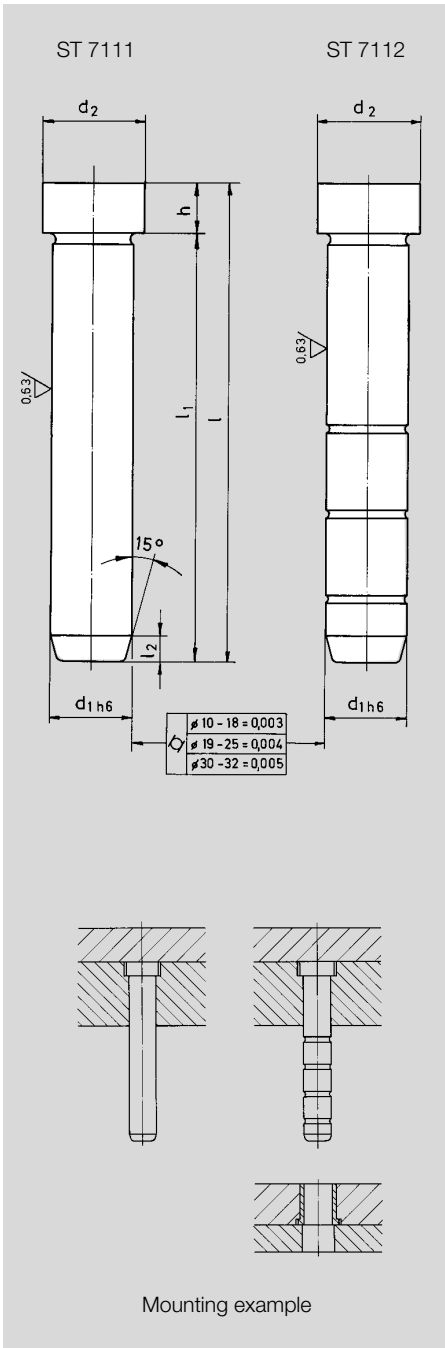
ST 7366, ST 7360

Order example: Guide pillar **ST 7112**

with head and oil grooves,
 $d_1 = 15$, $l_1 = 100$ mm

Add **15 x 100**

Order number **ST 7112.15 x 100**



							Add size to order number
without oil grooves							ST 7111. □ x □
with oil grooves							ST 7112. □ x □

d_{1h6}	$d_{2-0,5}$	l	l_1	l_2	$h_{0,3}$	▲
10	14	66	60	5	6	10 x 060
		86	80			10 x 080
		106	100			10 x 100
		131	125			10 x 125
12	16	66	60	5	6	12 x 060
		86	80			12 x 080
		106	100			12 x 100
		131	125			12 x 125
15	20	88	80	7	8	15 x 080
		108	100			15 x 100
		133	125			15 x 125
		168	160			15 x 160
16	20	208	200	8	8	15 x 200
		88	80			16 x 080
		108	100			16 x 100
		133	125			16 x 125
19	24	168	160	8	8	16 x 160
		208	200			16 x 200
		88	80			19 x 080
		108	100			19 x 100
19	24	133	125	9	15	19 x 125
		168	160			19 x 160
		188	180			19 x 180
		228	220			19 x 220

							Add size to order number
without oil grooves							ST 7111. □ x □
with oil grooves							ST 7112. □ x □

d_{1h6}	$d_{2-0,5}$	l	l_1	l_2	$h_{0,3}$	▲
20	24	88	80	8	8	20 x 080
		108	100			20 x 100
		133	125			20 x 125
		168	160			20 x 160
24	30	188	180	15	15	20 x 180
		228	220			20 x 220
		115	100			24 x 100
		140	125			24 x 125
24	30	175	160	8	15	24 x 160
		215	200			24 x 200
		255	240			24 x 240
		115	100			25 x 100
25	30	140	125	8	15	25 x 125
		175	160			25 x 160
		215	200			25 x 200
		255	240			25 x 240
30	36	155	140	9	15	30 x 140
		195	180			30 x 180
		235	220			30 x 220
		275	260			30 x 260
32	36	155	140	9	15	32 x 140
		195	180			32 x 180
		235	220			32 x 220
		275	260			32 x 260

Mounting example

Guide bushes ST 7366; ST 7360

with collar



ST 7366

Steel sliding guide ST 7366

Material:
steel 1.7131 (16 Mn Cr 5) case hardened,
hardness 60 – 62 HRC

Guide diameter ISO H7, ground
Mounting diameter ISO k6, ground
Mount into mounting hole ISO H7

Order example: Guide bush **ST 7366**
with shoulder, steel sliding guide
 $d_2 = 16, d_1 = 10, l = 12$ mm
Add **16.10 x 012**
Order number **ST 7366.16.10 x 012**

Matching Guide pillars:
ST 7111, ST 7112

similar to DIN 16716/ISO 8018



ST 7360

Sliding guide with solid lubricants ST 7360

Material:
solid bronze

Order example: Guide bush **ST 7360**
with shoulder, sliding guide solid bronze
 $d_2 = 16, d_1 = 10, l = 12$ mm
Add **16.10 x 012**
Order number **ST 7360.16.10 x 012**

Steel sliding guide Add size to order number
Order number **ST 7366.** . x

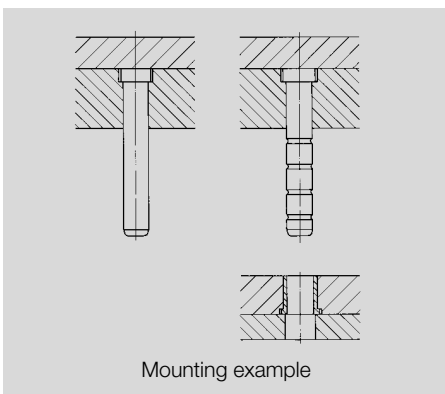
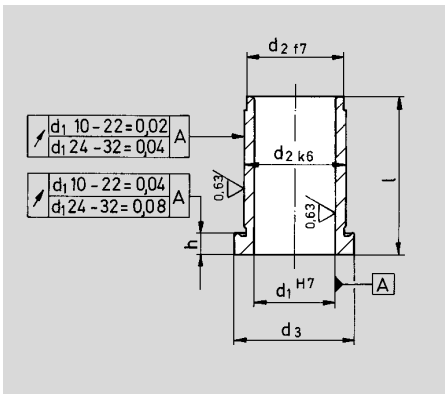
Steel sliding guide Add size to order number
Order number **ST 7366.** . x

Sliding guide solid bronze Add size to order number
Order number **ST 7360.** . x

Sliding guide solid bronze Add size to order number
Order number **ST 7360.** . x

d_1^{H7}	d_{2k6}	$d_{3-0,5}$	$h_{-0,1}$	l	▲
10	16	20	3.5	12	16.10 x 012
				17	16.10 x 017
				22	16.10 x 022
				27	16.10 x 027
				36	16.10 x 036
12	16	20	3.5	12	16.12 x 012
				17	16.12 x 017
				22	16.12 x 022
				27	16.12 x 027
				36	16.12 x 036
15	20	25	6	17	20.15 x 017
				22	20.15 x 022
				27	20.15 x 027
				36	20.15 x 036
				46	20.15 x 046
16	20	25	6	17	20.16 x 017
				22	20.16 x 022
				27	20.16 x 027
				36	20.16 x 036
				46	20.16 x 046
19	26	31	6	22	26.19 x 022
				27	26.19 x 027
				36	26.19 x 036
				46	26.19 x 046

d_1^{H7}	d_{2k6}	$d_{3-0,5}$	$h_{-0,1}$	l	▲
20	26	31	6	22	26.20 x 022
				27	26.20 x 027
				36	26.20 x 036
				46	26.20 x 046
24	30	35	6	27	30.24 x 027
				36	30.24 x 036
				46	30.24 x 046
25	30	35	6	27	30.25 x 027
				36	30.25 x 036
				46	30.25 x 046
30	40	46	6	36	40.30 x 036
				46	40.30 x 046
				56	40.30 x 056
32	40	46	6	36	40.32 x 036
				46	40.32 x 046
				56	40.32 x 056



Mounting example

Guide pillars ST 7160

for large tools

STEINEL[®]
NORMALIEN



DIN 9833/ISO 9182

Material:

steel 1.7139 (16 Mn CrS 5)
or 1.1221 (Ck 60)
hardness 62 – 64 HRC

Guide diameter ISO g6, super-fine ground finish
Mounting diameter ISO r6
Mount into mounting hole ISO H7

Matching guide bushes to ST 7160:

ST 7460 and ST 7469

Order example: Guide pillar ST 7160

$d_1 = 32, l_1 = 200$ mm

Add **032 x 200**

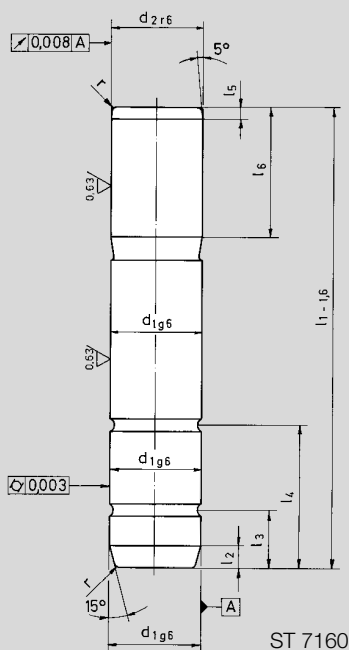
Order number **ST 7160.032 x 200**

Add
size to
order number

with oil grooves

Order number **ST 7160.** x

d_{1g6}	d_{2r6}	$l_{1-1,6}$	l_2	l_3	l_4	l_5	l_6	r	▲
25	25	125	8	20	45	4	40	2	025 x 125
		140							025 x 140
		160							025 x 160
		180							025 x 180
		200							025 x 200
		224							025 x 224
32	32	140	8	20	50	4	45	2	032 x 140
		160							032 x 160
		180							032 x 180
		200							032 x 200
		224							032 x 224
		250							032 x 250
40	40	160	8	20	50	4	56	2	040 x 160
		180							040 x 180
		200							040 x 200
		224							040 x 224
		250							040 x 250
		280							040 x 280
50	50	180	10	25	65	4	70	2.5	050 x 180
		200							050 x 200
		224							050 x 224
		250							050 x 250
		280							050 x 280
		315							050 x 315
63	63	200	10	32	72	4	80	2.5	063 x 200
		224							063 x 224
		250							063 x 250
		280							063 x 280
		315							063 x 315
		355							063 x 355
80	80	224	10	32	82	4	100	3	080 x 224
		250							080 x 250
		280							080 x 280
		315							080 x 315
		355							080 x 355
		400							080 x 400
100	100	250	10	32	82	4	125	3	100 x 250
		280							100 x 280
		315							100 x 315
		355							100 x 355
		400							100 x 400
		450							100 x 450



ST 7160

Guide bushes ST 746.

Sliding guide, for large tools



DIN 9834/ ISO 9448

Technical description:

Guide diameter ISO H7 precision turned
Mounting diameter ISO h6 ground

ST 7460 solid bronze

for usual load, good lubrication is necessary

ST 7469 steel, bronze plated

steel 1.7131 (16 Mn Cr 5)
induction hardened, hardness 61-63 HRC
sliding surface bronze plated
Due to the bronze plating on the hardened steel jacket this bush qualifies especially for high sliding speeds and extreme lateral forces.
Good lubrication is necessary.

Mounting instructions:

Adjust in mounting bore hole ISO H7.
Fix with 2 holding clamps (not included in delivery).

The shoulder surface, right-angled ground to the guide bore, will be squeezed onto the plate by the holding clamps and guarantees an absolutely rigid clamping of the guide bush.

Matching guide pillars

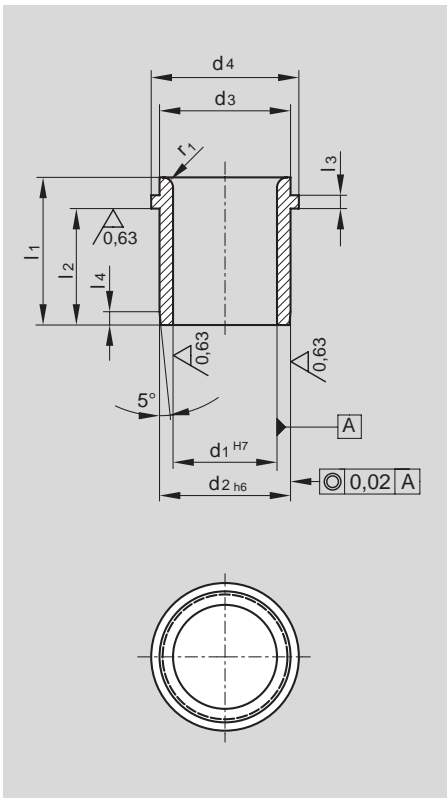
ST 7160

Order example: Guide bush ST 7469

d₁ = 32 mm

Add **032**

Order number **ST 7469.032**



Sliding guide
solid bronze

for usual load,
external
lubrication

Order-no. **ST 7460.**



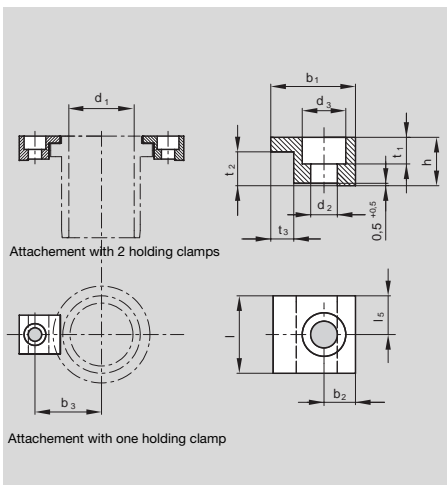
Sliding guide
steel hardened
bronze plated

for highest load
external
lubrication

Order-no. **ST 7469**

Add
size to
order number

d ₁ ^{H7}	d ₂ ^{h6}	d ₃ ^{0 -0,25}	d ₄ ^{0 -0,8}	l ₁ ^{0 -1,6}	l ₂ ^{-2 -3}	l ₃ ^{+0,1 -0,1}	l ₄ ^{+1 -1}	r ₁	▲
25	32	32	40	40	30	6.3	3.0	3	025
32	40	40	50	50	40	6.3	4.0	3	032
40	50	50	63	63	50	6.3	5.0	3	040
50	63	63	71	71	56	6.3	6.3	5	050
63	80	80	90	80	63	10.0	8.0	6	063
80	100	100	112	100	80	10.0	10.0	8	080
100	125	125	140	125	106	10.0	12.5	10	100



Holding clamps ST 7377

DIN 9832

Material: steel

Attachment

Suitable hexagon socket screws DIN 912
order number. SZ 8510

Order example: holding clamp ST 7377

d₁ = 32 mm

Add **032**

order number **ST 7377.032**

Add
size to
order number

Order number **ST 7377.**

d ₁	d ₂	d ₃	b ₁	b ₂	b ₃	h	l	l ₅	t ₁	t ₂	t ₃	Screw	▲
25	7	11	20	7.5	29	10	20	10	7	6.3	5	M6 x 16	01
32					33								01
40					39.5								01
50					44.5								01
63	11.5	17.5	32	11	61.5	16	32	16	11.5	10	10	M10 x 25	02
80					71.5								02
100					84								02
125					101.5								02
160					121.5								02

Guide pillars ST 9833

STEINEL®
NORMALIEN



Material: Steel 1.7139 (16 Mn CrS 5)
or 1.1221 (Ck 60)
hardness 62-64 HRC

Guide diameter ISO g6 super-fine ground finish
Mounting diameter ISO r6
Mount into mounting hole ISO H7

Note:

The transport-hole in the solid pillar $d_1 = 80$ mm and $d_1 = 100$ mm has the measurement of a) = M 12, 24 mm deep.

Order example: Guide pillar **ST 9833**

$d_1 = 32, l_1 = 200$ mm

Add **032 x 200**

Order number **ST 9833.032 x 200**

Guide pillars with $d_1 = 80$ mm and $d_1 = 100$ mm can also be delivered as a solid pillar with a transport-hole (T). Please note this when placing order.

Add T to order number (for example: Guide pillar ST 9833.100 x 400 T).

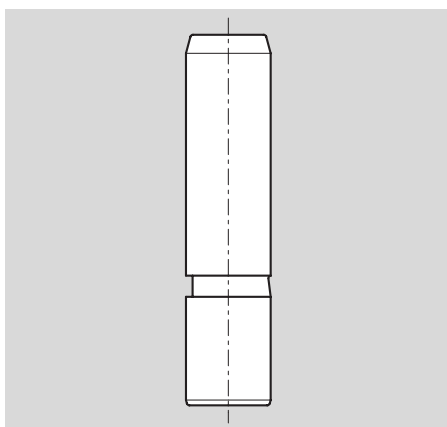
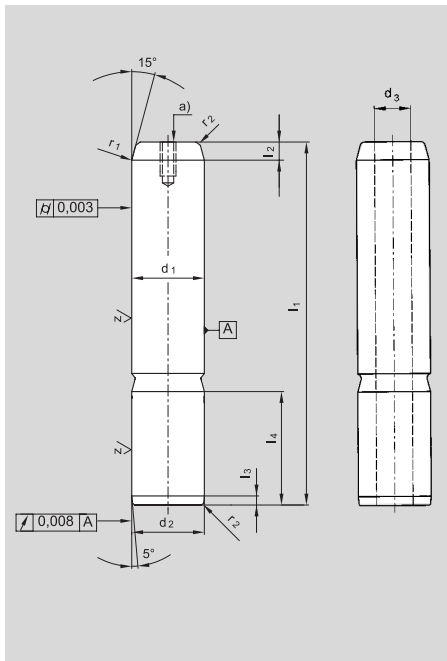
DIN 9833

Add size to order number

Order number **ST 9833.**

x

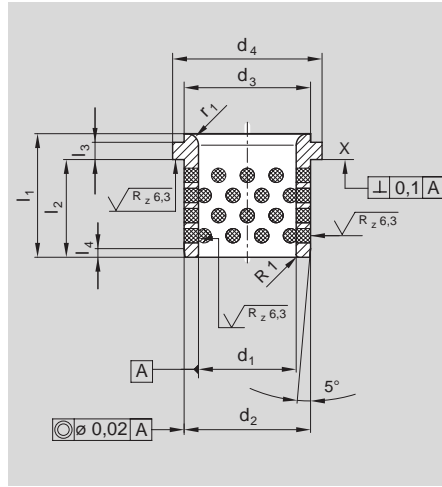
d_{1g6}	d_{2r6}	$d_{3\pm 2}$	l_{1-1}^0	$l_2^{+0,8}_0$	$l_3^{+0,8}_0$	$l_4^{+0,8}_0$	r_1	r_2	▲
25	25	-	125	8	4	40	3	2	025 x 125
			140						025 x 140
			160						025 x 160
			180						025 x 180
			200						025 x 200
			224						025 x 224
32	32	-	140	8	4	45	3	2	032 x 140
			160						032 x 160
			180						032 x 180
			200						032 x 200
			224						032 x 224
			250						032 x 250
40	40	-	140	8	4	56	3	2	040 x 140
			160						040 x 160
			180						040 x 180
			200						040 x 200
			224						040 x 224
			280						040 x 280
50	50	-	160	10	4	70	5	2.5	050 x 160
			180						050 x 180
			200						050 x 200
			224						050 x 224
			250						050 x 250
			315						050 x 315
63	63	-	180	10	4	80	6	2.5	063 x 180
			200						063 x 200
			224						063 x 224
			250						063 x 250
			280						063 x 280
			355						063 x 355
80	80	40	200	10	4	100	8	3	080 x 200
			224						080 x 224
			250						080 x 250
			280						080 x 280
			315						080 x 315
			355						080 x 355
100	100	50	224	10	4	125	10	3	100 x 224
			250						100 x 250
			280						100 x 280
			315						100 x 315
			355						100 x 355
			400						100 x 400
125	125	65	315	12	5	140	12	4	125 x 315
			355						125 x 355
			400						125 x 400
			450						125 x 450
			500						125 x 500
			160						160
450	160 x 450								
500	160 x 500								
560	160 x 560								



Guide pillar with groove

Price and time of delivery upon request

Guide bushes ST 9834



Material:

bronze with solid lubricant

Due to the internal solid lubricant inserts this sliding guide is self-lubricating and suitable for higher loads.

Technical description:

Guide diameter ISO H7 precision turned
Mounting diameter ISO h6 ground

Mounting instructions:

Fit in mounting bore hole ISO H7
Fix with 2 holding clamps ST 7377
(not included in delivery).

Order example: Guide bush **ST 9834**

d₁ = 32 mm

Add **032**

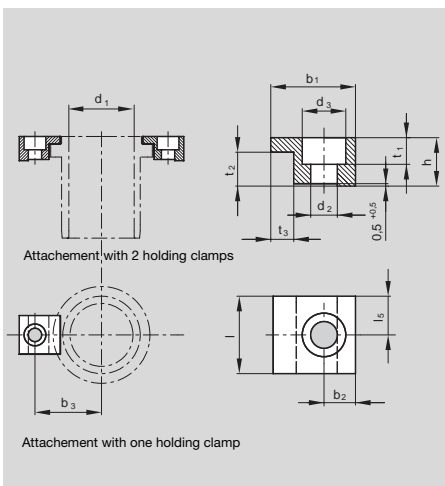
Order number **ST 9834.032**

DIN 9834

Add size to order number

Order number **ST 9834.**

d ₁ ^{H7}	d ₂ ^{h6}	d ₃ ^{0 -0,25}	d ₄ ^{0 -0,8}	l ₁ ^{0 -1,6}	l ₂ ⁻²	l ₃ ^{+0,1 -0,1}	l ₄ ^{+1 -1}	r ₁	▲
25	32	32	40	40	30	6.3	3.0	3	025
32	40	40	50	50	40	6.3	4.0	3	032
40	50	50	63	63	50	6.3	5.0	3	040
50	63	63	71	71	56	6.3	6.3	5	050
63	80	80	90	80	63	10.0	8.0	6	063
80	100	100	112	100	80	10.0	10.0	8	080
100	125	125	140	125	106	10.0	12.5	10	100
125	160	160	180	160	132	10.0	16.0	12	125
160	200	200	220	200	170	10.0	16.0	18	160



Holding clamps ST 7377

DIN 9832

Material: steel

Attachment

Suitable hexagon socket screws DIN 912
order number. SZ 8510

Order example: holding clamp **ST 7377**

d₁ = 32 mm

Add **032**

order number **ST 7377.032**

Add size to order number

Order number **ST 7377.**

d ₁	d ₂	d ₃	b ₁	b ₂	b ₃	h	l	l ₅	t ₁	t ₂	t ₃	Screw	▲
25	7	11	20	7.5	29	10	20	10	7	6.3	5	M6 x 16	01
32					33								01
40					39.5								01
50					44.5								01
63	11.5	17.5	32	11	61.5	16	32	16	11.5	10	10	M10 x 25	02
80					71.5								02
100					84								02
125					101.5								02
160					121.5								02

Guide pillars ST 9825

with shoulder (Guide tolerance g6)



Material: Steel 1.1221 (Ck 60)
Induction hardened, hardness 62-64 HRC

Guide diameter ISO g6, super-fine ground finish
Mounting diameter ISO r6
Mount into mounting bore holes ISO H7

Guide pillars with diameters of 80 and 100 mm come with an M12 x 18 tapped hole.

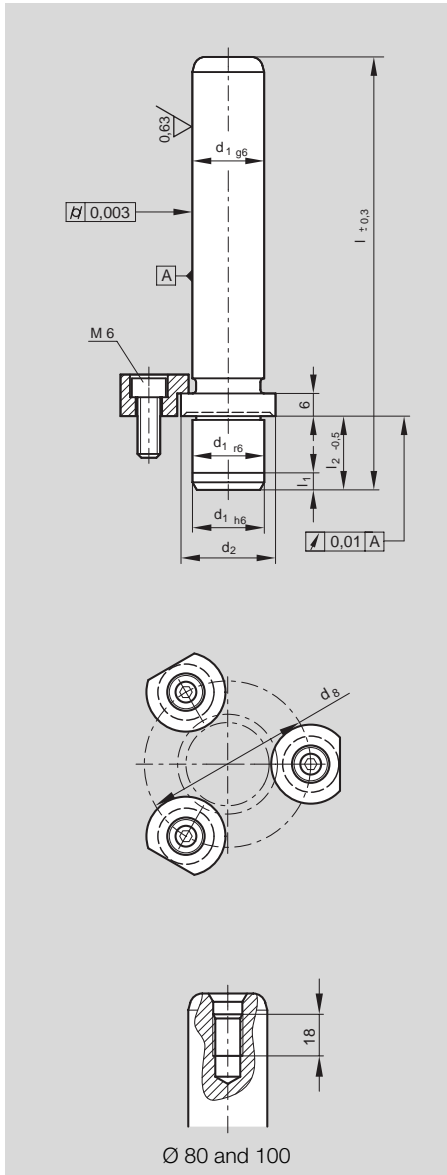
Guide pillars with shoulder are fastened with 3 clamps ST 7367 (included in delivery).

Order example: Guide pillar **ST 9825**
with shoulder
 $d_1 = 32, l = 200$ mm
Add **032 x 200**
Order number **ST 9825.032 x 200**

Add size to order number

Order number **ST 9825.**

x



d_{1g6}	l	d_2	d_8	l_1	l_2	▲
25	125	32	49	6	40	025 x 125
	140					025 x 140
	160					025 x 160
	180					025 x 180
	200					025 x 200
	224					025 x 224
32	140	40	57	7	45	032 x 140
	160					032 x 160
	180					032 x 180
	200					032 x 200
	224					032 x 224
	250					032 x 250
40	160	50	67	7	56	040 x 160
	180					040 x 180
	200					040 x 200
	224					040 x 224
	250					040 x 250
	280					040 x 280
50	180	63	80	7	70	050 x 180
	200					050 x 200
	224					050 x 224
	250					050 x 250
	280					050 x 280
	315					050 x 315
63	200	80	97	8	80	063 x 200
	224					063 x 224
	250					063 x 250
	280					063 x 280
	315					063 x 315
	355					063 x 355
80	224	100	117	8	100	080 x 224
	250					080 x 250
	280					080 x 280
	315					080 x 315
	355					080 x 355
	400					080 x 400
100	280	125	142	8	125	100 x 280
	315					100 x 315
	355					100 x 355
	400					100 x 400

Mounting dimension l_2 can be shortened upon request.

Guide bushes ST 9831

smooth, sliding guide with solid lubricant



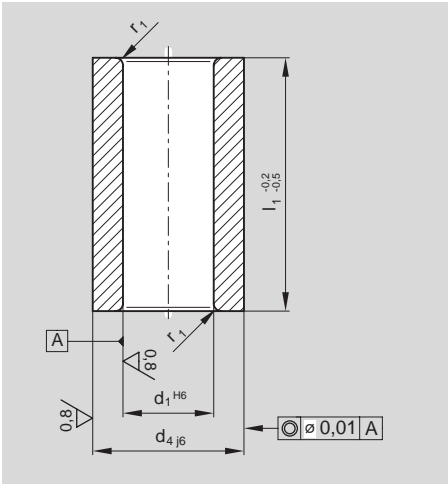
Material:
Bronze with solid lubricant
Due to the solid lubricant inserts, the sliding guide is self-lubricating and suitable for higher loads.

Guide diameter ISO H6, precision turned
Mounting diameter ISO j6, precision turned

Matching guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 and ST 9825

Mounting instructions:
1. Glue into the mounting bore hole ISO H6 (Bonding agents under section 6)
2. If possible, avoid press fit, because the internal diameter will decrease.

Order example: Guide bush **ST 9831**
d₁ = 25, l₁ = 37 mm
Add **25 x 037**
Order number **ST 9831.25 x 037**



Order number ST 9831.					Add size to order number
					□ x □
d ₁ ^{H6}	d _{4j6}	r ₁	l ₁	▲	
25	40	3	23	▲	25 x 023
			30		25 x 030
			37		25 x 037
			47		25 x 047
			60		25 x 060
32	48	3	77		25 x 077
			30		32 x 030
			37		32 x 037
			47		32 x 047
			60		32 x 060
40	58	3	77		32 x 077
			95		32 x 095
			30		40 x 030
			37		40 x 037
			47		40 x 047
50	70	5	60		40 x 060
			77		40 x 077
			95		40 x 095
			120		40 x 120
			37		50 x 037
63	85	6	47		50 x 047
			60		50 x 060
			77		50 x 077
			95		50 x 095
			120		50 x 120
80	105	8	60		63 x 060
			77		63 x 077
			95		63 x 095
			120		63 x 120
			120		80 x 120
			135		80 x 135

Guide pillars ST 9827

with shoulder (Guide tolerance g6)

STEINEL®
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Made of solid material

Material:

Steel 1.1221 (Ck 60) induction hardened,
hardness 62 – 64 HRC

Guide diameter ISO g6 super-fine ground finish

Mounting diameter ISO j6

Mounting into mounting holes ISO H6

Guide pillars with shoulder are secured with
three holding clamps ST 7367 (included).

Alternative this pillar can be fixed with the
holding washer ST 7387. (please order specially)

Please note:

**These guide pillars can only be used with
sliding guide bushes.**

Order example: Guide pillar ST 9827

with shoulder

$d_1 = 19, l = 160$ mm

Add **19 x 160**

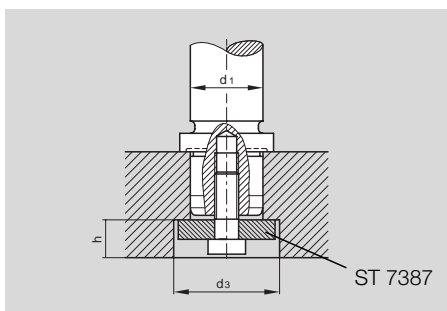
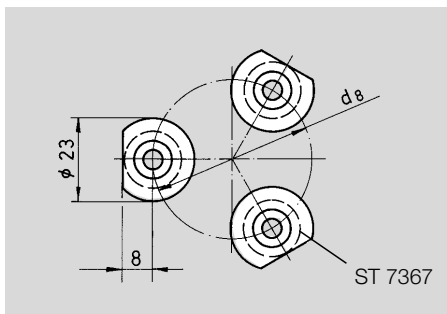
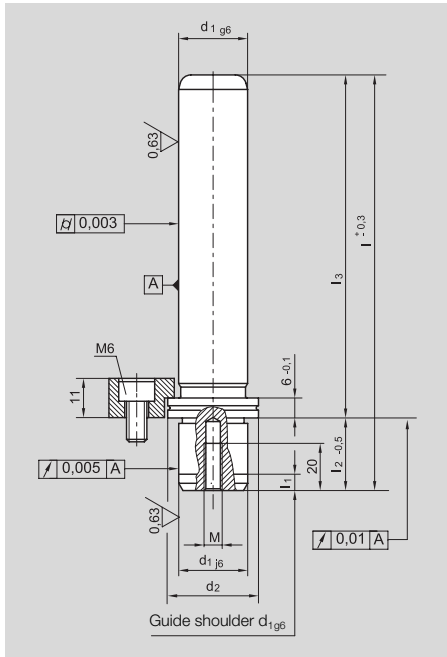
Order number **ST 9827.19 x 160**

Add size to
order number

Order number **ST 9827.** x

Add size to
order number

Order number **ST 9827.** x



$d_{g6^*)}$	d_2	d_8	l	l_1	$l_{2-0.5}$	l_3	▲
15	21	38	115	5	20	95	15 x 115
			125			105	15 x 125
			140			120	15 x 140
			160			140	15 x 160
			180			160	15 x 180
			200			180	15 x 200
224	204	15 x 224					
16	21	38	115	5	20	95	16 x 115
			125			105	16 x 125
			140			120	16 x 140
			160			140	16 x 160
			180			160	16 x 180
			200			180	16 x 200
224	204	16 x 224					
19	25	42	115	5	23	92	19 x 115
			125			102	19 x 125
			140			117	19 x 140
			160			137	19 x 160
			180			157	19 x 180
			200			177	19 x 200
224	201	19 x 224					
250	227	19 x 250					
20	25	42	115	5	23	92	20 x 115
			125			102	20 x 125
			140			117	20 x 140
			160			137	20 x 160
			180			157	20 x 180
			200			177	20 x 200
224	201	20 x 224					
250	227	20 x 250					
24	32	49	125	6	27	98	24 x 125
			140			113	24 x 140
			160			133	24 x 160
			180			153	24 x 180
			200			173	24 x 200
			224			197	24 x 224
250	223	24 x 250					
280	253	24 x 280					
315	288	24 x 315					
25	32	49	125	6	27	98	25 x 125
			140			113	25 x 140
			160			133	25 x 160
			180			153	25 x 180
			200			173	25 x 200
			224			197	25 x 224
250	223	25 x 250					
280	253	25 x 280					
315	288	25 x 315					
30	40	57	140	7	37	103	30 x 140
			160			123	30 x 160
			180			143	30 x 180
			200			163	30 x 200
			224			187	30 x 224
			250			213	30 x 250
280	243	30 x 280					
315	278	30 x 315					
355	318	30 x 355					
32	40	57	140	7	37	103	32 x 140
			160			123	32 x 160
			180			143	32 x 180
			200			163	32 x 200
			224			187	32 x 224
			250			213	32 x 250
280	243	32 x 280					
315	278	32 x 315					
355	318	32 x 355					
60	80	97	224	8	47	177	60 x 224
			250			203	60 x 250
			280			233	60 x 280
			315			268	60 x 315
			355			308	60 x 355
			400			353	60 x 400
450	403	60 x 450					
63	80	97	224	8	47	177	63 x 224
			250			203	63 x 250
			280			233	63 x 280
			315			268	63 x 315
			355			308	63 x 355
			400			353	63 x 400
450	403	63 x 450					
80	95	112	280	8	60	220	80 x 280
			315			255	80 x 315
			355			295	80 x 355
			400			340	80 x 400
			450			390	80 x 450
			500			440	80 x 500
560	500	80 x 560					

*) guide diameter d_{1g6}
mounting diameter d_{1j6}

thread press-in side M =

$\phi 15-32 = M 8$

$\phi 38-50 = M 10$

$\phi 60-80 = M 12$

Ball cages ST 7130

made of aluminium

STEINEL[®]
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Material: ball cage made of aluminium balls of steel, hardened, grade 1, sorted

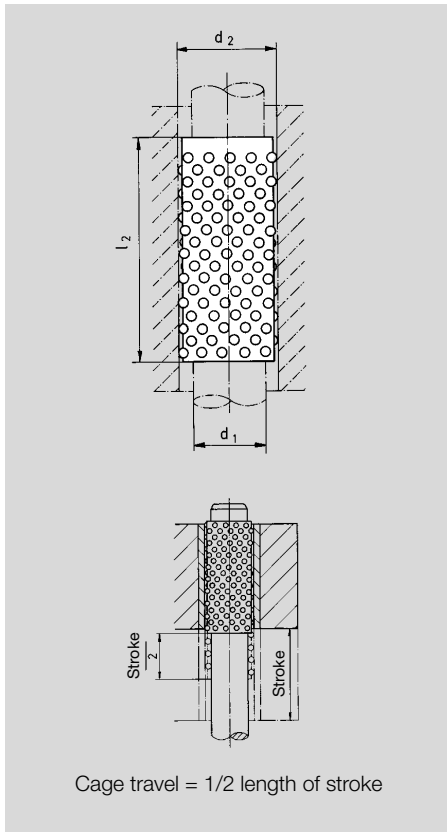
The balls in the cage holes are free-wheeling wedges. They are helically arranged in the axial direction, so that each ball has its own race.

Order example: Ball cage **ST 7130**

made of aluminium
 $d_1 = 16$, $l_2 = 54$ mm

Add **16 x 054**

Order number **ST 7130.16 x 054**



Add size to order number

Order number **ST 7130.** x

d_1	d_2	l_2	▲		
10	14	30	10 x 030		
		38	10 x 038		
		43	10 x 043		
12	16	30	12 x 030		
		38	12 x 038		
		43	12 x 043		
15	21	30	15 x 030		
		38	15 x 038		
		43	15 x 043		
		54	15 x 054		
		63	15 x 063		
16	22	30	16 x 030		
		38	16 x 038		
		43	16 x 043		
		54	16 x 054		
		63	16 x 063		
19	25	30	19 x 030		
		38	19 x 038		
		43	19 x 043		
		54	19 x 054		
		63	19 x 063		
20	26	30	20 x 030		
		38	20 x 038		
		43	20 x 043		
		54	20 x 054		
		63	20 x 063		
24	30	30	24 x 030		
		38	24 x 038		
		43	24 x 043		
		54	24 x 054		
		63	24 x 063		
25	31	30	25 x 030		
		38	25 x 038		
		43	25 x 043		
		54	25 x 054		
		63	25 x 063		
25	31	74	25 x 074		
		83	25 x 083		
		90	25 x 090		
		30	38	38	30 x 038
				43	30 x 043
54	30 x 054				
58	30 x 058				
68	30 x 068				
30	38	74	30 x 074		
		83	30 x 083		
		88	30 x 088		
		103	30 x 103		
		108	30 x 108		

Add size to order number

Order number **ST 7130.** x

d_1	d_2	l_2	▲		
32	40	38	32 x 038		
		43	32 x 043		
		54	32 x 054		
		58	32 x 058		
		68	32 x 068		
32	40	74	32 x 074		
		83	32 x 083		
		88	32 x 088		
		103	32 x 103		
		108	32 x 108		
38	46	38	38 x 038		
		43	38 x 043		
		58	38 x 058		
		68	38 x 068		
		88	38 x 088		
38	46	94	38 x 094		
		108	38 x 108		
		128	38 x 128		
		40	48	38	40 x 038
				43	40 x 043
58	40 x 058				
68	40 x 068				
88	40 x 088				
40	48	94	40 x 094		
		108	40 x 108		
		128	40 x 128		
		48	56	43	48 x 043
				58	48 x 058
68	48 x 068				
74	48 x 074				
88	48 x 088				
48	56	108	48 x 108		
		128	48 x 128		
		50	58	43	50 x 043
				58	50 x 058
				68	50 x 068
74	50 x 074				
88	50 x 088				
50	58	108	50 x 108		
		128	50 x 128		
		60	70	75	60 x 075
				94	60 x 094
				113	60 x 113
128	60 x 128				
139	60 x 139				
60	70	154	60 x 154		
		63	73	75	63 x 075
				94	63 x 094
				113	63 x 113
				128	63 x 128
139	63 x 139				
63	73	154	63 x 154		
		80	92	113	80 x 113
				138	80 x 138
				156	80 x 156

Sturdy workmanship, universally adaptable.

Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 and to all ball guide bushes.

Technical description: see page 3.04

Ball cages ST 7170

made of aluminium, with installation assistance



Material: ball cage made of aluminium balls of steel, hardened, grade 1, sorted

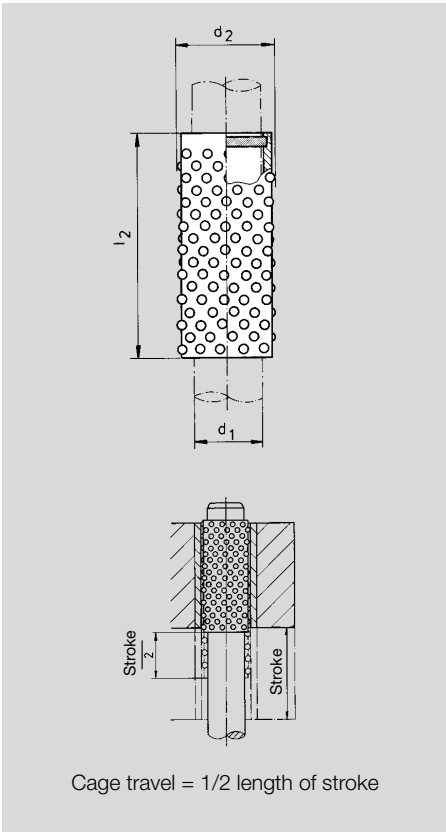
The balls in the cage holes are free-wheeling wedges. They are helically arranged in the axial direction, so that each ball has its own race.

The installation assistance in the ball cage makes the assembly of the die sets within multiple guiding units simpler.

Aluminium ball cages are universally utilizable. They have a high mechanical endurance, as well as excellent sliding characteristics, a high resistance to abrasion and great stability.

Due to their optimum heat stability, they are suitable for use in temperatures of over 80 °C.

Extremely robust construction, utilizable in machines and tools with extremely high precision demands.



Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 and to all ball guide bushes.

Technical description: see page 3.04

Order example: Ball cage **ST 7170** made of aluminium
d₁ = 16, l₂ = 54 mm
Add **16 x 054**
Order number **ST 7170.16 x 054**

Other lengths available upon request.

Add size to order number
Order number **ST 7170.** x

d ₁	d ₂	l ₂	▲
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
25	31	30	25 x 030
		38	25 x 038
		43	25 x 043
		54	25 x 054
		63	25 x 063
30	38	30	30 x 030
		38	30 x 038
		43	30 x 043
		54	30 x 054
		63	30 x 063
30	38	74	30 x 074
		83	30 x 083
		88	30 x 088
		103	30 x 103
		108	30 x 108

Add size to order number
Order number **ST 7170.** x

d ₁	d ₂	l ₂	▲		
32	40	38	32 x 038		
		43	32 x 043		
		54	32 x 054		
		58	32 x 058		
		68	32 x 068		
		74	32 x 074		
		83	32 x 083		
16	22	88	32 x 088		
		103	32 x 103		
		108	32 x 108		
		38	46	38	38 x 038
				43	38 x 043
58	38 x 058				
68	38 x 068				
88	38 x 088				
20	26	94	38 x 094		
		108	38 x 108		
		128	38 x 128		
		40	48	38	40 x 038
				43	40 x 043
58	40 x 058				
68	40 x 068				
88	40 x 088				
24	30	94	40 x 094		
		108	40 x 108		
		128	40 x 128		
		48	56	43	48 x 043
				58	48 x 058
68	48 x 068				
74	48 x 074				
88	48 x 088				
25	31	108	48 x 108		
		128	48 x 128		
		50	58	43	50 x 043
				58	50 x 058
				68	50 x 068
74	50 x 074				
88	50 x 088				
30	38	108	50 x 108		
		128	50 x 128		
		60	70	75	60 x 075
				94	60 x 094
				113	60 x 113
128	60 x 128				
139	60 x 139				
63	73	154	60 x 154		
		75	63 x 075		
		94	63 x 094		
		113	63 x 113		
		128	63 x 128		
80	92	139	63 x 139		
		154	63 x 154		
		113	80 x 113		
		138	80 x 138		
		156	80 x 156		

Ball cages ST 7171

made of aluminium, with safety ring



Material: ball cage made of aluminium balls of steel, hardened, grade 1, sorted

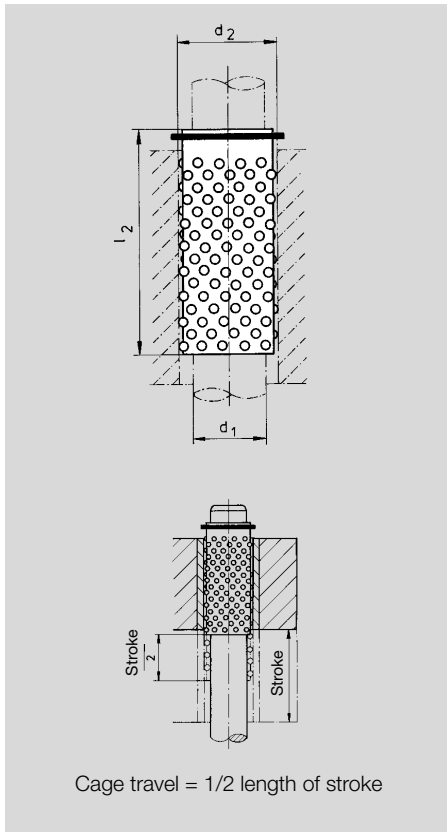
The balls in the cage holes are free-wheeling wedges. They are helically arranged in the axial direction, so that each ball has its own race.

The ball cages are constructed with a safety ring according to DIN 471.

Aluminium ball cages are universally utilizable. They have a high mechanical endurance, as well as excellent sliding characteristics, a high resistance to abrasion and great stability.

Due to their optimum heat stability, they are suitable for use in temperatures of over 80 °C.

Extremely robust construction, utilizable in machines and tools with extremely high precision demands.



Order number **ST 7171.** x Add size to order number

d ₁	d ₂	l ₂	▲
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
25	31	30	25 x 030
		38	25 x 038
		43	25 x 043
		54	25 x 054
		63	25 x 063
25	31	74	25 x 074
		83	25 x 083
		90	25 x 090
		30	30 x 038
		43	30 x 043
30	38	54	30 x 054
		58	30 x 058
		68	30 x 068
		74	30 x 074
		83	30 x 083
30	38	88	30 x 088
		103	30 x 103
		108	30 x 108

Order number **ST 7171.** x Add size to order number

d ₁	d ₂	l ₂	▲		
32	40	38	32 x 038		
		43	32 x 043		
		54	32 x 054		
		58	32 x 058		
		68	32 x 068		
		74	32 x 074		
		83	32 x 083		
		88	32 x 088		
32	40	103	32 x 103		
		108	32 x 108		
38	46	38	38 x 038		
		43	38 x 043		
		58	38 x 058		
		68	38 x 068		
		88	38 x 088		
		94	38 x 094		
		108	38 x 108		
		128	38 x 128		
40	48	38	40 x 038		
		43	40 x 043		
		58	40 x 058		
		68	40 x 068		
		88	40 x 088		
		94	40 x 094		
		108	40 x 108		
		128	40 x 128		
48	56	43	48 x 043		
		58	48 x 058		
		68	48 x 068		
		74	48 x 074		
		88	48 x 088		
		108	48 x 108		
		128	48 x 128		
		50	58	43	50 x 043
58	50 x 058				
68	50 x 068				
74	50 x 074				
88	50 x 088				
108	50 x 108				
128	50 x 128				
60	70			75	60 x 075
		94	60 x 094		
		113	60 x 113		
		128	60 x 128		
		139	60 x 139		
		154	60 x 154		
		63	73	75	63 x 075
				94	63 x 094
113	63 x 113				
128	63 x 128				
139	63 x 139				
154	63 x 154				
80	92			113	80 x 113
				138	80 x 138
		156	80 x 156		

Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 and to all ball guide bushes.

Technical description: see page 3.04

Order example: Ball cage **ST 7171** made of aluminium
d₁ = 16, l₂ = 54 mm
Add **16 x 054**
Order number **ST 7171.16 x 054**

Other lengths available upon request.

Roller cages ST 7140

made of aluminium



Material: Roller cage made of aluminium, profile rollers of steel, hardened, grade 1, sorted.

The profile rollers in the cage holes are free-wheeling wedged. Thus a protection against torsion is guaranteed. The rollers are helically arranged in the axial direction, so that each roller has its own race.

Sturdy workmanship, universally adaptable.

Roller cage matching to guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128 and to all ball guide bushes.

Additional guide diameters and lengths according to the ball cages ST 7130 are available upon request.

Technical description: see page 3.05

Order example: roller cage **ST 7140**

made of aluminium

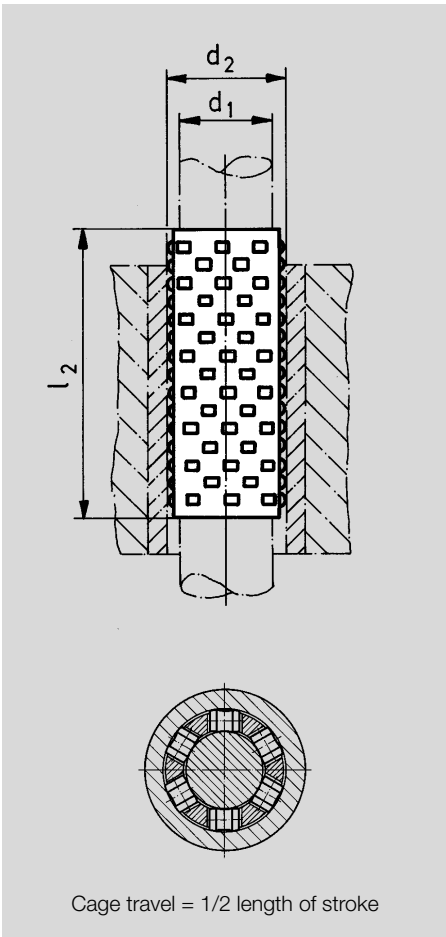
$d_1 = 32$, $l_2 = 54$ mm

Add **32 x 054**

Order number **ST 7140.32 x 054**

Roller cages can be delivered also with installation assistance or safety ring

Price and delivery time upon request



Order number ST 7140.							□ x □	Add size to order number
d_1	d_2	l_2	m_1	m_2	dR	▲		
19	25	43	8	5	3	19 x 043		
		54		6		19 x 054		
		63		7		19 x 063		
		74		8		19 x 074		
20	26	43	8	5	3	20 x 043		
		54		6		20 x 054		
		63		7		20 x 063		
		74		8		20 x 074		
24	30	43	8	5	3	24 x 043		
		63		7		24 x 063		
		74		8		24 x 074		
		90		10		24 x 090		
25	31	43	8	5	3	25 x 043		
		63		7		25 x 063		
		74		8		25 x 074		
		90		10		25 x 090		
30	38	54	12	5	4	30 x 054		
		74		7		30 x 074		
		83		8		30 x 083		
		103		10		30 x 103		
32	40	54	12	5	4	32 x 054		
		74		7		32 x 074		
		83		8		32 x 083		
		103		10		32 x 103		
38	46	58	12	6	4	38 x 058		
		88		9		38 x 088		
		94		10		38 x 094		
		128		13		38 x 128		

m_1 = rollers per roller ring
 m_2 = quantity of roller rings
dR = roller diameter

Order number ST 7140.							□ x □	Add size to order number
d_1	d_2	l_2	m_1	m_2	dR	▲		
40	48	58	12	6	4	40 x 058		
		88		9		40 x 088		
		94		10		40 x 094		
		128		13		40 x 128		
48	56	74	15	8	4	48 x 074		
		108		11		48 x 108		
		128		13		48 x 128		
50	58	74	15	8	4	50 x 074		
		108		11		50 x 108		
50	58	128		13		50 x 128		
		74	15	8	4	50 x 074		
60	70	113	15	9	5	60 x 113		
		128		11		60 x 128		
60	70	139		12		60 x 139		
		113	15	9	5	60 x 113		
63	73	128		11		63 x 128		
		139		12		63 x 139		
80	92	113	16	9	6	80 x 113		
		138		11		80 x 138		
		156		13		80 x 156		

Ball cages ST 7150

made of brass

STEINEL[®]
NORMALIEN



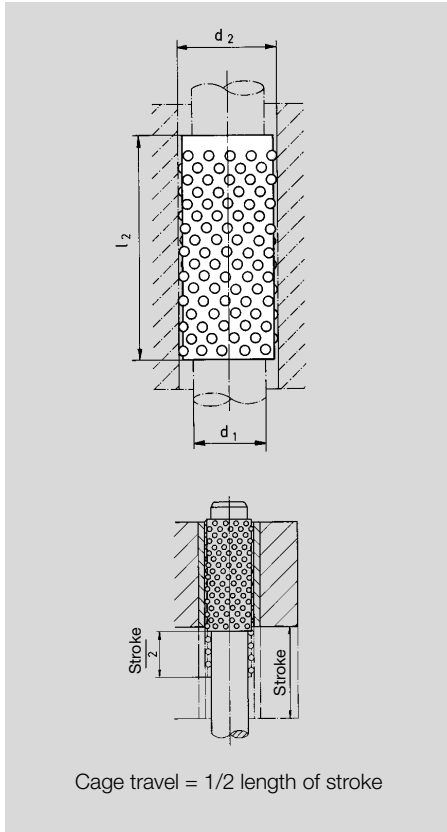
Material: ball cage made of brass, balls of steel, hardened, grade 1, sorted

The balls in the cage holes are free-wheeling wedges. They are helically arranged in the axial direction, so that each ball has its own race.

Ball cages made of brass are universally utilizable. They have a high mechanical strength, best antifriction properties as well as high abrasive resistance and stability.

Due to their optimum heat resistance they are suited for temperatures over 80 °C.

Sturdy workmanship usable in machines and tools with high precision demands.



Sturdy workmanship, universally adaptable.

Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 and to all ball guide bushes.

Technical description: see page 3.04

Order example: Ball cage **ST 7150**

made of brass
d₁ = 16, l₂ = 54 mm
Add **16 x 054**

Order number **ST 7150.16 x 054**

Other lengths available upon request.

Add size to order number

Order number **ST 7150.** x

d ₁	d ₂	l ₂	▲
10	14	30	10 x 030
		38	10 x 038
		43	10 x 043
12	16	30	12 x 030
		38	12 x 038
		43	12 x 043
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
25	31	30	25 x 030
		38	25 x 038
		43	25 x 043
		54	25 x 054
		63	25 x 063
24	30	74	24 x 074
		83	24 x 083
		90	24 x 090
		30	30 x 030
		43	30 x 043
30	38	54	30 x 054
		58	30 x 058
		68	30 x 068
		74	30 x 074
		83	30 x 083
63	73	88	30 x 088
		103	30 x 103
		108	30 x 108

Add size to order number

Order number **ST 7150.** x

d ₁	d ₂	l ₂	▲
32	40	38	32 x 038
		43	32 x 043
		54	32 x 054
		58	32 x 058
		68	32 x 068
38	46	74	32 x 074
		83	32 x 083
		88	32 x 088
		103	32 x 103
		108	32 x 108
40	48	38	40 x 038
		43	40 x 043
		58	40 x 058
		68	40 x 068
		88	40 x 088
48	56	94	40 x 094
		108	40 x 108
		128	40 x 128
		43	48 x 043
		58	48 x 058
50	58	68	48 x 068
		74	48 x 074
		88	48 x 088
		108	48 x 108
		128	48 x 128
60	70	43	50 x 043
		58	50 x 058
		68	50 x 068
		74	50 x 074
		88	50 x 088
63	73	108	50 x 108
		128	50 x 128
		75	60 x 075
		94	60 x 094
		113	60 x 113
80	92	128	60 x 128
		139	60 x 139
		154	60 x 154
		75	63 x 075
		94	63 x 094
80	92	113	63 x 113
		128	63 x 128
		139	63 x 139
		154	63 x 154
		113	80 x 113
80	92	138	80 x 138
		156	80 x 156

Ball cages ST 7151

made of brass, with installation assistance



Material: ball cage made of brass, balls of steel, hardened, grade 1, sorted

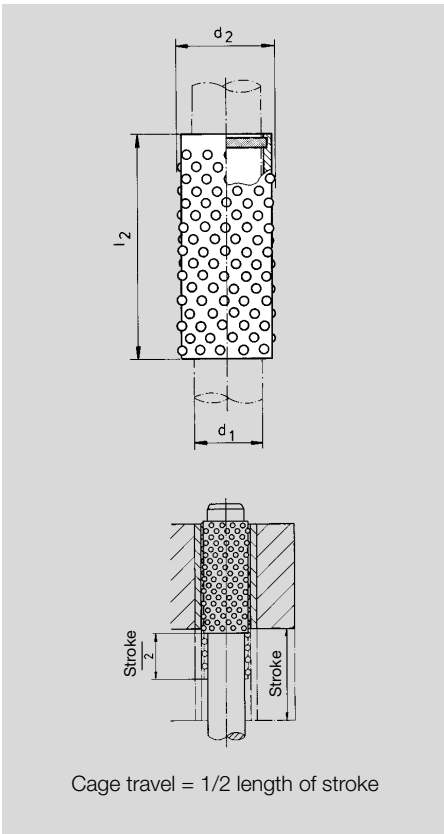
The balls in the cage holes are free-wheeling wedges. They are helically arranged in the axial direction, so that each ball has its own race.

The installation assistance in the ball cage makes the assembly of the die sets with multiple guiding units simpler.

Ball cages made of brass are universally utilizable. They have a high mechanical strength, best antifriction properties as well as high abrasive resistance and stability.

Due to their optimum heat resistance they are suited for temperatures over 80 °C.

Sturdy workmanship usable in machines and tools with high precision demands.



Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 as well as to all guide bushes.

Technical description: see page 3.04

Order example: Ball cage **ST 7151**
made of brass
 $d_1 = 16$, $l_2 = 54$ mm
Add **16 x 054**
Order number **ST 7151.16 x 054**

Other lengths available upon request.

Add size to order number
Order number **ST 7151.** x

d_1	d_2	l_2	▲
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
25	31	30	25 x 030
		38	25 x 038
		43	25 x 043
		54	25 x 054
		63	25 x 063
30	38	30	30 x 030
		38	30 x 038
		43	30 x 043
		54	30 x 054
		63	30 x 063
30	38	74	30 x 074
		83	30 x 083
		90	30 x 090
		103	30 x 103
		108	30 x 108

Add size to order number
Order number **ST 7151.** x

d_1	d_2	l_2	▲		
32	40	38	32 x 038		
		43	32 x 043		
		54	32 x 054		
		58	32 x 058		
		68	32 x 068		
		74	32 x 074		
		83	32 x 083		
		88	32 x 088		
38	46	103	32 x 103		
		108	32 x 108		
38	46	38	38 x 038		
		43	38 x 043		
		58	38 x 058		
		68	38 x 068		
		88	38 x 088		
		94	38 x 094		
		108	38 x 108		
		128	38 x 128		
40	48	38	40 x 038		
		43	40 x 043		
		58	40 x 058		
		68	40 x 068		
		88	40 x 088		
		94	40 x 094		
		108	40 x 108		
		128	40 x 128		
48	56	43	48 x 043		
		58	48 x 058		
		68	48 x 068		
		74	48 x 074		
		88	48 x 088		
		108	48 x 108		
		128	48 x 128		
		50	58	43	50 x 043
58	50 x 058				
68	50 x 068				
74	50 x 074				
88	50 x 088				
108	50 x 108				
128	50 x 128				
60	70			75	60 x 075
		94	60 x 094		
		113	60 x 113		
		128	60 x 128		
		139	60 x 139		
		154	60 x 154		
		63	73	75	63 x 075
				94	63 x 094
113	63 x 113				
128	63 x 128				
139	63 x 139				
154	63 x 154				
80	92			113	80 x 113
				138	80 x 138
		156	80 x 156		

Ball cages ST 7152

made of brass, with safety ring



Material: ball cage made of brass, balls of steel, hardened, grade 1, sorted

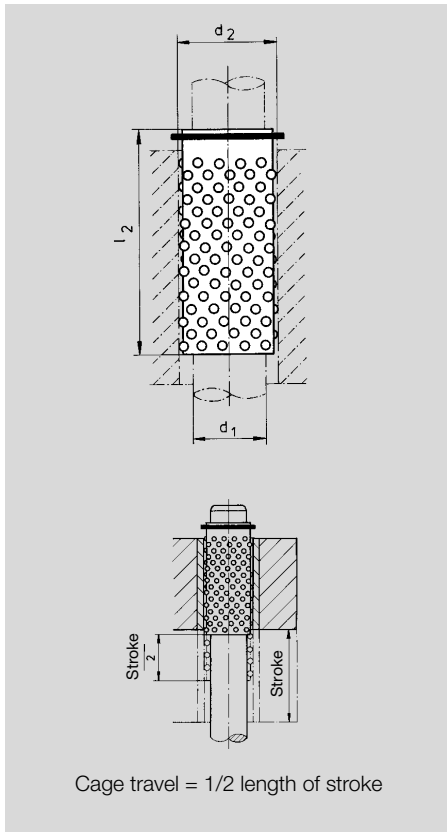
The balls in the cage holes are free-wheeling wedges. They are helically arranged in the axial direction, so that each ball has its own race.

The ball cages are constructed with a safety ring according to DIN 471.

Ball cages made of brass are universally utilizable. They have a high mechanical strength, best antifriction properties as well as high abrasive resistance and stability.

Due to their optimum heat resistance they are suited for temperatures over 80°C.

Sturdy workmanship, usable in machines and tools with high precision demands.



Order number **ST 7152.** x Add size to order number

d ₁	d ₂	l ₂	▲
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
25	31	30	25 x 030
		38	25 x 038
		43	25 x 043
		54	25 x 054
		63	25 x 063
30	38	38	30 x 038
		43	30 x 043
		54	30 x 054
		58	30 x 058
		68	30 x 068
30	38	74	30 x 074
		83	30 x 083
		88	30 x 088
		103	30 x 103
		108	30 x 108

Order number **ST 7152.** x Add size to order number

d ₁	d ₂	l ₂	▲		
32	40	38	32 x 038		
		43	32 x 043		
		54	32 x 054		
		58	32 x 058		
		68	32 x 068		
32	40	74	32 x 074		
		83	32 x 083		
		88	32 x 088		
		103	32 x 103		
		108	32 x 108		
38	46	38	38 x 038		
		43	38 x 043		
		58	38 x 058		
		68	38 x 068		
		88	38 x 088		
38	46	94	38 x 094		
		108	38 x 108		
		128	38 x 128		
		40	48	38	40 x 038
				43	40 x 043
58	40 x 058				
68	40 x 068				
88	40 x 088				
40	48	94	40 x 094		
		108	40 x 108		
		128	40 x 128		
		48	56	43	48 x 043
				58	48 x 058
68	48 x 068				
74	48 x 074				
88	48 x 088				
48	56	108	48 x 108		
		128	48 x 128		
		50	58	43	50 x 043
				58	50 x 058
				68	50 x 068
74	50 x 074				
88	50 x 088				
50	58	108	50 x 108		
		128	50 x 128		
		60	70	75	60 x 075
				94	60 x 094
				113	60 x 113
128	60 x 128				
139	60 x 139				
60	70	154	60 x 154		
		63	73	75	63 x 075
				94	63 x 094
				113	63 x 113
				128	63 x 128
139	63 x 139				
63	73	154	63 x 154		
		80	92	113	80 x 113
				138	80 x 138
				156	80 x 156

Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 as well as to all ball guide bushes.

Technical description: see page 3.04

Order example: Ball cage **ST 7152**
made of brass
d₁ = 16, l₂ = 54 mm
Add **16 x 054**
Order number **ST 7152.16 x 054**

Other lengths available upon request.

Ball cages ST 7133

made of plastic



Material: ball cage made of plastic, balls made of steel, hardened, grade 1, sorted.

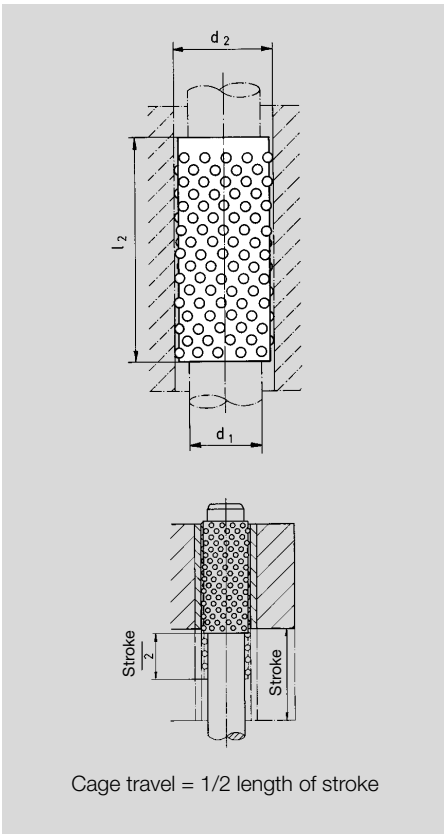
The balls in the cage holes are free-wheeling wedged. They are helically arranged in the axial direction, so that each ball has its own race.

Order example: Ball cage **ST 7133**

made of plastic
d₁ = 16, l₂ = 54 mm

Add **16 x 054**

Order number **ST 7133.16 x 054**



Add
size to
order number

Order number **ST 7133.** x

d ₁	d ₂	l ₂	▲
10	14	30	10 x 030
		38	10 x 038
		43	10 x 043
12	16	30	12 x 030
		38	12 x 038
		43	12 x 043
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
		74	19 x 074
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
		74	20 x 074
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
		74	24 x 074
		83	24 x 083
		90	24 x 090
25	31	30	25 x 030
		38	25 x 038
		43	25 x 043
		54	25 x 054
		63	25 x 063
		74	25 x 074
		83	25 x 083
		90	25 x 090
30	38	38	30 x 038
		43	30 x 043
		54	30 x 054
		58	30 x 058
		68	30 x 068
		74	30 x 074
		83	30 x 083
		88	30 x 088
		103	30 x 103
		108	30 x 108

Add
size to
order number

Order number **ST 7133.** x

d ₁	d ₂	l ₂	▲		
32	40	38	32 x 038		
		43	32 x 043		
		54	32 x 054		
		58	32 x 058		
		68	32 x 068		
		74	32 x 074		
38	46	83	32 x 083		
		88	32 x 088		
		103	32 x 103		
		108	32 x 108		
		38	38 x 038		
		43	38 x 043		
40	48	58	38 x 058		
		68	38 x 068		
		88	38 x 088		
		94	38 x 094		
		108	38 x 108		
		128	38 x 128		
40	48	38	40 x 038		
		43	40 x 043		
		58	40 x 058		
		68	40 x 068		
		88	40 x 088		
		94	40 x 094		
48	56	108	40 x 108		
		128	40 x 128		
		43	48 x 043		
		58	48 x 058		
		68	48 x 068		
		74	48 x 074		
50	58	88	48 x 088		
		108	48 x 108		
		128	48 x 128		
		43	50 x 043		
		58	50 x 058		
		68	50 x 068		
50	58	74	50 x 074		
		88	50 x 088		
		108	50 x 108		
		128	50 x 128		

Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 as well as to all guide bushes using ball cages.

Ball cages ST 7173

made of plastic with installation assistance

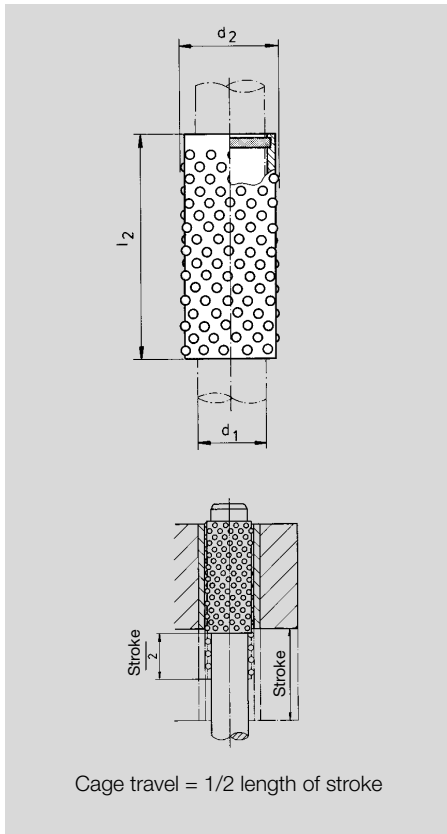


Material: Ball cage made of plastic, balls made of steel, hardened, grade 1, sorted.

The balls in the cage holes are free-wheeling wedged. They are helically arranged in the axial direction, so that each ball has its own race.

The installation assistance in the ball cage makes it easier to assemble the die set with multiple guide units.

Order example: Ball cage **ST 7173** made of plastic with installation assistance
 $d_1 = 16, l_2 = 54$ mm
 Add **16 x 054**
 Order number **ST 7173.16 x 054**



Order number **ST 7173.** x Add size to order number

d_1	d_2	l_2	▲
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
25	31	30	25 x 030
		38	25 x 038
		43	25 x 043
		54	25 x 054
		63	25 x 063
30	38	38	30 x 038
		43	30 x 043
		54	30 x 054
		58	30 x 058
		68	30 x 068
30	38	74	30 x 074
		83	30 x 083
		88	30 x 088
		103	30 x 103
		108	30 x 108

Order number **ST 7173.** x Add size to order number

d_1	d_2	l_2	▲
32	40	38	32 x 038
		43	32 x 043
		54	32 x 054
		58	32 x 058
		68	32 x 068
		74	32 x 074
		83	32 x 083
		88	32 x 088
32	40	103	32 x 103
		108	32 x 108
38	46	38	38 x 038
		43	38 x 043
		58	38 x 058
		68	38 x 068
		88	38 x 088
		94	38 x 094
		108	38 x 108
		128	38 x 128
40	48	38	40 x 038
		43	40 x 043
		58	40 x 058
		68	40 x 068
		88	40 x 088
		94	40 x 094
		108	40 x 108
		128	40 x 128
48	56	43	48 x 043
		58	48 x 058
		68	48 x 068
		74	48 x 074
		88	48 x 088
		108	48 x 108
		128	48 x 128
		50	58
58	50 x 058		
68	50 x 068		
74	50 x 074		
88	50 x 088		
108	50 x 108		
128	50 x 128		

Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 as well as to all bushes using ball cages.

Ball cages ST 7174

made of plastic with safety ring

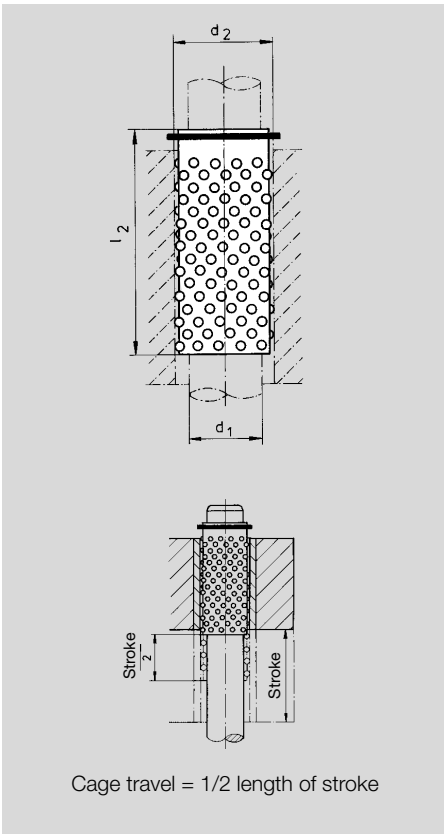


Material: Ball cage made of plastic, balls made of steel, hardened, grade 1, sorted.

The balls in the cage holes are free-wheeling wedged. They are helically arranged in the axial direction, so that each ball has its own race.

The ball cages with a safety ring are made in accordance to DIN 471.

Order example: Ball cage **ST 7174** made of plastic with safety ring
 $d_1 = 16$, $l_2 = 54$ mm
 Add **16 x 054**
 Order number **ST 7174.16 x 054**



Order number **ST 7174.** x Add size to order number

d_1	d_2	l_2	▲
15	21	30	15 x 030
		38	15 x 038
		43	15 x 043
		54	15 x 054
		63	15 x 063
16	22	30	16 x 030
		38	16 x 038
		43	16 x 043
		54	16 x 054
		63	16 x 063
19	25	30	19 x 030
		38	19 x 038
		43	19 x 043
		54	19 x 054
		63	19 x 063
20	26	30	20 x 030
		38	20 x 038
		43	20 x 043
		54	20 x 054
		63	20 x 063
24	30	30	24 x 030
		38	24 x 038
		43	24 x 043
		54	24 x 054
		63	24 x 063
25	31	74	24 x 074
		83	24 x 083
		90	24 x 090
		30	25 x 030
		38	25 x 038
30	38	43	25 x 043
		54	25 x 054
		63	25 x 063
		74	25 x 074
		83	25 x 083
		88	25 x 088
		103	30 x 103
		108	30 x 108
		38	30 x 038
		43	30 x 043

Order number **ST 7174.** x Add size to order number

d_1	d_2	l_2	▲
32	40	38	32 x 038
		43	32 x 043
		54	32 x 054
		58	32 x 058
		68	32 x 068
		74	32 x 074
		83	32 x 083
		88	32 x 088
38	46	103	32 x 103
		108	32 x 108
		38	38 x 038
40	48	43	38 x 043
		58	38 x 058
		68	38 x 068
		88	38 x 088
		94	38 x 094
		108	38 x 108
		128	38 x 128
		40	40 x 038
48	56	43	40 x 043
		58	40 x 058
		68	40 x 068
		88	40 x 088
		94	40 x 094
		108	40 x 108
		128	40 x 128
		48	48 x 043
50	58	58	48 x 058
		68	48 x 068
		74	48 x 074
		88	48 x 088
		108	48 x 108
		128	48 x 128
		43	50 x 043
		58	50 x 058
		68	50 x 068
		74	50 x 074

Matching guide pillars ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82 as well as to all guide bushes using ball cages.

Ball cages ST 7134

made of aluminium



Ball cage complete with holding safety device

Material: ball cage made of aluminium, balls of steel, hardened, grade 1, sorted

The balls in the cage holes are free-wheeling wedges. They are helically arranged in the axial direction, so that each ball has its own race. In the area of both longitudinal grooves as well as in the area of safety grooves the balls are eliminated.

Sturdy workmanship, universally utilizable.

Application: In all die-sets where the guide pillars are fastened into the upper plate. The locking plate holds the ball cage and allows a complete retraction from the guide bush.

Suitable especially to the guide pillars ST 7106 and ST 7108 and to all ball guide bushes.

Technical description: see page 3.04

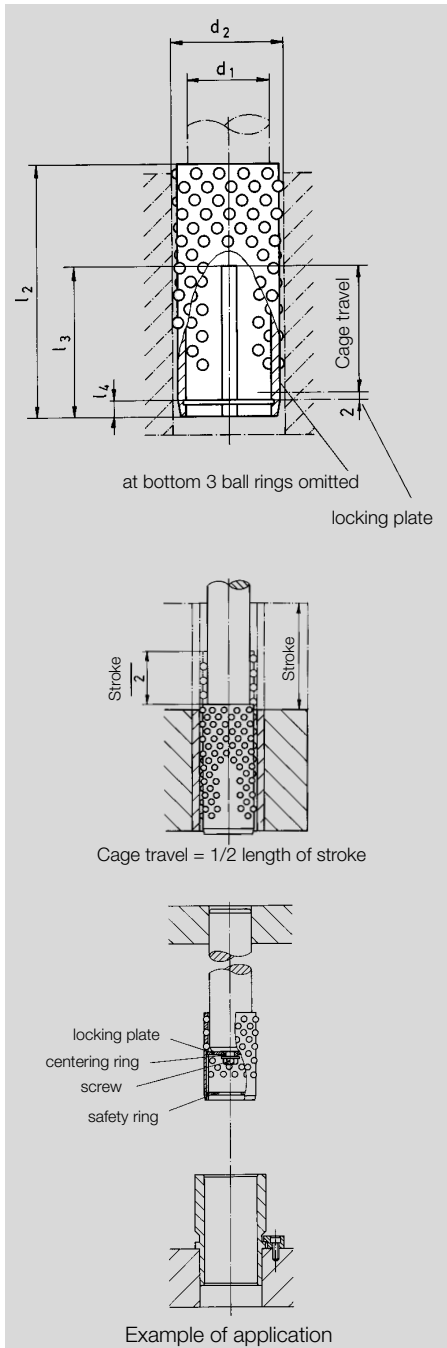
Order example: Ball cage **ST 7134**

made of aluminium

$d_1 = 32, l_2 = 74$ mm

Add **32 x 074**

Order number **ST 7134.32 x 074**

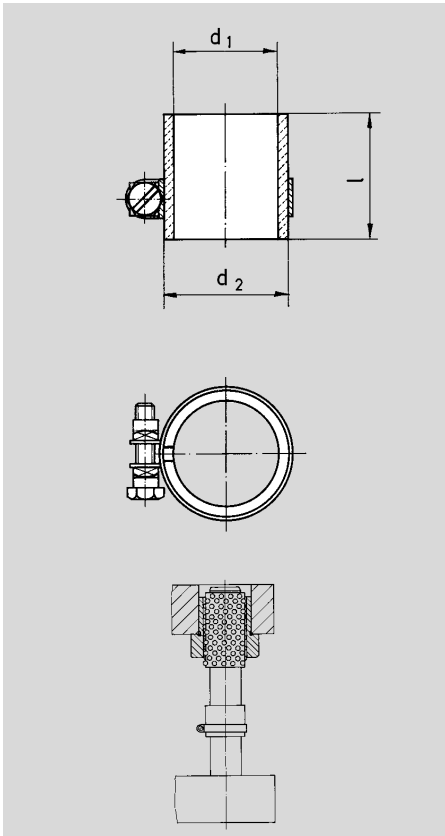


Order number ST 7134.						□ x □	Add size to order number
d_1	d_2	l_2	l_3	l_4	▲		
24	30	63	34	4.5		24 x 063	
		74	44			24 x 074	
		83	46			24 x 083	
25	31	63	34	4.5		25 x 063	
		74	44			25 x 074	
		83	46			25 x 083	
30	38	68	38	4.5		30 x 068	
		74	44			30 x 074	
		83	46			30 x 083	
		88	47			30 x 088	
		98	53			30 x 098	
32	40	68	38	4.5		32 x 068	
		74	44			32 x 074	
		83	46			32 x 083	
		88	47			32 x 088	
		98	53			32 x 098	
		108	58			32 x 108	
38	46	68	38	6		38 x 068	
		88	47			38 x 088	
		108	58			38 x 108	
		128	78			38 x 128	

Order number ST 7134.						□ x □	Add size to order number
d_1	d_2	l_2	l_3	l_4	▲		
40	48	68	38	6		40 x 068	
		88	47			40 x 088	
		108	58			40 x 108	
		128	78			40 x 128	
48	56	88	47	7		48 x 088	
		108	58			48 x 108	
		128	78			48 x 128	
50	58	88	47	7		50 x 088	
		108	58			50 x 108	
		128	78			50 x 128	
60	70	113	65	7		60 x 113	
		128	78			60 x 128	
		139	86			60 x 139	
63	73	113	65	7		63 x 113	
		128	78			63 x 128	
		139	86			63 x 139	

Limiting sleeves Cage holder

ST 7135 ST 7132



Order example: Limiting sleeves **ST 7135**
 $d_1 = 30$ mm
 Add **30**
 Order number **ST 7135.30**

Matching Guide pillars: ST 7100,
 ST 7106, ST 7107, ST 7108, ST 7120,
 ST 7126, ST 7127, ST 7128, ST 7181

Limiting sleeves

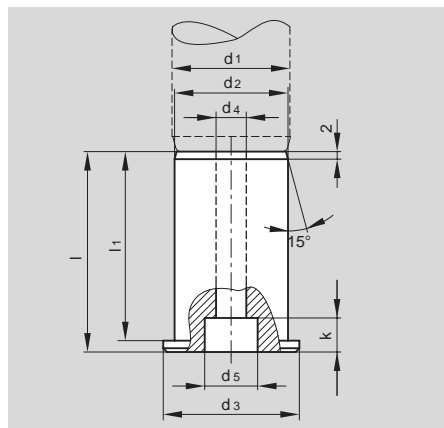
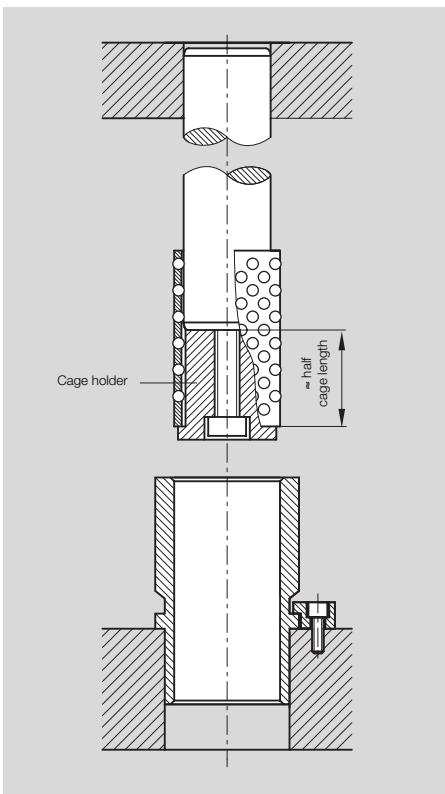
Material: Durethan

Limiting sleeves will be slipped over the guide pillars and clamped on. They prevent the shifting of the ball cage thereby facilitating the proper positioning of the ball cage during the assembly of the upper die block.

Add
size to
order number

Order number **ST 7135.**

d_1	d_2	l	▲
15	20	20	15
16			16
19	25	20	19
20			20
24	30	30	24
25			25
30	40	30	30
32			32
38	50	40	38
40			40
48	60	40	48
50			50
60	70	40	60
63			63
80	90	45	80



Cage holder

Material: Steel

The cage holder can be used for all ball and roller cages. The lengths of the cage holder should be half the lengths of the cage in use. (If necessary please machine down.)

Application: In all die sets in which the guide posts are fastened in the upper part. The cage holder supports the ball cage and permits a complete removal from the guide bush.

Matching guide pillars:
 ST 7106, ST 7108, ST 7126, ST 7128

Order example: Cage holder **ST 7132**
 $d_1 = 30$ mm
 Add **30**
 Order number **ST 7132.30**

Add
size to
order number

Cage holder Order number **ST 7132.**

d_1	d_2	d_3	d_4	d_5	l	l_1	k	▲
15	14.5	20.5	8.1	13.5	34	31	9	15
16	15.5	21.5	8.1	13.5	34	31	9	16
19	18.5	24.5	8.1	15	40	37	9	19
20	19.5	25.5	8.1	15	40	37	9	20
24	23.5	29.5	8.1	15	48	45	9	24
25	24.5	30.5	8.1	15	48	45	9	25
30	29.5	37	8.1	15	58	54	9	30
32	31.5	39	8.1	15	58	54	9	32
38	37.5	45	8.1	15	68	64	9	38
40	39.5	47	8.1	15	68	64	9	40
48	47.5	55	8.1	15	68	64	9	48
50	49.5	57	8.1	15	68	64	9	50
60	59.5	69	8.1	15	80	75	9	60
63	62.5	72	8.1	15	80	75	9	63
80	79.0	91	8.1	15	80	75	9	80

Guide and pillar bearings ST 720.

with rectangular flange

STEINEL®
NORMALIEN



Guide bearings ST 720.

Material: basic body special grey cast iron GG 25 as one chooses with pressed in guide bush (see below.)
Guide diameter ISO H5, honed.
If sliding guide lubrication by funnel grease nipple at the flange.

Pillar bearings ST 7200

Material: special grey cast iron GG 25 mounting holes ISO R6 precision turned. Both flange surfaces machined, with mounting holes.

ISO 11903

Indication: please order matchable guide pillars ST 7100 separately.

Upon request centering by standing over guide pillars respectively guide bushes.

Guide bearings can be supplied as well with roller cages.

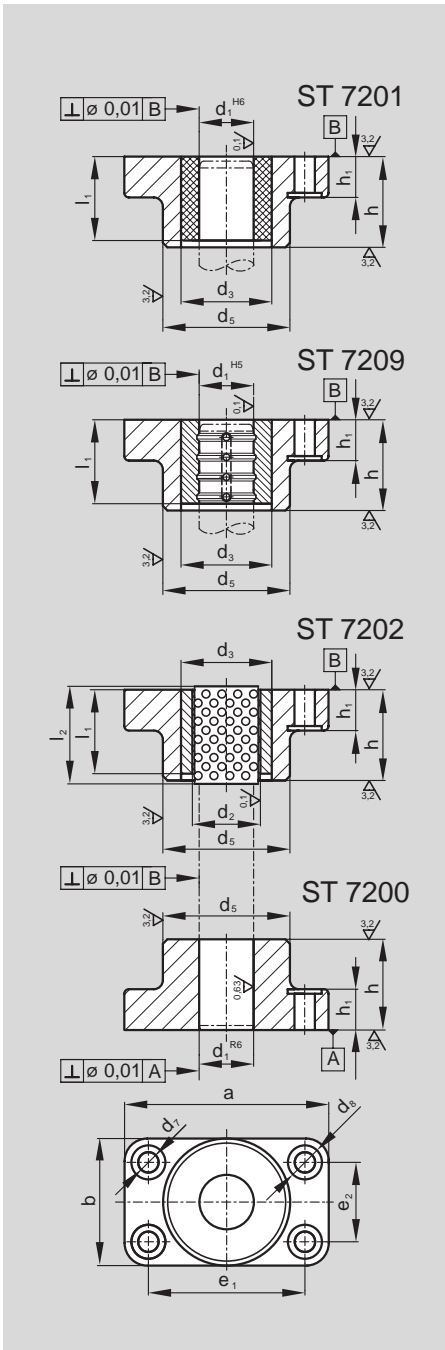
Order example: guide bearing **ST 7202**





with ball guide

$d_1 = 19 \text{ mm}$

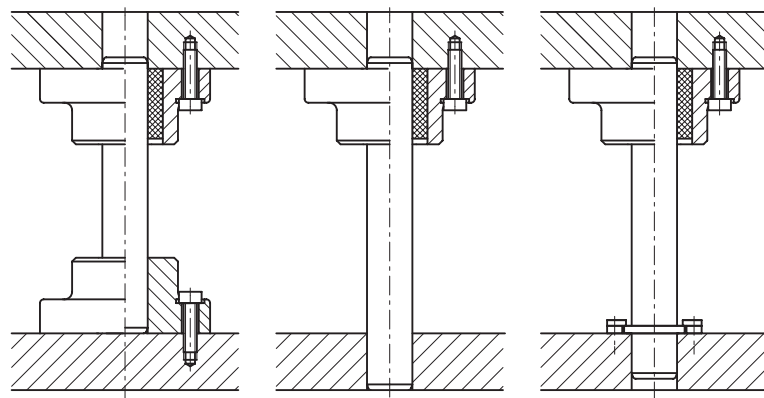
Add **19**

Order number **ST 7202.19**



				
Sliding guide with solid lubricant	Sliding guide hardened steel bush bronze plated	Ball guide with Ball cage Cage travel = $\frac{1}{2}$ length of stroke	Ball guide without Ball cage	Add size to order number
ST 7201.	ST 7209.	ST 7202.	ST 7206.	<input type="checkbox"/>
Pillar bearing ST 7200.				<input type="checkbox"/>

d_1	a	b	e_1	e_2	d_2	d_3	d_5	d_7	d_8	h	h_1	l_1	l_2	▲
15	71	40	53	22	21	28	40	6.6	11	25	16	23	30	15
16	71	40	53	22	22	28	40	6.6	11	25	16	23	30	16
19	80	45	60	25	25	32	45	9	15	32	18	30	38	19
20	80	45	60	25	26	32	45	9	15	32	18	30	38	20
24	90	56	69	35	30	40	56	9	15	40	18	37	43	24
25	90	56	69	35	31	40	56	9	15	40	18	37	43	25
30	112	71	86	45	38	48	71	11	18	50	20	47	58	30
32	112	71	86	45	40	48	71	11	18	50	20	47	58	32
38	132	85	102	55	46	58	85	14	20	63	25	60	68	38
40	132	85	102	55	48	58	85	14	20	63	25	60	68	40
48	160	112	126	78	56	70	112	18	26	80	28	77	88	48
50	160	112	126	78	58	70	112	18	26	80	28	77	88	50
60	200	132	154	86	70	85	132	18	26	100	36	95	113	60
63	200	132	154	86	73	85	132	18	26	100	36	95	113	63
80	224	140	172	88	92	105	140	22	33	125	40	120	138	80



Mounting examples

Guide and pillar bearings ST 721.

with rectangular flange (machined execution)



Guide bearings ST 721.

Material: basic body special grey cast iron GG 25 as one chooses with pressed in guide bush (see below.)
Guide diameter ISO H5, honed.
If sliding guide lubrication by funnel grease nipple at the flange.
Both flange surfaced machined, with mounting holes.

Pillar bearings ST 7210

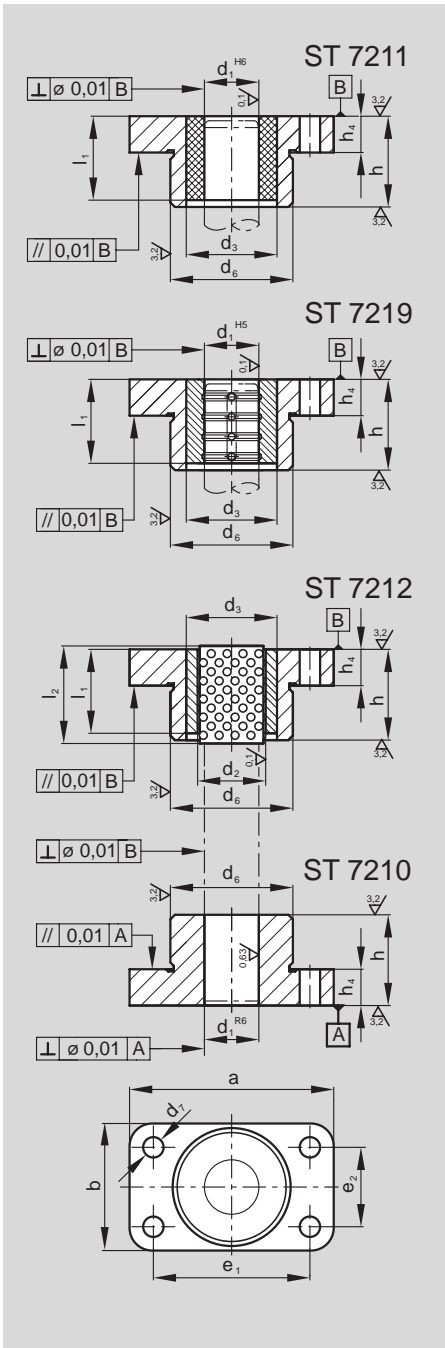
Material: special grey cast iron GG 25
mounting holes ISO R6 precision turned.
Both flange surfaces machined, with mounting holes.

Indication: please order matchable guide pillars ST 7100 separately.

Upon request centering by standing over guide pillars respectively guide bushes.
Guide bearings can be supplied as well with roller cages.

Order example: guide bearing **ST 7212**

with ball guide
 $d_1 = 19$ mm
Add **19**
Order number **ST 7212.19**



Sliding guide
with solid
lubricant



Sliding guide
hardened
steel bush
bronze plated



Ball guide
with
Ball cage
Cage travel =
 $1/2$ length of stroke

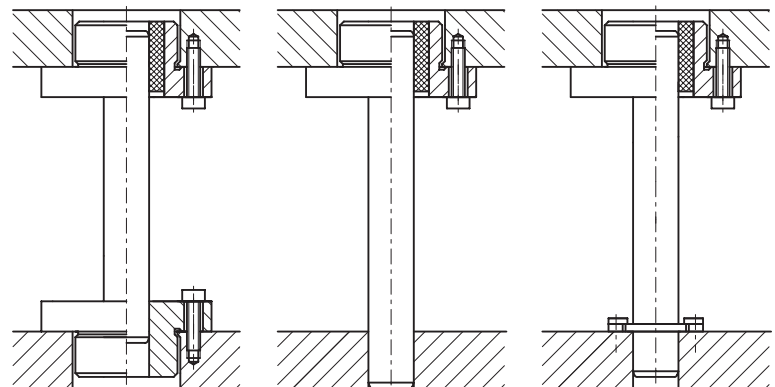


Ball guide
without
Ball cage

Add
size to
order number

ST 7211.	ST 7219.	ST 7212.	ST 7216.	
				<input type="checkbox"/>
Pillar bearing ST 7210.				<input type="checkbox"/>

d_1	a	b	e_1	e_2	d_2	d_3	d_6	d_7	h	h_4	l_1	l_2	▲
15	71	40	53	22	21	28	37	6.6	25	14	23	30	15
16	71	40	53	22	22	28	37	6.6	25	14	23	30	16
19	80	45	60	25	25	32	42	9	32	16	30	38	19
20	80	45	60	25	26	32	42	9	32	16	30	38	20
24	90	56	69	35	30	40	52	9	40	16	37	43	24
25	90	56	69	35	31	40	52	9	40	16	37	43	25
30	112	71	86	45	38	48	65	11	50	17.5	47	58	30
32	112	71	86	45	40	48	65	11	50	17.5	47	58	32
38	132	85	102	55	46	58	80	14	63	22.5	60	68	38
40	132	85	102	55	48	58	80	14	63	22.5	60	68	40
48	160	112	126	78	56	70	107	18	80	25	77	88	48
50	160	112	126	78	58	70	107	18	80	25	77	88	50
60	200	132	154	86	70	85	125	18	100	33	95	113	60
63	200	132	154	86	73	85	125	18	100	33	95	113	63
80	224	140	172	88	92	105	130	22	125	36.5	120	138	80



Mounting examples

Guide and pillar bearings ST 72..

with small, round flange (space saving version)



Guide bearings ST 7250

Material: basic body special grey cast iron GG 25

Guide diameter ISO H5 honed.

Lubrication by funnel grease nipple at the flange. One flange surface is machined, with mounting holes.

Pillar bearings ST 7260

Material: special grey cast iron GG 25

mounting holes ISO R6, precision turned, one flange surface is machined, with mounting holes (without mounting holes available upon request).

Note: please order matchable guide pillars ST 7100 separately.

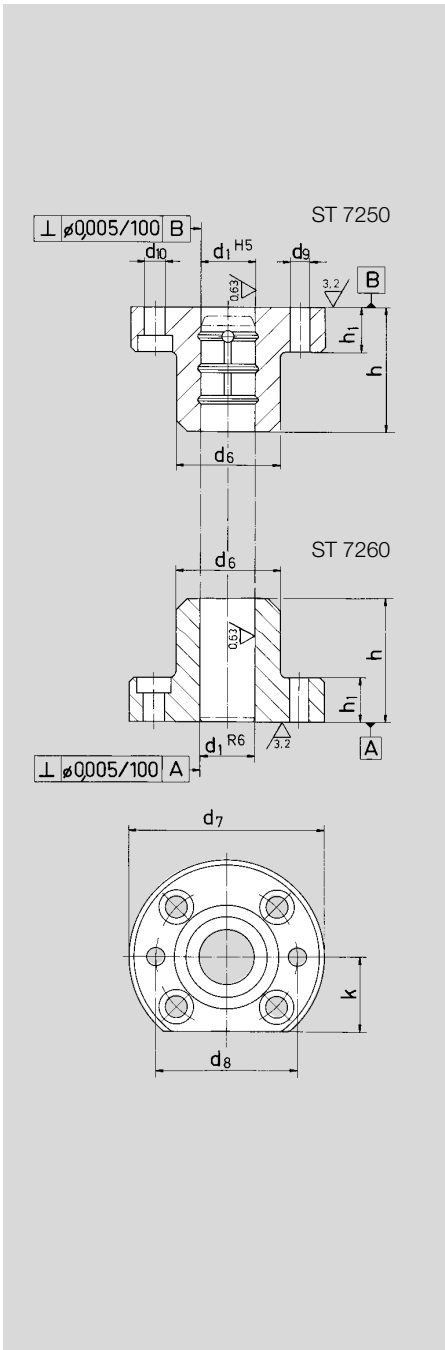
Technical description: see page 2.02

Order example: Pillar bearing **ST 7260**

$d_1 = 30$ mm

Add **30**

Order number **ST 7260.30**



Sliding guide

Guide bore directly in grey cast iron basic body

Add size to order number

Guide bearing	Order number ST 7250	<input type="checkbox"/>
Pillar bearing	Order number ST 7260	<input type="checkbox"/>

d_1	d_6	d_7	d_8	d_9	d_{10}	h	h_1	k	▲
19	36	78	54	7.8	9	50	18	30	19
20	36	78	54	7.8	9	50	18	30	20
24	46	86	64	7.8	9	55	20	33	24
25	46	86	64	7.8	9	55	20	33	25
30	56	106	80	9.8	11	63	22	41	30
32	56	106	80	9.8	11	63	22	41	32
38	66	116	90	9.8	11	72	26	45	38
40	66	116	90	9.8	11	72	26	45	40
48	80	140	108	11.8	13.5	80	30	54	48
50	80	140	108	11.8	13.5	80	30	54	50

Guide bushes ST 7319

smooth, sliding guide steel bronze plated



Material: steel 1.3505 (100 Cr6)
hardened, hardness 61-63 HRC
sliding surface bronze plated

Guide diameter ISO H5, honed
mounting diameter ISO p6, ground

Important: Due to the galvanically applied bronze plating onto the hardened steel jacket, this bush is suitable especially for high sliding speeds and strong lateral forces.

Matching guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82

Mounting instructions:

1. To glue into the mounting bore hole ISO F6
When gluing ensure that the oil distribution groove remains clear at the mounting diameter. (Bonding agent see to corresponding page)
2. If possible avoid press fit, because the internal diameter will decrease.
3. Do not pour in because the oil distribution groove at the mounting diameter will be clogged.

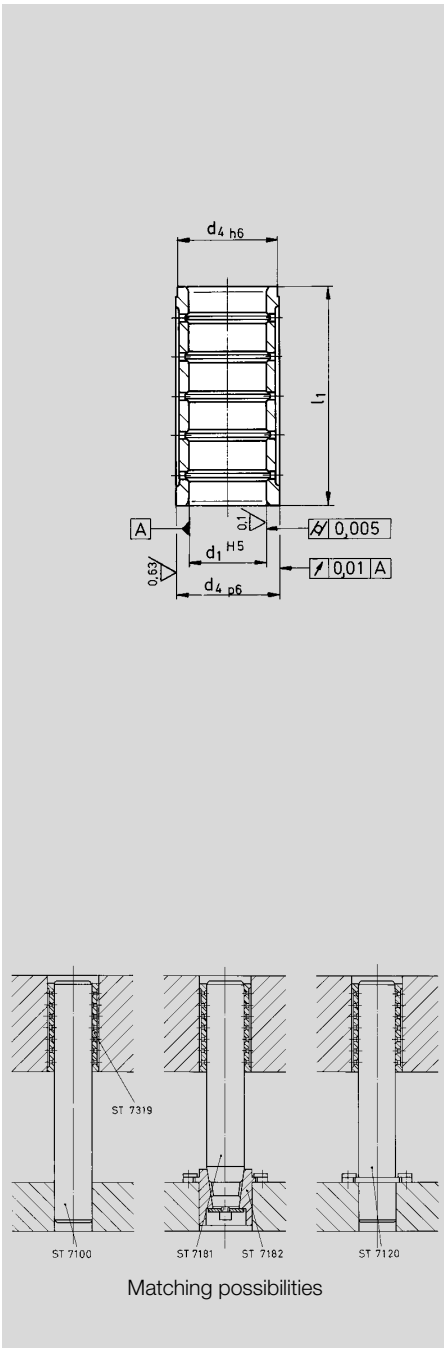
Technical description: see page 3.03

Order example: Guide bush **ST 7319**

$d_1 = 16, l_1 = 37$ mm

Add **16 x 037**

Order number **ST 7319.16 x 037**



Order number ST 7319.				□ x □	Add size to order number
d_1^{H5}	d_{4p6}	l_1	▲		
10	16	23	▲	10 x 023	
		30		10 x 030	
		37		10 x 037	
12	18	23		12 x 023	
		30		12 x 030	
		37		12 x 037	
15	21	23		15 x 023	
		30		15 x 030	
		37		15 x 037	
		47		15 x 047	
16	22	23		16 x 023	
		30		16 x 030	
		37		16 x 037	
		47		16 x 047	
19	26	30		19 x 030	
		37		19 x 037	
		47		19 x 047	
		60		19 x 060	
20	28	30		20 x 030	
		37		20 x 037	
		47		20 x 047	
		60		20 x 060	
24	32	30		24 x 030	
		37		24 x 037	
		47		24 x 047	
		60		24 x 060	
		77		24 x 077	

Order number ST 7319.				□ x □	Add size to order number
d_1^{H5}	d_{4p6}	l_1	▲		
25	33	30		25 x 030	
		37		25 x 037	
		47		25 x 047	
		60		25 x 060	
30	38	77		25 x 077	
		37		30 x 037	
		47		30 x 047	
30	38	60		30 x 060	
		77		30 x 077	
		95		30 x 095	
32	40	37		32 x 037	
		47		32 x 047	
		60		32 x 060	
		77		32 x 077	
32	40	95		32 x 095	
		47		38 x 047	
		60		38 x 060	
38	48	77		38 x 077	
		95		38 x 095	
		120		38 x 120	
40	50	47		40 x 047	
		60		40 x 060	
		77		40 x 077	
		95		40 x 095	
		120		40 x 120	

Guide bushes ST 7409

smooth, sliding guide steel bronze plated

STEINEL®
NORMALIEN



Material: steel 1.3505 (100 Cr6)
hardened, hardness 61-63 HRC
sliding surface bronze plated.

Guide diameter ISO H5, honed
mounting diameter ISO j6, ground

Important: Due to the galvanically applied bronze plating onto the hardened steel jacket, this bush is suitable especially for high sliding speeds and strong lateral forces.

Matching guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82

DIN 9831/ISO 9448

Mounting instructions:

- To glue into the mounting bore hole ISO H6
When gluing ensure that the oil distribution groove remains clear at the mounting diameter.
(Bonding agent see to corresponding page)
- If possible avoid press fit, because the internal diameter will decrease.
- Do not pour in because the oil distribution groove at the mounting diameter will be clogged.
Guide bushes for pour in see ST 7411.

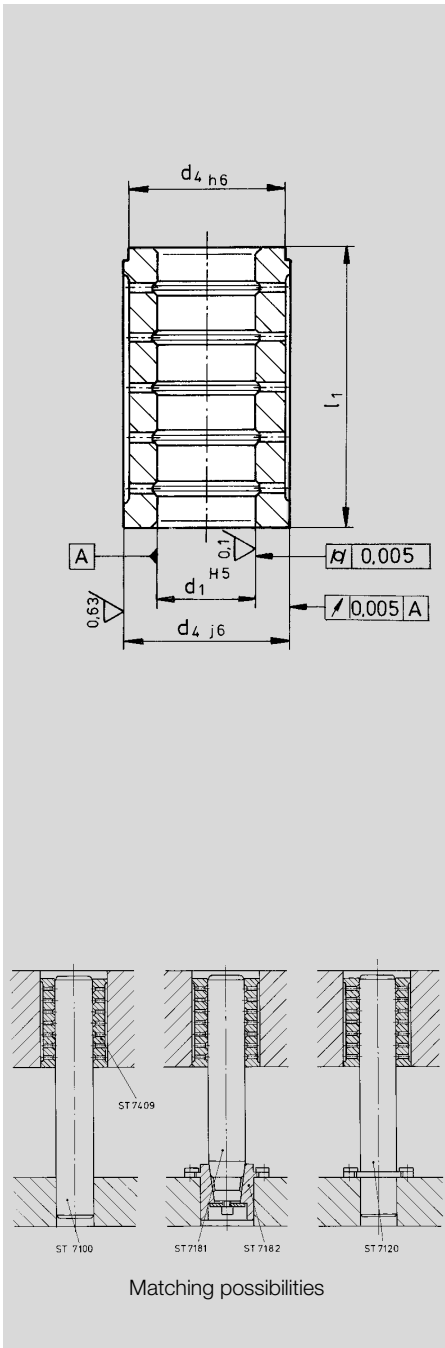
Technical description: see page 3.03

Order example: Guide bush **ST 7409**

$d_1 = 16, l_1 = 37$ mm

Add **16 x 037**

Order number **ST 7409.16 x 037**



Order number ST 7409.				Add size to order number
d_1^{H5}	d_{4j6}	l_1	▲	□ x □
10		23	▲	10 x 023
		30		10 x 030
		37		10 x 037
12		23	▲	12 x 023
		30		12 x 030
		37		12 x 037
15	28	23	▲	15 x 023
		30		15 x 030
		37		15 x 037
		47		15 x 047
		60		15 x 060
16	28	23	▲	16 x 023
		30		16 x 030
		37		16 x 037
		47		16 x 047
		60		16 x 060
19	32	23	▲	19 x 023
		30		19 x 030
		37		19 x 037
		47		19 x 047
		60		19 x 060
		77		19 x 077
20	32	23	▲	20 x 023
		30		20 x 030
		37		20 x 037
		47		20 x 047
		60		20 x 060
		77		20 x 077
24	40	23	▲	24 x 023
		30		24 x 030
		37		24 x 037
		47		24 x 047
		60		24 x 060
		77		24 x 077
25	40	23	▲	25 x 023
		30		25 x 030
		37		25 x 037
		47		25 x 047
		60		25 x 060
		77		25 x 077
30	48	30	▲	30 x 030
		37		30 x 037
		47		30 x 047

Order number ST 7409.				Add size to order number
d_1^{H5}	d_{4j6}	l_1	▲	□ x □
30	48	60	▲	30 x 060
		77		30 x 077
		95		30 x 095
32	48	30	▲	32 x 030
		37		32 x 037
		47		32 x 047
		60		32 x 060
38	58	30	▲	38 x 030
		37		38 x 037
		47		38 x 047
		60		38 x 060
40	58	30	▲	40 x 030
		37		40 x 037
		47		40 x 047
		60		40 x 060
		77		40 x 077
48	70	37	▲	48 x 037
		47		48 x 047
		60		48 x 060
		77		48 x 077
		95		48 x 095
		120		48 x 120
50	70	37	▲	50 x 037
		47		50 x 047
		60		50 x 060
		77		50 x 077
		95		50 x 095
		120		50 x 120
60	85	60	▲	60 x 060
		77		60 x 077
		95		60 x 095
		120		60 x 120
63	85	60	▲	63 x 060
		77		63 x 077
		95		63 x 095
80	105	120	▲	80 x 120
		135		80 x 135

Guide bushes ST 7411

smooth, to pour in, sliding guide steel bronze plated



Material: steel 1.3505 (100 Cr6)
hardened, hardness 61-63 HRC
sliding surface bronze plated

Guide diameter ISO H5, honed
Mounting diameter machined with grooves for casting resin

Important: Due to the galvanically applied bronze plating onto the hardened steel jacket, this bush is suitable especially for high sliding speeds and strong lateral forces.

Matching Guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82

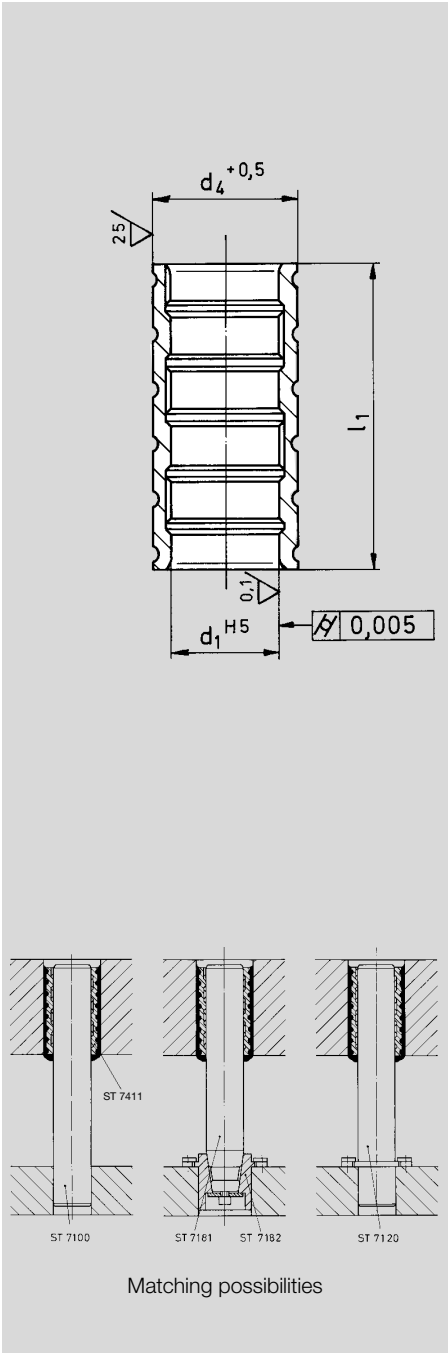
DIN 9831/ISO 9448

Mounting instructions: For lubricating reasons assemble guide bush ST 7411 vertically with the air groove upwards.

Mounting bore hole: Provide $d_4 +1$ to $+4$ mm as casting gap.

Technical description: see page 3.03

Order example: Guide bush **ST 7411**
 $d_1 = 16$, $l_1 = 37$ mm
Add **16 x 037**
Order number **ST 7411.16 x 037**



Order number ST 7411.				□ x □	Add size to order number
d_1^{H5}	$d_4^{+0,5}$	l_1	▲		
10		23	10 x 023		
		30	10 x 030		
		37	10 x 037		
12		23	12 x 023		
		30	12 x 030		
		37	12 x 037		
15		23	15 x 023		
		30	15 x 030		
		37	15 x 037		
		47	15 x 047		
		60	15 x 060		
16		23	16 x 023		
		30	16 x 030		
		37	16 x 037		
		47	16 x 047		
		60	16 x 060		
19		23	19 x 023		
		30	19 x 030		
		37	19 x 037		
		47	19 x 047		
		60	19 x 060		
		77	19 x 077		
20		23	20 x 023		
		30	20 x 030		
		37	20 x 037		
		47	20 x 047		
		60	20 x 060		
		77	20 x 077		
24		23	24 x 023		
		30	24 x 030		
		37	24 x 037		
		47	24 x 047		
		60	24 x 060		
		77	24 x 077		
25		23	25 x 023		
		30	25 x 030		
		37	25 x 037		
		47	25 x 047		
		60	25 x 060		
		77	25 x 077		
30		30	30 x 030		
		37	30 x 037		
		47	30 x 047		

Order number ST 7411.				□ x □	Add size to order number
d_1^{H5}	$d_4^{+0,5}$	l_1	▲		
30		60	30 x 060		
		77	30 x 077		
		95	30 x 095		
32		30	32 x 030		
		37	32 x 037		
		47	32 x 047		
		60	32 x 060		
		77	32 x 077		
38		30	38 x 030		
		37	38 x 037		
		47	38 x 047		
40		30	40 x 030		
		37	40 x 037		
		47	40 x 047		
		60	40 x 060		
		77	40 x 077		
48		37	48 x 037		
		47	48 x 047		
		60	48 x 060		
		77	48 x 077		
		95	48 x 095		
		120	48 x 120		
50		37	50 x 037		
		47	50 x 047		
		60	50 x 060		
		77	50 x 077		
		95	50 x 095		
		120	50 x 120		
60		60	60 x 060		
		77	60 x 077		
		95	60 x 095		
		120	60 x 120		
63		60	63 x 060		
		77	63 x 077		
		95	63 x 095		
80		120	80 x 120		
		135	80 x 135		

Guide bushes ST 7491

smooth, sliding guide with solid lubricant

STEINEL®
NORMALIEN



Material:
Steel with insert of solid lubricant
Due to the insert solid lubricant, this sliding guide is self-lubricating and is suited for higher loads.

Outside diameter ISO H6, precision turned
mounting diameter ISO j6, precision turned

Matching Guide pillars: ST 7100,
ST 7106, ST 7107, ST 7108, ST 7117,
ST 7118, ST 7120, ST 7126, ST 7127,
ST 7128, ST 7181/82

**Dimensions according to
DIN 9831/ISO 9448**

Mounting instructions:

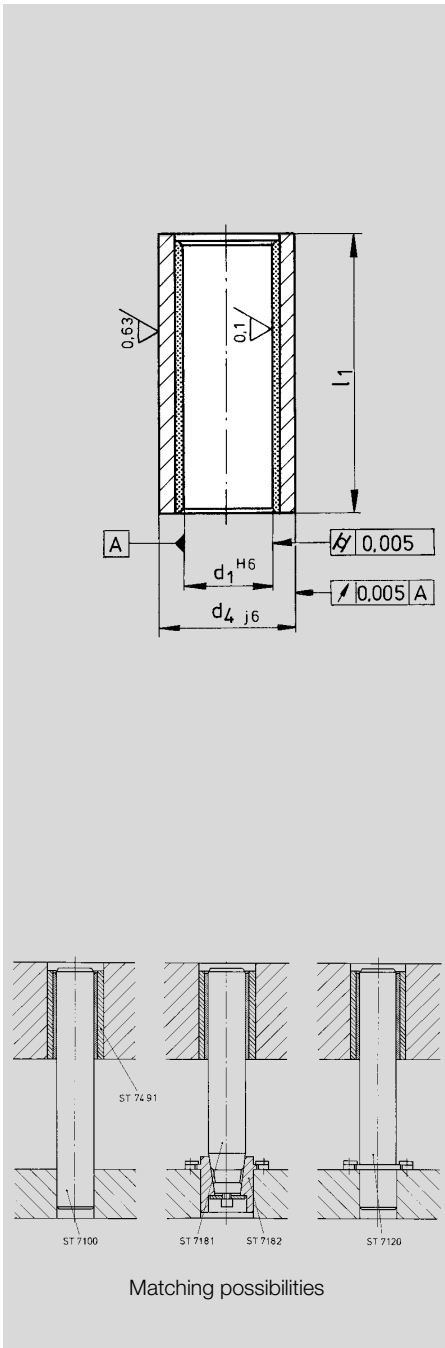
1. Glue into the mounting bore hole ISO H6.
(Bonding agent see to corresponding page)
2. If possible avoid press fit, because the internal diameter will decrease.

Order example: Guide bush **ST 7491**

$d_1 = 16, l_1 = 37$ mm

Add **16 x 037**

Order number **ST 7491.16 x 037**



Matching possibilities

Order number ST 7491.				Add size to order number
d_1^{H6}	d_{4j6}	l_1	▲	
15	28	23	15 x 023	
		30	15 x 030	
		37	15 x 037	
		47	15 x 047	
		60	15 x 060	
16	28	23	16 x 023	
		30	16 x 030	
		37	16 x 037	
		47	16 x 047	
		60	16 x 060	
19	32	23	19 x 023	
		30	19 x 030	
		37	19 x 037	
		47	19 x 047	
		60	19 x 060	
20	32	23	20 x 023	
		30	20 x 030	
		37	20 x 037	
		47	20 x 047	
		60	20 x 060	
24	40	23	24 x 023	
		30	24 x 030	
		37	24 x 037	
		47	24 x 047	
		60	24 x 060	
25	40	23	25 x 023	
		30	25 x 030	
		37	25 x 037	
		47	25 x 047	
		60	25 x 060	
30	48	23	30 x 023	
		30	30 x 030	
		37	30 x 037	
		47	30 x 047	
		60	30 x 060	
32	48	23	32 x 023	
		30	32 x 030	
		37	32 x 037	
		47	32 x 047	
		60	32 x 060	

Order number ST 7491.				Add size to order number
d_1^{H6}	d_{4j6}	l_1	▲	
38	58	30	38 x 030	
		37	38 x 037	
		47	38 x 047	
		60	38 x 060	
		77	38 x 077	
40	58	95	38 x 095	
		120	38 x 120	
		30	40 x 030	
48	70	37	40 x 037	
		47	40 x 047	
		60	40 x 060	
		77	40 x 077	
		95	40 x 095	
50	70	120	40 x 120	
		37	48 x 037	
		47	48 x 047	
		60	48 x 060	
		77	48 x 077	
60	85	95	48 x 095	
		120	48 x 120	
		37	50 x 037	
		47	50 x 047	
		60	50 x 060	
63	85	77	50 x 077	
		95	50 x 095	
		120	50 x 120	
		60	60 x 060	
		77	60 x 077	
80	105	95	60 x 095	
		120	60 x 120	
		60	63 x 060	
		77	63 x 077	
		95	63 x 095	
80	105	120	63 x 120	
		135	63 x 135	
		120	80 x 120	
80	105	135	80 x 135	

Guide bushes ST 7451

smooth, sliding guide with solid lubricant



Material: Bronze with solid lubricant bands
Due to the solid lubricant bands, the sliding guide is self-lubricating and suitable for higher loads.

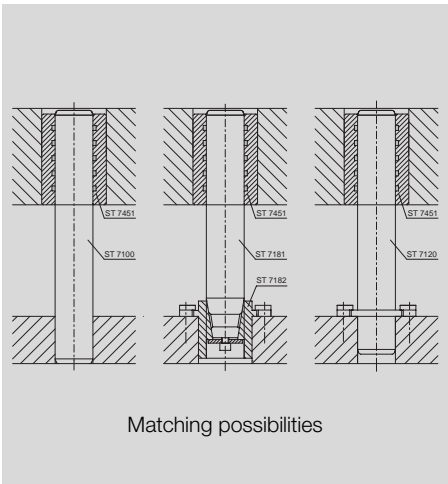
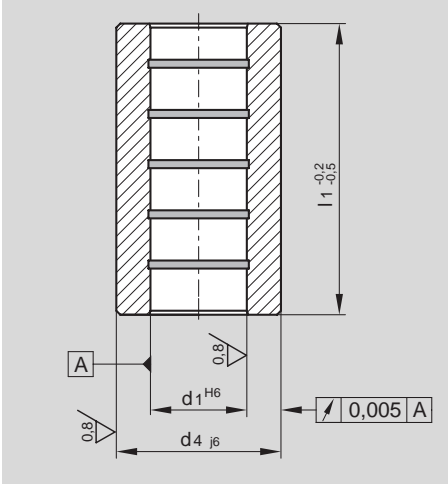
Guide diameter ISO H6, precision-turned
Mounting diameter ISO j6, precision-turned

Matching guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

1. Glue into the mounting bore hole ISO H6 (Bonding agents under section 6)
2. If possible, avoid press fit, because the internal diameter will decrease.

Order example: Guide bush **ST 7451**
 $d_1 = 16$, $l_1 = 37$ mm
Add **16 x 037**
Order number **ST 7451.16 x 037**



Order number ST 7451.				□ x □
d_1^{H6}	d_{4j6}	l_1	▲	Add size to order number
15	28	23	15 x 023	
		30	15 x 030	
		37	15 x 037	
		47	15 x 047	
		60	15 x 060	
16	28	23	16 x 023	
		30	16 x 030	
		37	16 x 037	
		47	16 x 047	
		60	16 x 060	
19	32	23	19 x 023	
		30	19 x 030	
		37	19 x 037	
		47	19 x 047	
		60	19 x 060	
20	32	23	20 x 023	
		30	20 x 030	
		37	20 x 037	
		47	20 x 047	
		60	20 x 060	
24	40	23	24 x 023	
		30	24 x 030	
		37	24 x 037	
		47	24 x 047	
		60	24 x 060	
25	40	23	25 x 023	
		30	25 x 030	
		37	25 x 037	
		47	25 x 047	
		60	25 x 060	
30	48	23	30 x 023	
		30	30 x 030	
		37	30 x 037	
		47	30 x 047	
		60	30 x 060	
32	48	23	32 x 023	
		30	32 x 030	
		37	32 x 037	
		47	32 x 047	
		60	32 x 060	

Order number ST 7451.				□ x □
d_1^{H6}	d_{4j6}	l_1	▲	Add size to order number
38	58	30	38 x 030	
		37	38 x 037	
		47	38 x 047	
		60	38 x 060	
		77	38 x 077	
40	58	95	38 x 095	
		120	38 x 120	
		30	40 x 030	
48	70	37	40 x 037	
		47	40 x 047	
		60	40 x 060	
		77	40 x 077	
		95	40 x 095	
50	70	120	40 x 120	
		37	48 x 037	
		47	48 x 047	
		60	48 x 060	
		77	48 x 077	
60	85	95	48 x 095	
		120	48 x 120	
		60	60 x 060	
		77	60 x 077	
		95	60 x 095	
63	85	120	60 x 120	
		60	63 x 060	
		77	63 x 077	
80	105	95	63 x 095	
		120	63 x 120	
		135	80 x 135	

Guide bushes ST 7402, ST 7406

smooth, ball guide aluminium



Material: Guide bushes made of steel 1.3505 (100 Cr6) hardened, hardness 61-63 HRC
Ball cage made of aluminium, balls made of steel, hardened, grade 1, sorted

Guide diameter d_2 honed, suitable to ball cage and guide pillar mounting diameter ISO j6, ground

Important: If possible order the complete ball guide, so that it can be matched with the correct fit

Matching Guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82

Guide bush without ball cage ST 7406
Ball cage only ST 7130

Mounting instructions:

- To glue into the mounting bore hole ISO H6 (Bonding agent see to corresponding page)
- If possible avoid press fit, because the internal diameter will decrease.

Technical description: see page 3.04

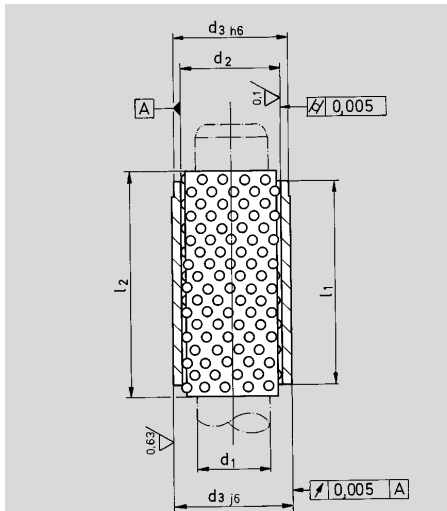
Order example: Guide bush **ST 7402**

with ball cage
 $d_1 = 30, l_1 = 47, l_2 = 58$ mm

Add **30 x 047 x 058**

Order number **ST 7402.30 x 047 x 058**

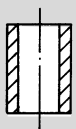
DIN 9831/ISO 9448



Cage travel = 1/2 length of stroke

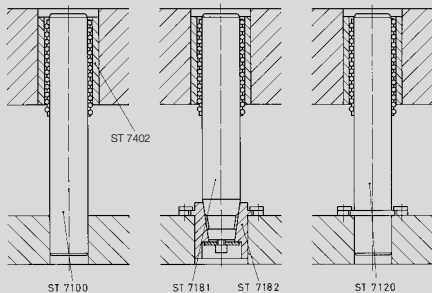
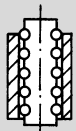
ST 7406

Guide bush, smooth without ball cage



ST 7402

Guide bush, smooth with ball cage



Matching possibilities

Add size to order number

without ball cage	ST 7406.	□ x □ x □	■
with ball cage	ST 7402.	□ x □ x □	□

d_{1H3}	d_2	d_3	l_1	l_2	▲
10	14	22	23	30	10 x 023 x 030
			30	38	10 x 030 x 038
			37	43	10 x 037 x 043
12	16	22	23	30	12 x 023 x 030
			30	38	12 x 030 x 038
			37	43	12 x 037 x 043
15	21	28	23	30	15 x 023 x 030
			30	38	15 x 030 x 038
			37	43	15 x 037 x 043
			47	54	15 x 047 x 054
			60	63	15 x 060 x 063
16	22	28	23	30	16 x 023 x 030
			30	38	16 x 030 x 038
			37	43	16 x 037 x 043
			47	54	16 x 047 x 054
			60	63	16 x 060 x 063
			120	128	16 x 120 x 128
19	25	32	23	30	19 x 023 x 030
			30	38	19 x 030 x 038
			37	43	19 x 037 x 043
			47	54	19 x 047 x 054
			60	63	19 x 060 x 063
			120	128	19 x 120 x 128
20	26	32	23	30	20 x 023 x 030
			30	38	20 x 030 x 038
			37	43	20 x 037 x 043
			47	54	20 x 047 x 054
			60	63	20 x 060 x 063
			120	128	20 x 120 x 128
24	30	40	23	30	24 x 023 x 030
			30	38	24 x 030 x 038
			37	43	24 x 037 x 043
			47	54	24 x 047 x 054
			60	63	24 x 060 x 063
			77	83	24 x 077 x 083
25	31	40	23	30	25 x 023 x 030
			30	38	25 x 030 x 038
			37	43	25 x 037 x 043
			47	54	25 x 047 x 054
			60	63	25 x 060 x 063
			77	83	25 x 077 x 083
30	38	48	30	38	30 x 030 x 038
			37	43	30 x 037 x 043
			47	58	30 x 047 x 058
			120	139	30 x 120 x 139

Add size to order number

without ball cage	ST 7406.	□ x □ x □	■
with ball cage	ST 7402.	□ x □ x □	□

d_{1H3}	d_2	d_3	l_1	l_2	▲
30	38	48	60	68	30 x 060 x 068
			77	88	30 x 077 x 088
			95	108	30 x 095 x 108
32	40	48	30	38	32 x 030 x 038
			37	43	32 x 037 x 043
			47	58	32 x 047 x 058
			60	68	32 x 060 x 068
			77	88	32 x 077 x 088
38	46	58	30	38	38 x 030 x 038
			37	43	38 x 037 x 043
			47	58	38 x 047 x 058
			60	68	38 x 060 x 068
			77	88	38 x 077 x 088
			95	108	38 x 095 x 108
40	48	58	30	38	40 x 030 x 038
			37	43	40 x 037 x 043
			47	58	40 x 047 x 058
			60	68	40 x 060 x 068
			77	88	40 x 077 x 088
			95	108	40 x 095 x 108
48	56	70	37	43	48 x 037 x 043
			47	58	48 x 047 x 058
			60	68	48 x 060 x 068
			77	88	48 x 077 x 088
			95	108	48 x 095 x 108
			120	128	48 x 120 x 128
50	58	70	37	43	50 x 037 x 043
			47	58	50 x 047 x 058
			60	68	50 x 060 x 068
			77	88	50 x 077 x 088
			95	108	50 x 095 x 108
			120	128	50 x 120 x 128
60	70	85	60	75	60 x 060 x 075
			77	94	60 x 077 x 094
			95	113	60 x 095 x 113
			120	139	60 x 120 x 139
			135	156	60 x 135 x 156
			156	188	60 x 156 x 188
63	73	85	60	75	63 x 060 x 075
			77	94	63 x 077 x 094
			95	113	63 x 095 x 113
			120	139	63 x 120 x 139
			135	156	63 x 135 x 156
			156	188	63 x 156 x 188
80	92	105	120	138	80 x 120 x 138
			135	156	80 x 135 x 156

Guide bushes ST 7403

smooth, roller guide



Material:

Guide bushes made of steel 1.3505 (100 Cr 6) hardened, hardness 61-63 HRC roller cage made of aluminium, profile rollers made of steel, hardened, grade 1, sorted

Guide diameter d_2 honed, suitable to roller cage and guide pillar mounting diameter ISO j6, ground.

Important: If possible order the complete roller guide, so that it can be matched with the correct fit

Matching Guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82

DIN 9831/ISO 9448

Mounting instructions:

1. To glue into the mounting bore hole ISO H6 (Bonding agent see to corresponding page)

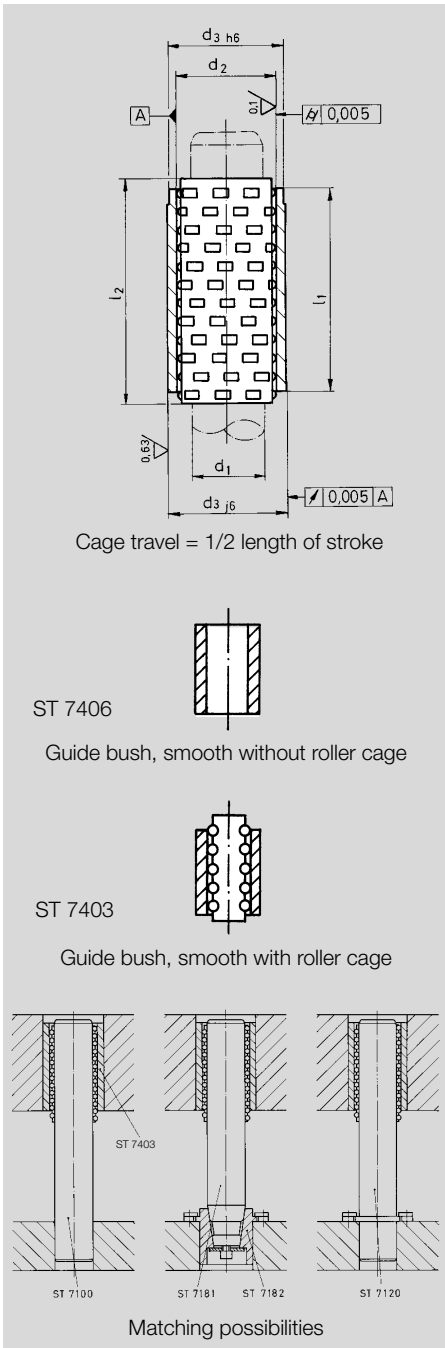
2. If possible, avoid press fit, because the internal diameter will decrease.

Guide bushes without roller cage ST 7406
Roller cage only ST 7140

Technical description: see page 3.05

Order example:

Guide bush **ST 7403**
with roller cage
 $d_1 = 30$, $l_1 = 47$, $l_2 = 54$ mm
Add **30 x 047 x 054**
Order number **ST 7403.30 x 047 x 054**



Add size to order number

						without roller cage	ST 7406.	□ x □ x ■
						with roller cage	ST 7403.	□ x □ x □
d_{1h3}	d_2	d_3	l_1	l_2	▲			
19	25	32	37	43	19 x 037 x 043			
			47	54	19 x 047 x 054			
			60	63	19 x 060 x 063			
20	26	32	37	43	20 x 037 x 043			
			47	54	20 x 047 x 054			
			60	63	20 x 060 x 063			
24	30	40	37	43	24 x 037 x 043			
			47	63	24 x 047 x 063			
			60	74	24 x 060 x 074			
			77	90	24 x 077 x 090			
25	31	40	37	43	25 x 037 x 043			
			47	63	25 x 047 x 063			
			60	74	25 x 060 x 074			
			77	90	25 x 077 x 090			
30	38	48	47	54	30 x 047 x 054			
			60	74	30 x 060 x 074			
			77	83	30 x 077 x 083			
			95	103	30 x 095 x 103			
32	40	48	47	54	32 x 047 x 054			
			60	74	32 x 060 x 074			
			77	83	32 x 077 x 083			
			95	103	32 x 095 x 103			
38	46	58	60	58	38 x 060 x 058			
			77	88	38 x 077 x 088			
			95	94	38 x 095 x 094			
			120	128	38 x 120 x 128			
40	48	58	60	58	40 x 060 x 058			
			77	88	40 x 077 x 088			
			95	94	40 x 095 x 094			
			120	128	40 x 120 x 128			
48	56	70	77	74	48 x 077 x 074			
			95	108	48 x 095 x 108			
			120	128	48 x 120 x 128			
50	58	70	77	74	50 x 077 x 074			
			95	108	50 x 095 x 108			
			120	128	50 x 120 x 128			
60	70	85	77	113	60 x 077 x 113			
			95	128	60 x 095 x 128			
			120	139	60 x 120 x 139			
63	73	85	77	113	63 x 077 x 113			
			95	128	63 x 095 x 128			
			120	139	63 x 120 x 139			
80	92	105	120	138	80 x 120 x 138			
			135	156	80 x 135 x 156			

Guide bushes ST 7404

smooth, ball guide brass

STEINEL[®]
NORMALIEN



Material:

Guide bushes made of steel 1.3505 (100 Cr6) hardened, hardness 61-63 HRC
Ball cage made of brass
balls made of steel, hardened, grade 1, sorted

Guide diameter d_2 honed, suitable to ball cage and guide pillar
mounting diameter ISO j6, ground.

Important: If possible, order the complete ball guide, so that it can be matched with the correct fit

Matching Guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128, ST 7181/82

Mounting instructions:

1. To glue into the mounting bore hole ISO H6 (Bonding agent see to corresponding page)
2. If possible, avoid press fit, because the internal diameter will decrease.

Technical description: see page 3.04

Order example: Guide bush **ST 7404**

with ball cage
 $d_1 = 30, l_1 = 47, l_2 = 58$ mm

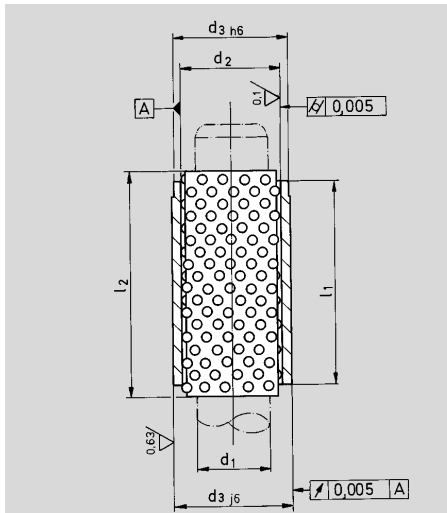
Add **30 x 047 x 058**

Order number **ST 7404.30 x 047 x 058**

Guide bushes without ball cage ST 7406

Ball cage only ST 7150

DIN 9831/ISO 9448



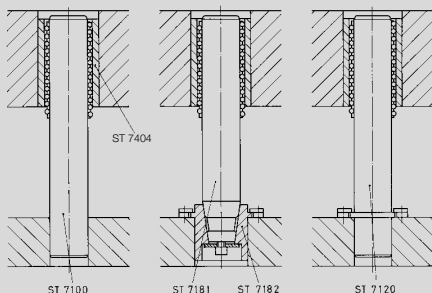
Cage travel = 1/2 length of stroke

ST 7406

Guide bush, smooth without ball cage

ST 7404

Guide bush, smooth with ball cage



Matching possibilities

Add size to order number

without ball cage **ST 7406.** □ x □ x □
with ball cage **ST 7404.** □ x □ x □

d_{1h3}	d_2	d_3	l_1	l_2	▲
10	14	22	23	30	10 x 023 x 030
			30	38	10 x 030 x 038
			37	43	10 x 037 x 043
12	16	22	23	30	12 x 023 x 030
			30	38	12 x 030 x 038
			37	43	12 x 037 x 043
15	21	28	23	30	15 x 023 x 030
			30	38	15 x 030 x 038
			37	43	15 x 037 x 043
			47	54	15 x 047 x 054
			60	63	15 x 060 x 063
16	22	28	23	30	16 x 023 x 030
			30	38	16 x 030 x 038
			37	43	16 x 037 x 043
			47	54	16 x 047 x 054
			60	63	16 x 060 x 063
19	25	32	23	30	19 x 023 x 030
			30	38	19 x 030 x 038
			37	43	19 x 037 x 043
			47	54	19 x 047 x 054
			60	63	19 x 060 x 063
20	26	32	23	30	20 x 023 x 030
			30	38	20 x 030 x 038
			37	43	20 x 037 x 043
			47	54	20 x 047 x 054
			60	63	20 x 060 x 063
24	30	40	23	30	24 x 023 x 030
			30	38	24 x 030 x 038
			37	43	24 x 037 x 043
			47	54	24 x 047 x 054
			60	63	24 x 060 x 063
24	30	40	37	43	24 x 037 x 043
			47	54	24 x 047 x 054
			60	63	24 x 060 x 063
			77	83	24 x 077 x 083
			95	108	24 x 095 x 108
25	31	40	23	30	25 x 023 x 030
			30	38	25 x 030 x 038
			37	43	25 x 037 x 043
			47	54	25 x 047 x 054
			60	63	25 x 060 x 063
25	31	40	77	83	25 x 077 x 083
			95	108	25 x 095 x 108
			120	128	25 x 120 x 128
			60	70	25 x 060 x 070
			77	83	25 x 077 x 083
30	38	48	30	38	30 x 030 x 038
			37	43	30 x 037 x 043
			47	58	30 x 047 x 058
			77	83	30 x 077 x 083
			95	108	30 x 095 x 108

Add size to order number

without ball cage **ST 7406.** □ x □ x □
with ball cage **ST 7404.** □ x □ x □

d_{1h3}	d_2	d_3	l_1	l_2	▲
30	38	48	60	68	30 x 060 x 068
			77	88	30 x 077 x 088
			95	108	30 x 095 x 108
32	40	48	30	38	32 x 030 x 038
			37	43	32 x 037 x 043
			47	58	32 x 047 x 058
			60	68	32 x 060 x 068
			77	88	32 x 077 x 088
32	40	48	95	108	32 x 095 x 108
			30	38	38 x 030 x 038
			37	43	38 x 037 x 043
			47	58	38 x 047 x 058
			60	68	38 x 060 x 068
38	46	58	77	88	38 x 077 x 088
			95	108	38 x 095 x 108
			30	38	38 x 030 x 038
			37	43	38 x 037 x 043
			47	58	38 x 047 x 058
38	46	58	60	68	38 x 060 x 068
			77	88	38 x 077 x 088
			95	108	38 x 095 x 108
			120	128	38 x 120 x 128
			30	38	40 x 030 x 038
40	48	58	37	43	40 x 037 x 043
			47	58	40 x 047 x 058
			60	68	40 x 060 x 068
			77	88	40 x 077 x 088
			95	108	40 x 095 x 108
40	48	58	120	128	40 x 120 x 128
			37	43	48 x 037 x 043
			47	58	48 x 047 x 058
			60	68	48 x 060 x 068
			77	88	48 x 077 x 088
48	56	70	95	108	48 x 095 x 108
			120	128	48 x 120 x 128
			37	43	48 x 037 x 043
			47	58	48 x 047 x 058
			60	68	48 x 060 x 068
50	58	70	77	88	48 x 077 x 088
			95	108	48 x 095 x 108
			120	128	48 x 120 x 128
			37	43	50 x 037 x 043
			47	58	50 x 047 x 058
50	58	70	60	68	50 x 060 x 068
			77	88	50 x 077 x 088
			95	108	50 x 095 x 108
			120	128	50 x 120 x 128
			60	70	60 x 060 x 070
60	70	85	77	94	60 x 077 x 094
			95	113	60 x 095 x 113
			120	139	60 x 120 x 139
			60	75	60 x 060 x 075
			77	94	60 x 077 x 094
63	73	85	95	113	63 x 095 x 113
			120	139	63 x 120 x 139
			60	75	63 x 060 x 075
			77	94	63 x 077 x 094
			95	113	63 x 095 x 113
80	92	105	120	138	80 x 120 x 138
			135	156	80 x 135 x 156
			60	75	80 x 060 x 075

Guide bushes ST 7405

smooth, ball guide plastic



Material:

Guide bushes made of steel 1.3505 (100 Cr 6) hardened, hardness 61-63 HRC
Ball cage made of plastic
Balls made of steel, hardened, grade 1, sorted

Guide diameter d_2 honed, matched to ball cage and guide pillar.
Mounting diameter ground to ISO j6.

Important: If possible, order the complete ball guide so that it can be matched with the correct preload.

Matching guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7117, ST 7118, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82.

Guide bushes without ball cage ST 7406
Ball cage only ST 7133

Mounting instructions:

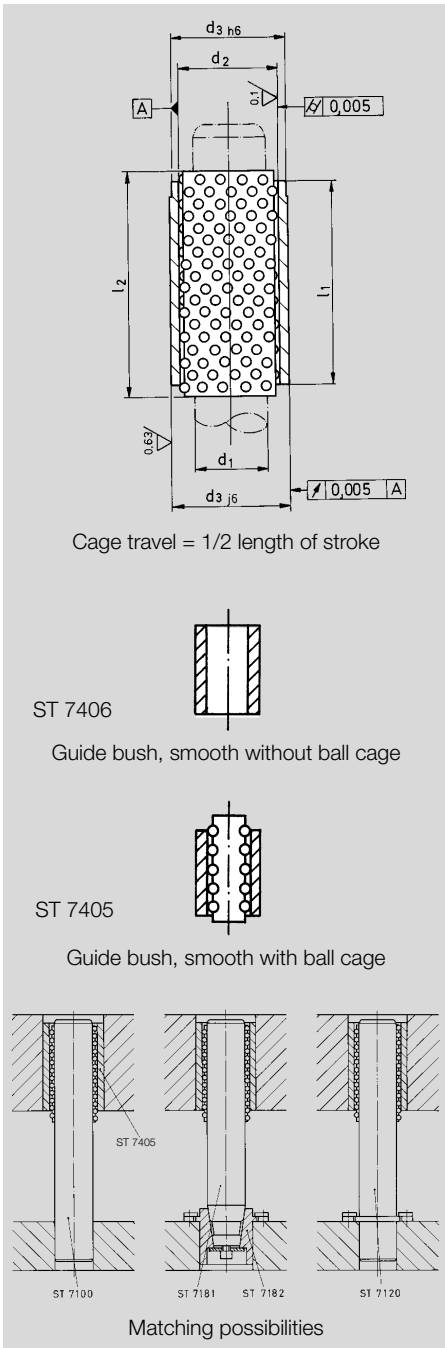
1. Glue into the bore hole ISO H6.
(Bonding agents under section 6)
2. If possible, avoid press fit, because the internal diameter will decrease.

Technical description: see page 3.04

Order example: Guide bush ST 7405

with ball cage
 $d_1 = 30$, $l_1 = 47$ mm, $l_2 = 58$ mm
Add **30 x 047 x 058**
Order number **ST 7405.30 x 047 x 058**

DIN 9831/ISO 9448



Add size to order number

without ball cage	ST 7406.	<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/>
with ball cage	ST 7405.	<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/>

d_{1h3}	d_2	d_3	l_1	l_2	▲
10	14	22	23	30	10 x 023 x 030
			30	38	10 x 030 x 038
			37	43	10 x 037 x 043
12	16	22	23	30	12 x 023 x 030
			30	38	12 x 030 x 038
			37	43	12 x 037 x 043
15	21	28	23	30	15 x 023 x 030
			30	38	15 x 030 x 038
			37	43	15 x 037 x 043
			47	54	15 x 047 x 054
			60	63	15 x 060 x 063
16	22	28	23	30	16 x 023 x 030
			30	38	16 x 030 x 038
			37	43	16 x 037 x 043
			47	54	16 x 047 x 054
			60	63	16 x 060 x 063
19	25	32	23	30	19 x 023 x 030
			30	38	19 x 030 x 038
			37	43	19 x 037 x 043
			47	54	19 x 047 x 054
			60	63	19 x 060 x 063
20	26	32	23	30	20 x 023 x 030
			30	38	20 x 030 x 038
			37	43	20 x 037 x 043
			47	54	20 x 047 x 054
			60	63	20 x 060 x 063
24	30	40	23	30	24 x 023 x 030
			30	38	24 x 030 x 038
			37	43	24 x 037 x 043
			47	54	24 x 047 x 054
			60	63	24 x 060 x 063
25	31	40	23	30	25 x 023 x 030
			30	38	25 x 030 x 038
			37	43	25 x 037 x 043
			47	54	25 x 047 x 054
			60	63	25 x 060 x 063
30	38	48	23	30	30 x 023 x 030
			30	38	30 x 030 x 038
			37	43	30 x 037 x 043
			47	58	30 x 047 x 058
			77	83	30 x 077 x 083

Add size to order number

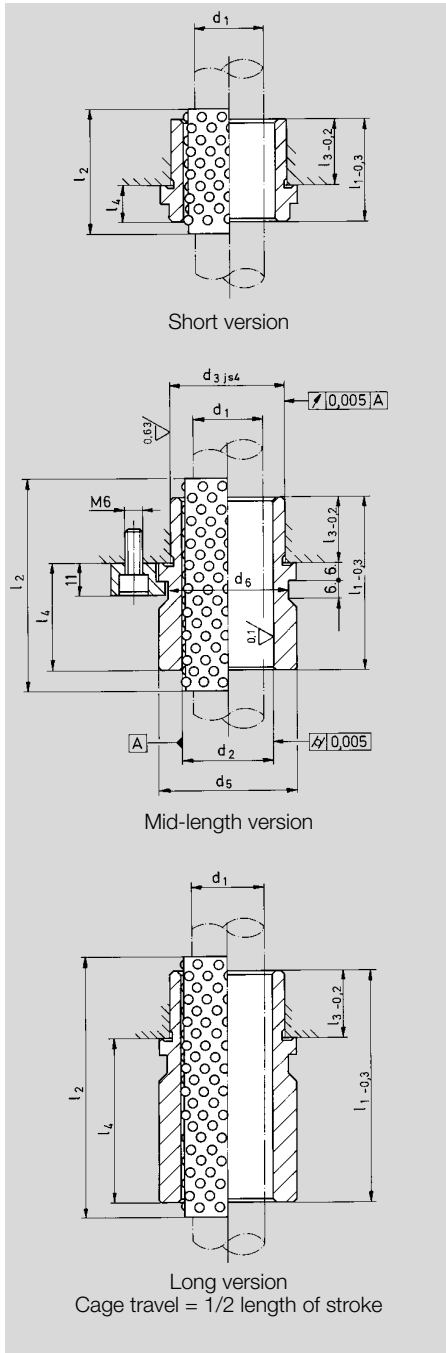
without ball cage	ST 7406.	<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/>
with ball cage	ST 7405.	<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/>

d_{1h3}	d_2	d_3	l_1	l_2	▲
30	38	48	60	68	30 x 060 x 068
			77	88	30 x 077 x 088
			95	108	30 x 095 x 108
32	40	48	30	38	32 x 030 x 038
			37	43	32 x 037 x 043
			47	58	32 x 047 x 058
			60	68	32 x 060 x 068
			77	88	32 x 077 x 088
38	46	58	30	38	38 x 030 x 038
			37	43	38 x 037 x 043
			47	58	38 x 047 x 058
			60	68	38 x 060 x 068
			77	88	38 x 077 x 088
40	48	58	30	38	40 x 030 x 038
			37	43	40 x 037 x 043
			47	58	40 x 047 x 058
			60	68	40 x 060 x 068
			77	88	40 x 077 x 088
48	56	70	37	43	48 x 037 x 043
			47	58	48 x 047 x 058
			60	68	48 x 060 x 068
			77	88	48 x 077 x 088
			95	108	48 x 095 x 108
50	58	70	37	43	50 x 037 x 043
			47	58	50 x 047 x 058
			60	68	50 x 060 x 068
			77	88	50 x 077 x 088
			95	108	50 x 095 x 108
50	58	70	120	128	50 x 120 x 128
			37	43	50 x 037 x 043
			47	58	50 x 047 x 058
			60	68	50 x 060 x 068
			77	88	50 x 077 x 088
50	58	70	95	108	50 x 095 x 108
			120	128	50 x 120 x 128

Guide bushes ST 7412, ST 7416

with shoulder, ball guide aluminium

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Material:

Guide bushes made of steel 1.3505 (16 MnCr5) case hardened,
hardness 61-63 HRC
Ball cage made of aluminium
balls made of steel, hardened, grade 1, sorted

Guide diameter honed, suitable to ball cage and guide pillar.
Mounting diameter ISO js4, ground.

Important: If possible, order the complete ball guide, so that it can be matched with the correct fit

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 holding clamps (included in delivery).
The shoulder surface, right-angled ground to the guide bore, will be squeezed onto the plate by the holding clamps and guarantees an absolutely rigid clamping of the guide bush.

Holding clamps:

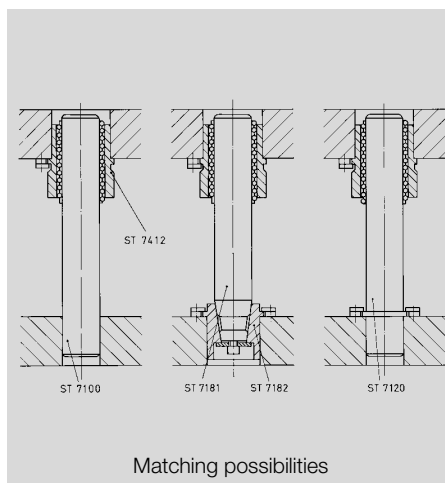
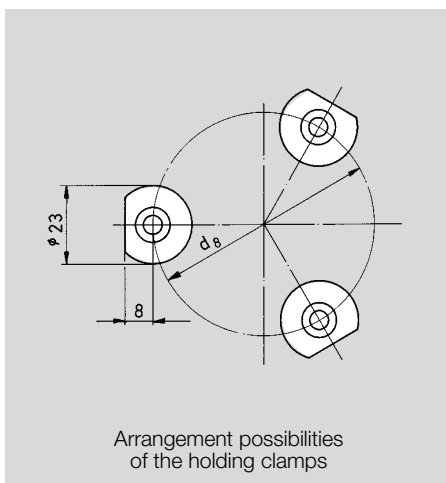
When reordering the holding clamps please order: 1 set = 3 pieces, order number ST 7367

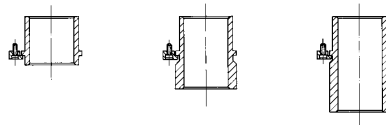
Guide bush without ball cage ST 7416
Ball cage only ST 7130

Technical description:

see page 3.04

DIN 9831/ISO 9448





Order example:

Guide bush **ST 7416**

without ball cage

$d_1 = 30$, $l_1 = 93$ mm

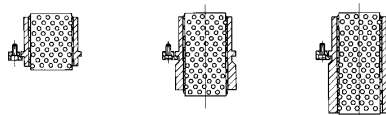
Add **30 x 093**

Order number **ST 7416. 30 x 093**

without ball cage

Order number **ST 7416. □ x □ x □**

Add
size to
order number



Order example:

Guide bush **ST 7412**

with ball cage

$d_1 = 40$, $l_1 = 82$, $l_2 = 94$ mm

Add **40 x 082 x 094**

Order number **ST 7412. 40 x 082 x 094**

with ball cage

Order number **ST 7412. □ x □ x □**

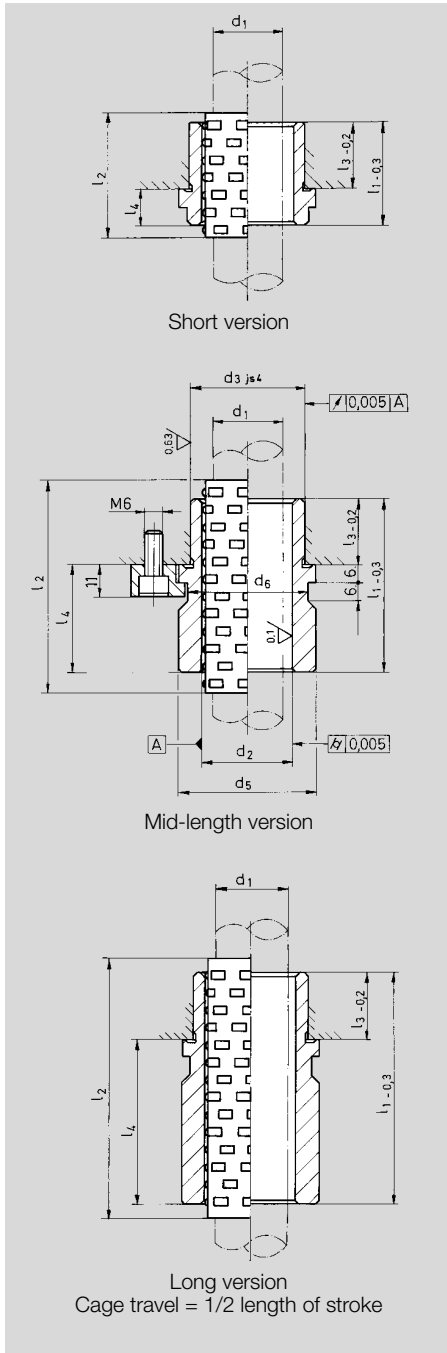
Add
size to
order number

d_{1h3}	d_2	d_{3js4}	d_5	d_6	d_8	$l_{1-0,3}$	l_2	$l_{3-0,2}$	l_4	▲
19	25	32	40	32	59	35	43	23	12	19 x 035 x 043
						43	54			19 x 043 x 054
						59	74			19 x 059 x 074
20	26	32	40	32	59	35	43	23	12	20 x 035 x 043
						43	54			20 x 043 x 054
						59	74			20 x 059 x 074
24	30	40	48	40	65	35	43	23	12	24 x 035 x 043
						60	74			24 x 060 x 074
						80	90			24 x 080 x 090
25	31	40	48	40	65	35	43	23	12	25 x 035 x 043
						60	74			25 x 060 x 074
						80	90			25 x 080 x 090
30	38	48	56	48	73	42	54	30	12	30 x 042 x 054
						75	83			30 x 075 x 083
						93	103			30 x 093 x 103
32	40	48	56	48	73	42	54	30	12	32 x 042 x 054
						75	83			32 x 075 x 083
						93	103			32 x 093 x 103
38	46	58	66	58	83	52	58	37	15	38 x 052 x 058
						82	94			38 x 082 x 094
						107	128			38 x 107 x 128
40	48	58	66	58	83	52	58	37	15	40 x 052 x 058
						82	94			40 x 082 x 094
						107	128			40 x 107 x 128
48	56	70	80	70	97	65	74	47	18	48 x 065 x 074
						97	108			48 x 097 x 108
						127	128			48 x 127 x 128
50	58	70	80	70	97	65	74	47	18	50 x 065 x 074
						97	108			50 x 097 x 108
						127	128			50 x 127 x 128
60	70	85	95	85	112	80	113	60	20	60 x 080 x 113
						115	128			60 x 115 x 128
						150	154			60 x 150 x 154
63	73	85	95	85	112	80	113	60	20	63 x 080 x 113
						115	128			63 x 115 x 128
						150	154			63 x 150 x 154
80	92	105	118	105	135	80	113	60	20	80 x 080 x 113
						120	138			80 x 120 x 138
						150	156			80 x 150 x 156

Guide bushes ST 7413

with shoulder, roller guide

STEINEL[®]
NORMALIEN



Material:

Guide bushes made of steel 1.7131 (16 MnCr5) case hardened, hardness 61-63 HRC
roller cage made of aluminium
profile rollers made of steel, hardened, grade 1, sorted

Guide diameter honed, suitable to roller cage and guide pillar.
Mounting diameter ISO js4, ground.

Important: If possible, order the complete roller guide, so that it can be matched with the correct fit

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 holding clamps ST 7367 (included in delivery).
The shoulder surface, right-angled ground to the guide bore, will be squeezed onto the plate by the holding clamps and guarantees an absolutely rigid clamping of the guide bush.

Holding clamps:

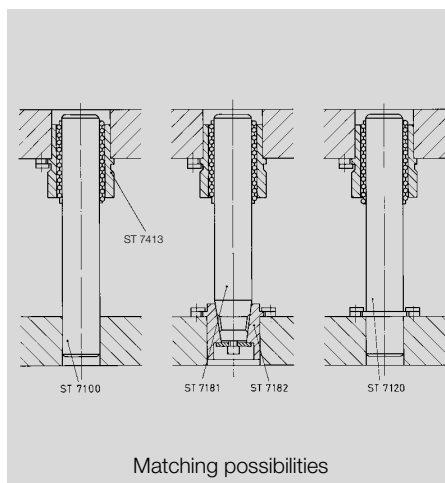
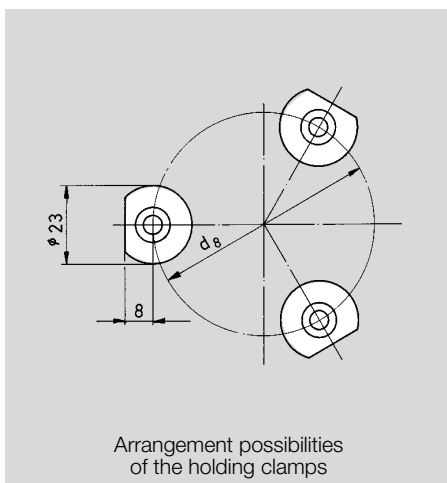
When reordering the holding clamps please order: 1 set = 3 pieces, order number ST 7367

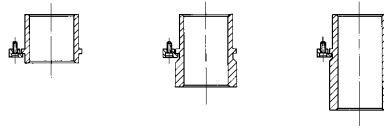
Guide bush without roller cage ST 7416
Roller cage only ST 7140

DIN 9831/ISO 9448

Technical description:

see page 3.05

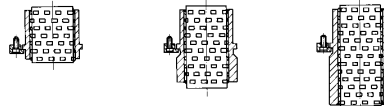




Order example:
Guide bush **ST 7416**
without roller cage
 $d_1 = 30$, $l_1 = 93$ mm
Add **30 x 093**
Order number **ST 7416. 30 x 093**

without roller cage

Add size to order number
Order number **ST 7416. □ x □ x □**



Order example:
Guide bush **ST 7413**
with roller cage
 $d_1 = 40$, $l_1 = 82$, $l_2 = 94$ mm
Add **40 x 082 x 094**
Order number **ST 7413. 40 x 082 x 094**

with roller cage

Add size to order number
Order number **ST 7413. □ x □ x □**

d_{1h3}	d_2	d_{3js4}	d_5	d_6	d_8	$l_{1-0,3}$	l_2	$l_{3-0,2}$	l_4	▲
19	25	32	40	32	59	35	43	23	12	19 x 035 x 043
						43	54			19 x 043 x 054
						59	74			19 x 059 x 074
20	26	32	40	32	59	35	43	23	12	20 x 035 x 043
						43	54			20 x 043 x 054
						59	74			20 x 059 x 074
24	30	40	48	40	65	35	43	23	12	24 x 035 x 043
						60	74			24 x 060 x 074
						80	90			24 x 080 x 090
25	31	40	48	40	65	35	43	23	12	25 x 035 x 043
						60	74			25 x 060 x 074
						80	90			25 x 080 x 090
30	38	48	56	48	73	42	54	30	12	30 x 042 x 054
						75	83			30 x 075 x 083
						93	103			30 x 093 x 103
32	40	48	56	48	73	42	54	30	12	32 x 042 x 054
						75	83			32 x 075 x 083
						93	103			32 x 093 x 103
38	46	58	66	58	83	52	58	37	15	38 x 052 x 058
						82	94			38 x 082 x 094
						107	128			38 x 107 x 128
40	48	58	66	58	83	52	58	37	15	40 x 052 x 058
						82	94			40 x 082 x 094
						107	128			40 x 107 x 128
48	56	70	80	70	97	65	74	47	18	48 x 065 x 074
						97	108			48 x 097 x 108
						127	128			48 x 127 x 128
50	58	70	80	70	97	65	74	47	18	50 x 065 x 074
						97	108			50 x 097 x 108
						127	128			50 x 127 x 128
60	70	85	95	85	112	80	113	60	20	60 x 080 x 113
						115	128			60 x 115 x 128
						150	139			60 x 150 x 139
63	73	85	95	85	112	80	113	60	20	63 x 080 x 113
						115	128			63 x 115 x 128
						150	139			63 x 150 x 139
80	92	105	118	105	135	80	113	60	20	80 x 080 x 113
						120	138			80 x 120 x 138
						150	156			80 x 150 x 156

Guide bushes ST 7414

with shoulder, ball guide brass

STEINEL[®]
NORMALIEN

Material:

Guide bush made of steel 1.7131 (16 MnCr5) case hardened,
hardness 61-63 HRC
Ball cage made of brass
balls made of steel, hardened, grade 1, sorted

Guide diameter honed, suitable to Ball cage and Guide pillar.
Mounting diameter ISO js4, ground.

Important: If possible, order the complete ball guide, so that it can be matched with the correct fit

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 holding clamps ST 7367 (included in delivery).
The shoulder surface, right-angled ground to the guide bore, will be squeezed onto the plate by the holding clamps and guarantees an absolutely rigid clamping of the guide bush.

Holding clamps:

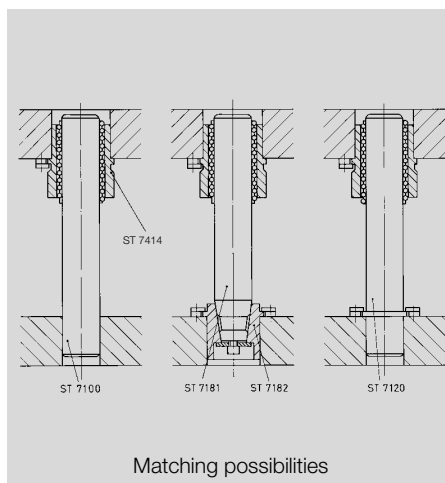
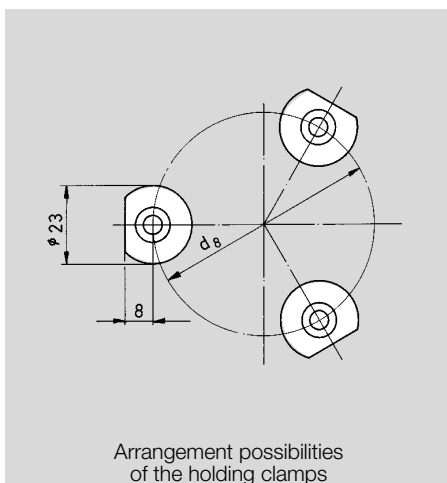
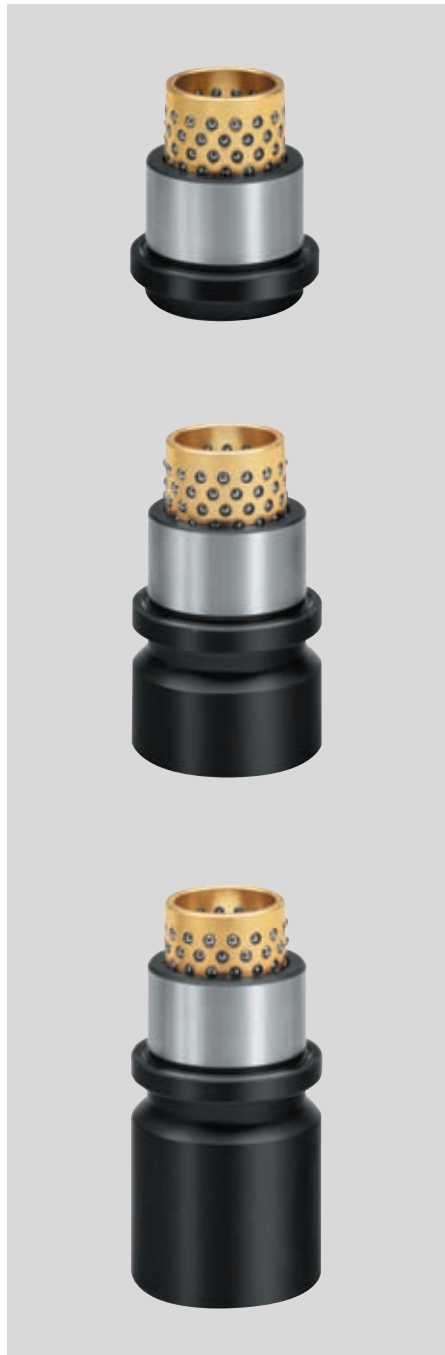
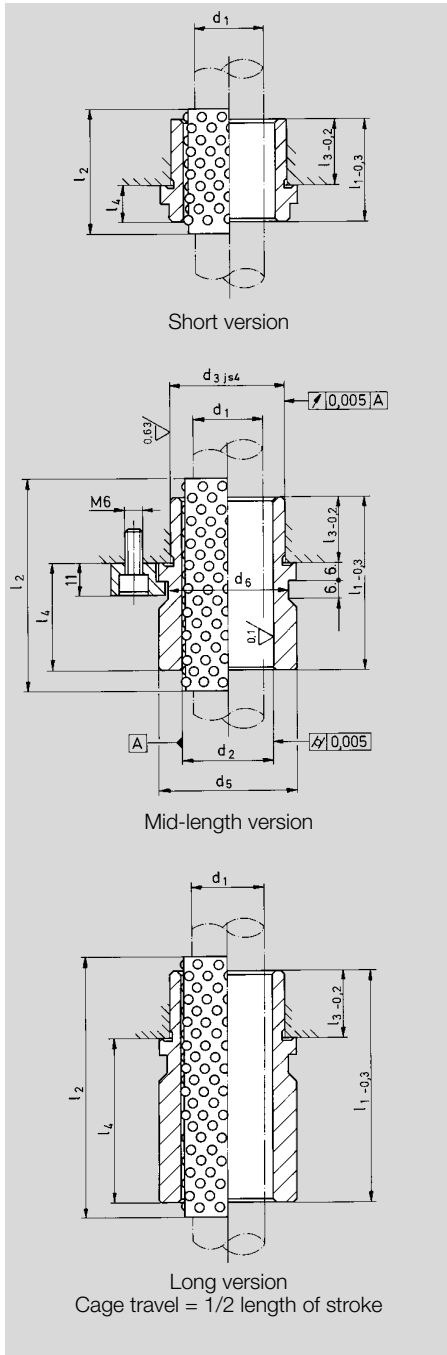
When reordering the holding clamps please order: 1 set = 3 pieces, order number ST 7367

Guide bush without roller cage ST 7416
Ball cage brass only ST 7150

DIN 9831/ISO 9448

Technical description:

see page 3.04



Order example:

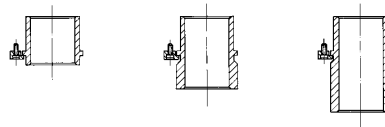
Guide bush **ST 7416.**

without ball cage

$d_1 = 30$, $l_1 = 93$ mm

Add **30 x 093**

Order number **ST 7416. 30 x 093**



without ball cage

Add
size to
order number

Order number **ST 7416.** x x

Order example:

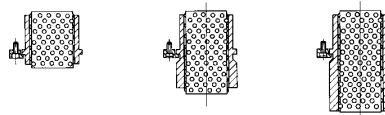
Guide bush **ST 7414.**

with ball cage, brass

$d_1 = 40$, $l_1 = 82$, $l_2 = 94$ mm

Add **40 x 082 x 094**

Order number **ST 7414. 40 x 082 x 094**



with ball cage

Add
size to
order number

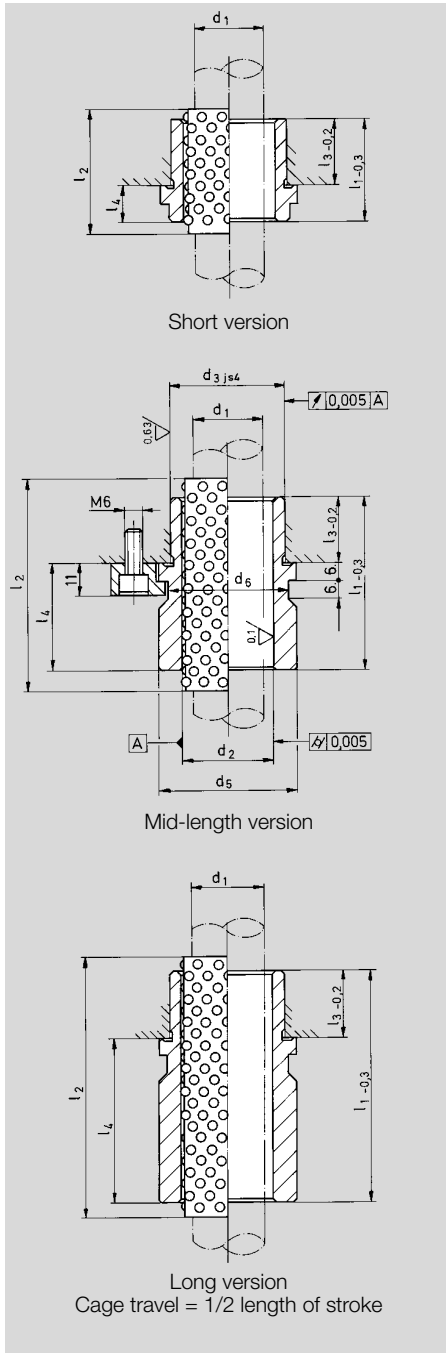
Order number **ST 7414.** x x

d_{1h3}	d_2	d_{3js4}	d_5	d_6	d_8	$l_{1-0,3}$	l_2	$l_{3-0,2}$	l_4	▲	
19	25	32	40	32	59	35	43	23	12	19 x 035 x 043	
						43	54			20	19 x 043 x 054
						59	74			36	19 x 059 x 074
20	26	32	40	32	59	35	43	23	12	20 x 035 x 043	
						43	54			20	20 x 043 x 054
						59	74			36	20 x 059 x 074
24	30	40	48	40	65	35	43	23	12	24 x 035 x 043	
						60	74			37	24 x 060 x 074
						80	90			57	24 x 080 x 090
25	31	40	48	40	65	35	43	23	12	25 x 035 x 043	
						60	74			37	25 x 060 x 074
						80	90			57	25 x 080 x 090
30	38	48	56	48	73	42	54	30	12	30 x 042 x 054	
						75	83			45	30 x 075 x 083
						93	103			63	30 x 093 x 103
32	40	48	56	48	73	42	54	30	12	32 x 042 x 054	
						75	83			45	32 x 075 x 083
						93	103			63	32 x 093 x 103
38	46	58	66	58	83	52	58	37	15	38 x 052 x 058	
						82	94			45	38 x 082 x 094
						107	128			70	38 x 107 x 128
40	48	58	66	58	83	52	58	37	15	40 x 052 x 058	
						82	94			45	40 x 082 x 094
						107	128			70	40 x 107 x 128
48	56	70	80	70	97	65	74	47	18	48 x 065 x 074	
						97	108			50	48 x 097 x 108
						127	128			80	48 x 127 x 128
50	58	70	80	70	97	65	74	47	18	50 x 065 x 074	
						97	108			50	50 x 097 x 108
						127	128			80	50 x 127 x 128
60	70	85	95	85	112	80	113	60	20	60 x 080 x 113	
						115	128			55	60 x 115 x 128
						150	154			90	60 x 150 x 154
63	73	85	95	85	112	80	113	60	20	63 x 080 x 113	
						115	128			55	63 x 115 x 128
						150	154			90	63 x 150 x 154
80	92	105	118	105	135	80	113	60	20	80 x 080 x 113	
						120	138			60	80 x 120 x 138
						150	156			90	80 x 150 x 156

Guide bushes ST 7415

with shoulder, ball guide plastic

STEINEL[®]
NORMALIEN



Material:

Guide bushes made of steel 1.7131 (16MnCr5).
Case hardened, hardness 61-63 HRC.
Ball cage made of plastic.
Balls made of steel, hardened, grade 1, sorted.

Guide diameter honed, matched to ball cage and guide pillar.
Mounting diameter ground ISO js4.

Important: If possible, order the complete ball guide so that it can be matched with the correct preload.

Matching guide pillars: ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole to ISO H6.
Fasten with 3 clamps ST 7367, included in delivery. The shoulder surface is right-angled ground to the guide bore and pressed into the base plate. It is held by the clamps, which provide a rigid mounting of the guide bush.

Clamps:

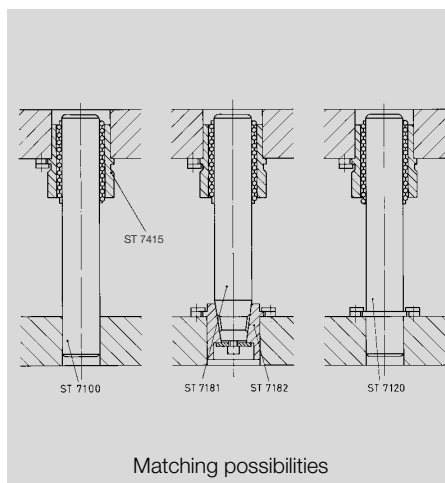
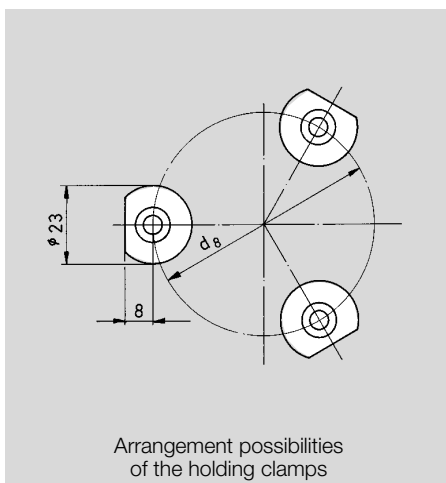
When reordering the clamps, please order: 3 pieces per guide bush, order number ST 7367

Guide bushes without ball cage ST 7416
Ball cage only ST 7133

DIN 9831/ISO 9448

Technical description:

see page 3.04



Order example:

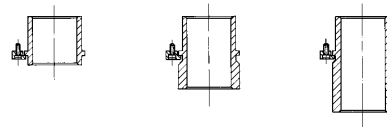
Guide bush **ST 7416**

without ball cage

$d_1 = 30, l_1 = 93 \text{ mm}$

Add **30 x 093**

Order number **ST 7416. 30 x 093**



without ball cage

Add
size to
order number

Order number **ST 7416. □ x □ x ■**

Order example:

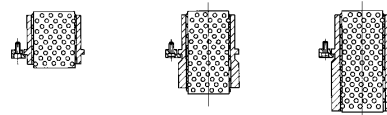
Guide bush **ST 7415**

with plastic ball cage

$d_1 = 40, l_1 = 82, l_2 = 94 \text{ mm}$

Add **40 x 082 x 094**

Order number **ST 7415. 40 x 082 x 094**



with ball cage

Add
size to
order number

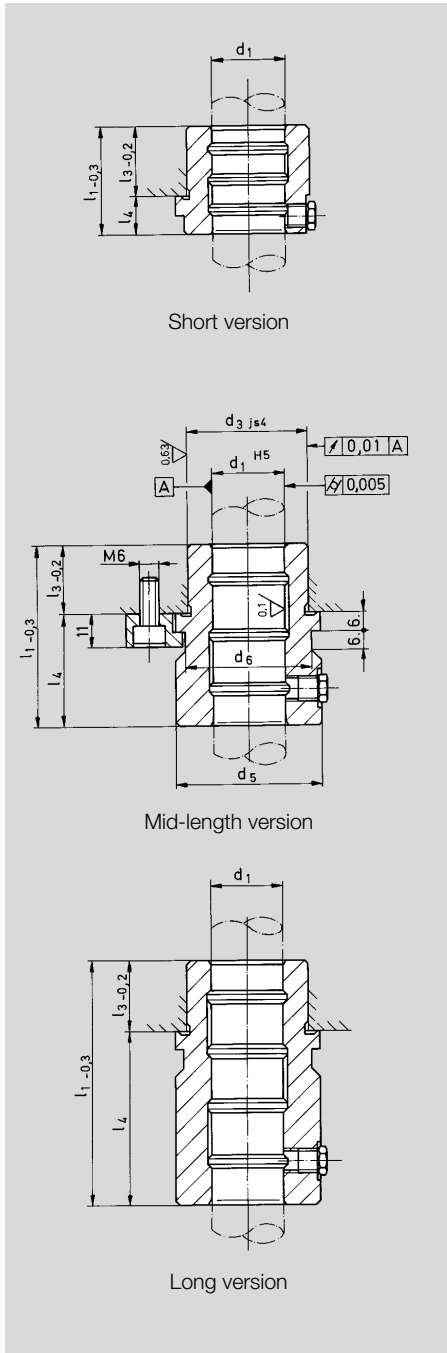
Order number **ST 7415. □ x □ x □**

d_{1h3}	d_2	d_{3s4}	d_5	d_6	d_8	$l_{1-0,3}$	l_2	$l_{3-0,2}$	l_4	▲
19	25	32	40	32	59	35	43	23	12	19 x 035 x 043
						43	54			19 x 043 x 054
						59	74			19 x 059 x 074
20	26	32	40	32	59	35	43	23	12	20 x 035 x 043
						43	54			20 x 043 x 054
						59	74			20 x 059 x 074
24	30	40	48	40	65	35	43	23	12	24 x 035 x 043
						60	74			24 x 060 x 074
						80	90			24 x 080 x 090
25	31	40	48	40	65	35	43	23	12	25 x 035 x 043
						60	74			25 x 060 x 074
						80	90			25 x 080 x 090
30	38	48	56	48	73	42	54	30	12	30 x 042 x 054
						75	83			30 x 075 x 083
						93	103			30 x 093 x 103
32	40	48	56	48	73	42	54	30	12	32 x 042 x 054
						75	83			32 x 075 x 083
						93	103			32 x 093 x 103
38	46	58	66	58	83	52	58	37	15	38 x 052 x 058
						82	94			38 x 082 x 094
						107	128			38 x 107 x 128
40	48	58	66	58	83	52	58	37	15	40 x 052 x 058
						82	94			40 x 082 x 094
						107	128			40 x 107 x 128
48	56	70	80	70	97	65	74	47	18	48 x 065 x 074
						97	108			48 x 097 x 108
						127	128			48 x 127 x 128
50	58	70	80	70	97	65	74	47	18	50 x 065 x 074
						97	108			50 x 097 x 108
						127	128			50 x 127 x 128

Guide bushes ST 7419

with shoulder, sliding guide steel bronze plated

STEINEL[®]
NORMALIEN



Material:

Guide bush made of steel 1.7131 (16 MnCr5), case hardened, hardness 61-63 HRC, sliding surface bronze plated.

Guide diameter ISO H5 honed
mounting diameter ISO js4, ground.

Important: Due to the galvanically applied bronze plating onto the hardened steel jacket, this bush is suitable especially for high sliding speeds and strong lateral forces.

Lubrication

Lubrication by funnel grease nipple
Connection M 8 x 1 provided for central lubrication.

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 holding clamps ST 7367 (included in delivery).
The shoulder surface, right-angled ground to the guide bore, will be squeezed onto the plate by the holding clamps and guarantees an absolutely rigid clamping of the guide bush.

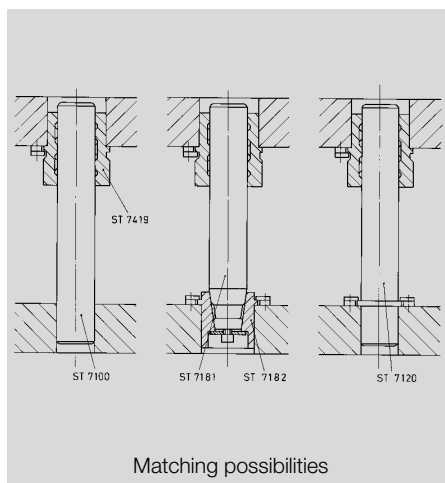
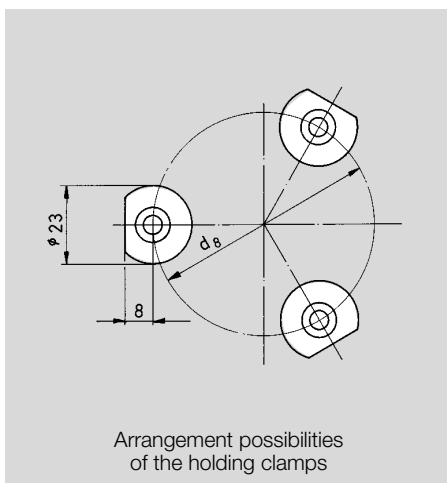
Holding clamps:

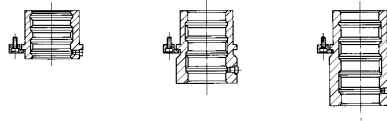
When reordering the holding clamps please order: 1 set = 3 pieces, order number ST 7367

Technical description:

see page 3.03

DIN 9831/ISO 9448





Order example:

Guide bush **ST 7419**.

$d_1 = 24$, $l_1 = 35$ mm

Add **24 x 035**

Order number **ST 7419. 24 x 035**

Add
size to
order number

Order number **ST 7419.** x

d_1^{H5}	d_{3js4}	d_5	d_6	d_8	$l_{1-0,3}$	$l_{3-0,2}$	l_4	▲	
19	32	40	32	59	35	23	12	19 x 035	
					43			20	19 x 043
					59			36	19 x 059
20	32	40	32	59	35	23	12	20 x 035	
					43			20	20 x 043
					59			36	20 x 059
24	40	48	40	65	35	23	12	24 x 035	
					60			37	24 x 060
					80			57	24 x 080
25	40	48	40	65	35	23	12	25 x 035	
					60			37	25 x 060
					80			57	25 x 080
30	48	56	48	73	42	30	12	30 x 042	
					75			45	30 x 075
					93			63	30 x 093
32	48	56	48	73	42	30	12	32 x 042	
					75			45	32 x 075
					93			63	32 x 093
38	58	66	58	83	52	37	15	38 x 052	
					82			45	38 x 082
					107			70	38 x 107
40	58	66	58	83	52	37	15	40 x 052	
					82			45	40 x 082
					107			70	40 x 107
48	70	80	70	97	65	47	18	48 x 065	
					97			50	48 x 097
					127			80	48 x 127
50	70	80	70	97	65	47	18	50 x 065	
					97			50	50 x 097
					127			80	50 x 127
60	85	95	85	112	80	60	20	60 x 080	
					115			55	60 x 115
					150			90	60 x 150
63	85	95	85	112	80	60	20	63 x 080	
					115			55	63 x 115
					150			90	63 x 150
80	105	118	105	135	80	60	20	80 x 080	
					120			60	80 x 120
					150			90	80 x 150

Guide bushes ST 7471

with shoulder, sliding guide with solid lubricant

Material:

Steel with insert of solid lubricant.

Due to the solid lubricant inserts, the sliding guide is self-lubricating and is suited for higher loads.

Guide diameter ISO H6, precision turned.
Mounting diameter ISO js4, precision turned.

Lubrication:

The solid lubricant greasing will be described as a lubricating status by which solid lubricant particles, which have a low shearing resistance within their crystal structure, are available between two surfaces and taking over the lubricating functions.

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 holding clamps ST 7367 (included in delivery).

The shoulder surface, right-angled ground to the guide bore, will be squeezed onto the plate by the holding clamps and guarantees an absolutely rigid clamping of the guide bush.

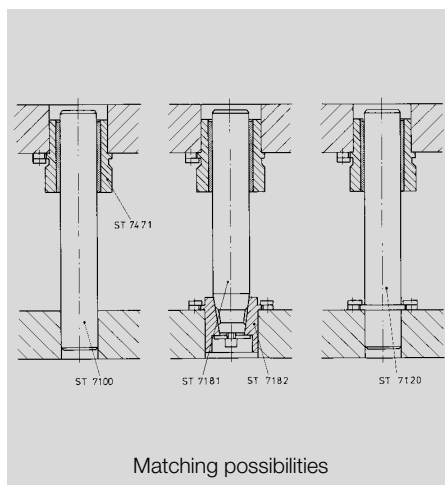
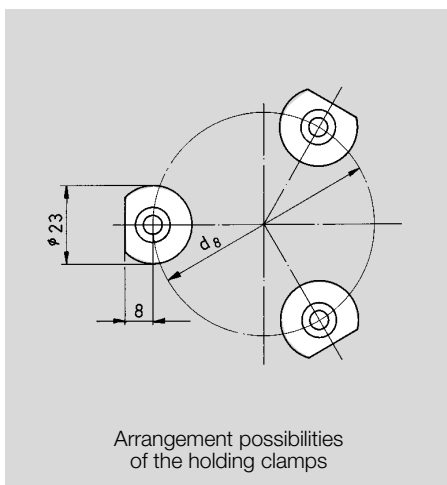
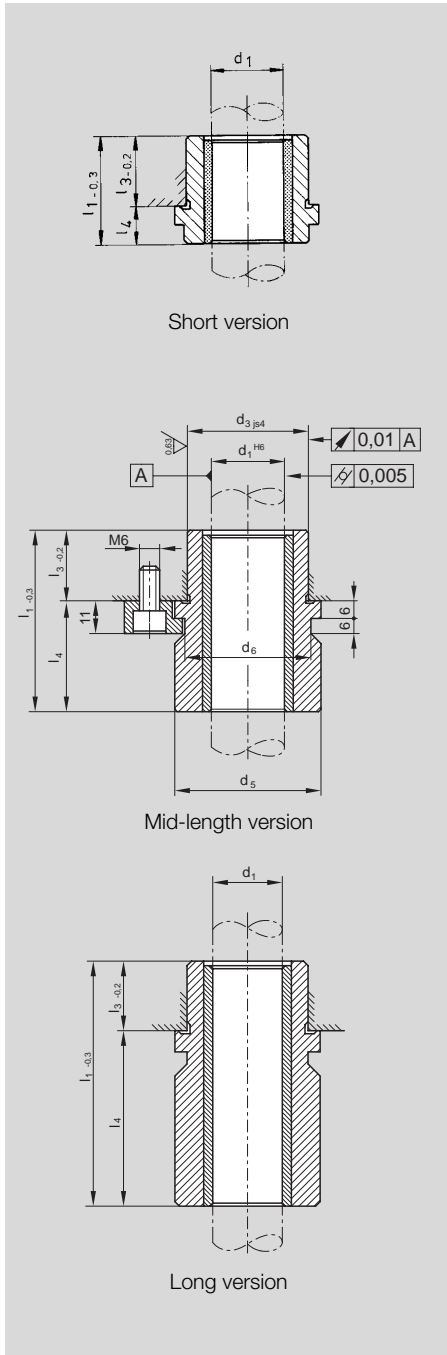
Holding clamps:

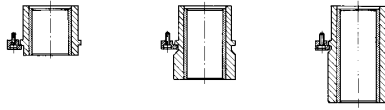
When reordering the holding clamps please order: 1 set = 3 pieces, order number ST 7367

Technical description:

see page 3.03

Dimensions according to DIN 9831/ISO 9448





Order example:

Guide bush **ST 7471**.

$d_1 = 24$, $l_1 = 35$ mm

Add **24 x 035**

Order number **ST 7471. 24 x 035**

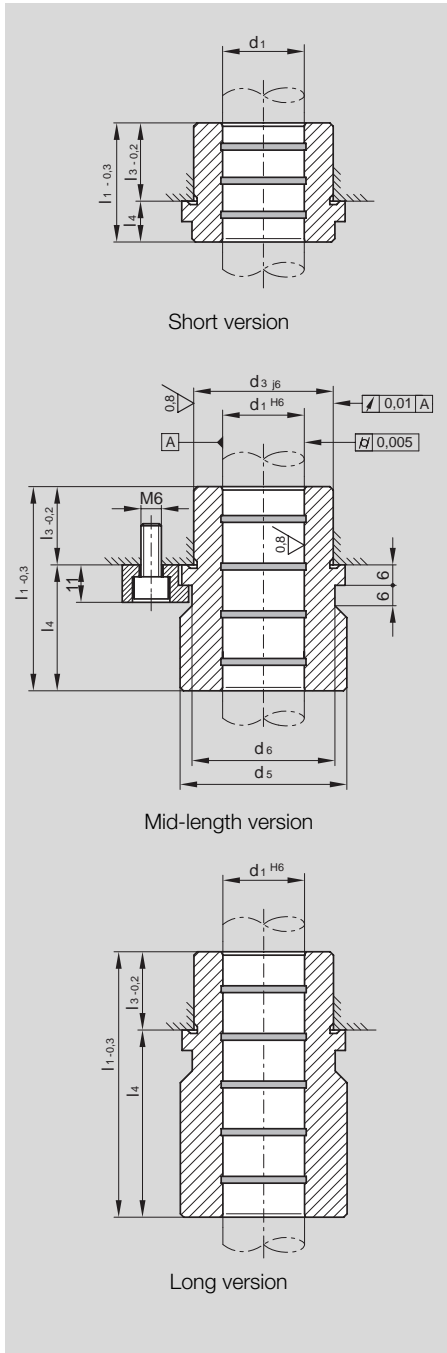
Add
size to
order number

Order number **ST 7471.** x

d_1^{H6}	d_{3js4}	d_5	d_6	d_8	$l_{1-0,3}$	$l_{3-0,2}$	l_4	▲	
19	32	40	32	59	35	23	12	19 x 035	
					43			20	19 x 043
					59			36	19 x 059
20	32	40	32	59	35	23	12	20 x 035	
					43			20	20 x 043
					59			36	20 x 059
24	40	48	40	65	35	23	12	24 x 035	
					60			37	24 x 060
					80			57	24 x 080
25	40	48	40	65	35	23	12	25 x 035	
					60			37	25 x 060
					80			57	25 x 080
30	48	56	48	73	42	30	12	30 x 042	
					75			45	30 x 075
					93			63	30 x 093
32	48	56	48	73	42	30	12	32 x 042	
					75			45	32 x 075
					93			63	32 x 093
38	58	66	58	83	52	37	15	38 x 052	
					82			45	38 x 082
					107			70	38 x 107
40	58	66	58	83	52	37	15	40 x 052	
					82			45	40 x 082
					107			70	40 x 107
48	70	80	70	97	65	47	18	48 x 065	
					97			50	48 x 097
					127			80	48 x 127
50	70	80	70	97	65	47	18	50 x 065	
					97			50	50 x 097
					127			80	50 x 127
60	85	95	85	112	80	60	20	60 x 080	
					115			55	60 x 115
					150			90	60 x 150
63	85	95	85	112	80	60	20	63 x 080	
					115			55	63 x 115
					150			90	63 x 150
80	105	118	105	135	80	60	20	80 x 080	
					120			60	80 x 120
					150			90	80 x 150

Guide bushes ST 7431

with shoulder, sliding guide with solid lubricant



Material:

Bronze with solid lubricant bands.

Due to the solid lubricant bands, the sliding guide is self-lubricating and suitable for higher loads.

Guide diameter ISO H6, precision turned
Mounting diameter ISO j6, precision turned

Lubrication:

In the solid lubricant construction, the particles of the solid lubricant have a low shearing resistance in their crystalline structure. They are between two surfaces and take over the lubricating function.

Matching guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole to ISO H6.
Fasten with 3 clamps ST 7367, included in delivery. The shoulder surface is right-angled ground to the guide bore and pressed into the base plate. It is held by the clamps, which provide a rigid mounting of the guide bush.

Clamps:

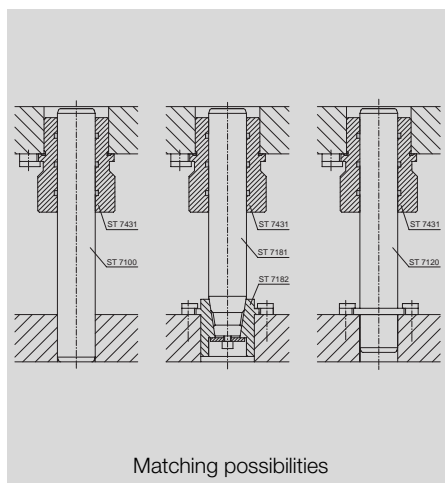
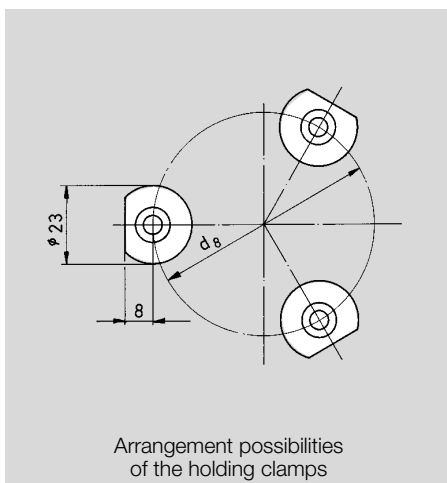
When reordering the clamps, please order: 3 pieces per guide bush, order number ST 7367

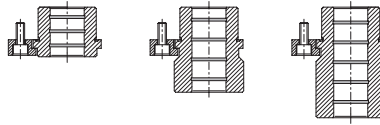
Guide bushes without ball cage ST 7416
Ball cage only ST 7133

Technical description:

see page 3.03

DIN 9831/ISO 9448





Order example:

Guide bush **ST 7431**.

$d_1 = 24$, $l_1 = 35$ mm

Add **24 x 035**

Order number **ST 7431. 24 x 035**

Add
size to
order number

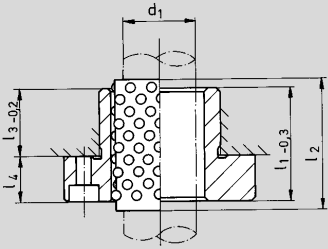
Order number **ST 7431.** x

d_1^{H6}	d_{3j6}	d_5	d_6	d_8	$l_{1-0,3}$	$l_{3-0,2}$	l_4	▲	
19	32	40	32	59	35	23	12	19 x 035	
					43			20	19 x 043
					59			36	19 x 059
20	32	40	32	59	35	23	12	20 x 035	
					43			20	20 x 043
					59			36	20 x 059
24	40	48	40	65	35	23	12	24 x 035	
					60			37	24 x 060
					80			57	24 x 080
25	40	48	40	65	35	23	12	25 x 035	
					60			37	25 x 060
					80			57	25 x 080
30	48	56	48	73	42	30	12	30 x 042	
					75			45	30 x 075
					93			63	30 x 093
32	48	56	48	73	42	30	12	32 x 042	
					75			45	32 x 075
					93			63	32 x 093
38	58	66	58	83	52	37	15	38 x 052	
					82			45	38 x 082
					107			70	38 x 107
40	58	66	58	83	52	37	15	40 x 052	
					82			45	40 x 082
					107			70	40 x 107
48	70	80	70	97	65	47	18	48 x 065	
					97			50	48 x 097
					127			80	48 x 127
50	70	80	70	97	65	47	18	50 x 065	
					97			50	50 x 097
					127			80	50 x 127
60	85	95	85	112	80	60	20	60 x 080	
					115			55	60 x 115
					150			90	60 x 150
63	85	95	85	112	80	60	20	63 x 080	
					115			55	63 x 115
					150			90	63 x 150
80	105	118	105	135	80	60	20	80 x 080	
					120			60	80 x 120
					150			90	80 x 150

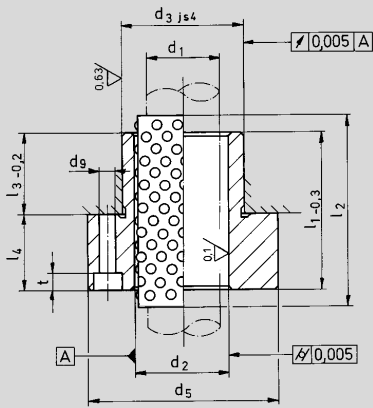
Guide bushes ST 7422, ST 7426

with flange, ball guide aluminium

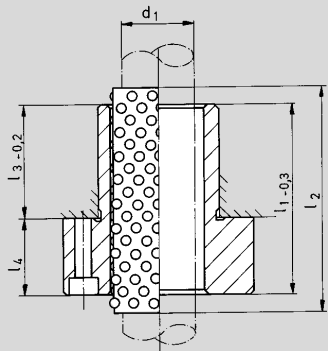
STEINEL[®]
NORMALIEN



Short version



Mid-length version



Long version
Cage travel = 1/2 length of stroke



Material:

Guide bush made of steel 1.7131 (16 MnCr5) case hardened, hardness 61-63 HRC.
ball cage made of aluminium,
balls made of steel, hardened, grade 1, sorted.

Guide diameter d_2 honed, suitable to ball cage and guide pillar.
Mounting diameter ISO js4, ground.

Important:

If possible, order the complete ball guide, so that it can be matched with the correct fit

Matching guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

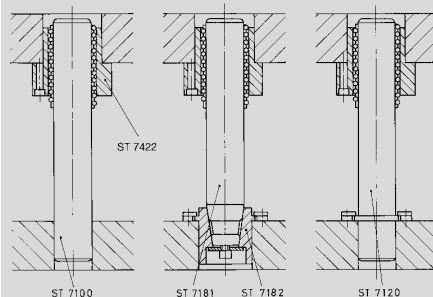
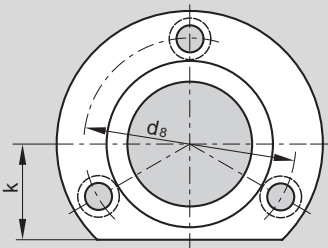
Fit in mounting bore hole ISO H6.
Fix with 3 cheese-head screws (like our SZ 8510, not included).
The flange surface, right-angled ground to the guide bore, will be squeezed onto the plate by the screws and guarantees an absolutely rigid clamping of the guide bush.

Guide bush without ball cage ST 7426
Ball cage aluminium only ST 7130

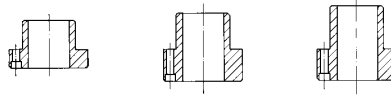
DIN 9831/ISO 9448

Technical description:

see page 3.04



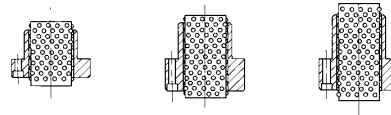
Matching possibilities



Order example:
Guide bush **ST 7426**
without ball cage
 $d_1 = 30$, $l_1 = 72$ mm
Add **30 x 072**
Order number **ST 7426. 30 x 072**

without ball cage

Add size to order number
Order number **ST 7426. □ x □ x □**



Order example:
Guide bush **ST 7422**
with ball cage
 $d_1 = 40$, $l_1 = 67$, $l_2 = 88$ mm
Add **40 x 067 x 088**
Order number **ST 7422. 40 x 067 x 088**

with ball cage

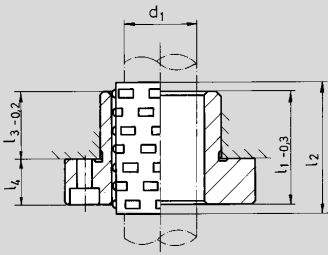
Add size to order number
Order number **ST 7422. □ x □ x □**

d_{1h3}	d_2	d_{3js4}	d_5	d_8	d_9	k	t	$l_{1-0,3}$	$l_{2-0,2}$	l_3	l_4	▲
15	21	28	45	35	4.5	15	3.5	29	43	23	6	15 x 029 x 043
								36	43	30	6	15 x 036 x 043
16	22	28	45	35	4.5	15	3.5	29	43	23	6	16 x 029 x 043
								36	43	30	6	16 x 036 x 043
19	25	32	50	40	4.5	18	4.6	38	43	23	15	19 x 038 x 043
								45	54	30	15	19 x 045 x 054
								51	63	36	15	19 x 051 x 063
20	26	32	50	40	4.5	18	4.6	38	43	23	15	20 x 038 x 043
								45	54	30	15	20 x 045 x 054
								51	63	36	15	20 x 051 x 063
24	30	40	63	50	5.5	23	5.7	38	43	23	15	24 x 038 x 043
								55	63	30	25	24 x 055 x 063
								62	74	37	25	24 x 062 x 074
25	31	40	63	50	5.5	23	5.7	38	43	23	15	25 x 038 x 043
								55	63	30	25	25 x 055 x 063
								62	74	37	25	25 x 062 x 074
30	38	48	72	58	5.5	28	5.7	45	54	30	15	30 x 045 x 054
								62	74	37	25	30 x 062 x 074
								72	83	47	25	30 x 072 x 083
32	40	48	72	58	5.5	28	5.7	45	54	30	15	32 x 045 x 054
								62	74	37	25	32 x 062 x 074
								72	83	47	25	32 x 072 x 083
38	46	58	85	70	6.6	33	6.8	55	58	30	25	38 x 055 x 058
								67	88	37	30	38 x 067 x 088
								77	94	47	30	38 x 077 x 094
40	48	58	85	70	6.6	33	6.8	55	58	30	25	40 x 055 x 058
								67	88	37	30	40 x 067 x 088
								77	94	47	30	40 x 077 x 094
48	56	70	104	86	9	38	9	62	74	37	25	48 x 062 x 074
								89	108	47	42	48 x 089 x 108
								102	128	60	42	48 x 102 x 128
50	58	70	104	86	9	38	9	62	74	37	25	50 x 062 x 074
								89	108	47	42	50 x 089 x 108
								102	128	60	42	50 x 102 x 128
60	70	85	120	100	9	46	9	89	113	47	42	60 x 089 x 113
								102	128	60	42	60 x 102 x 128
63	73	85	120	100	9	46	9	89	113	47	42	63 x 089 x 113
								102	128	60	42	63 x 102 x 128
80	92	105	148	125	11	56	11	125	138	75	50	80 x 125 x 138

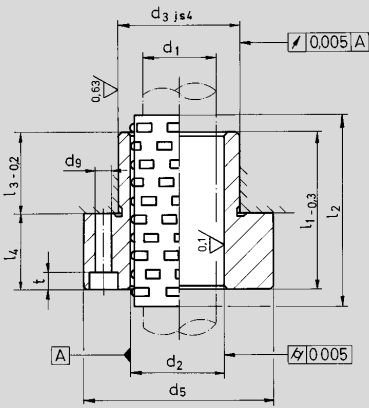
Guide bushes ST 7423

with flange, roller guide

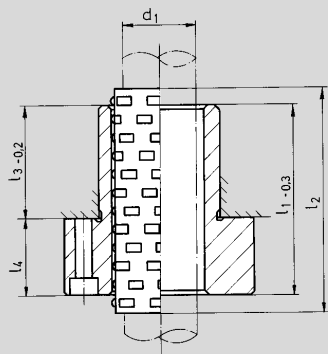
STEINEL[®]
NORMALIEN



Short version



Mid-length version



Long version
Cage travel = 1/2 length of stroke



Material:

Guide bush made of steel 1.7131 (16 Mn Cr5) case hardened, hardness 61-63 HRC.
roller cage made of aluminium,
profile rollers made of steel, hardened, grade 1, sorted.

Guide diameter honed, suitable to roller cage and guide pillar.
mounting diameter ISO js4, ground.

Important:

If possible, order the complete roller guide, so that it can be matched with the correct fit

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 cheese-head screws (like our SZ 8510, not included).

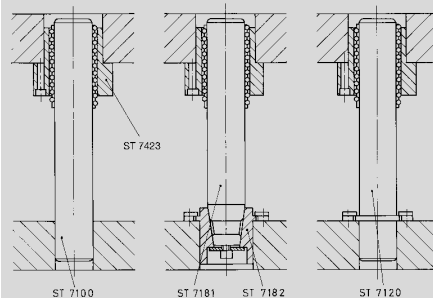
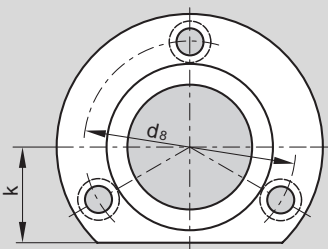
The flange surface, right-angled ground to the guide bore, will be squeezed onto the plate by the screws and guarantees an absolutely rigid clamping of the guide bush.

Guide bush without roller cage ST 7426
Roller cage aluminium only ST 7140

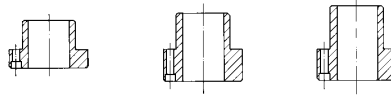
DIN 9831/ISO 9448

Technical description:

see page 3.05



Matching possibilities



Order example:

Guide bush **ST 7426**

without roller cage

$d_1 = 30$, $l_1 = 72$ mm

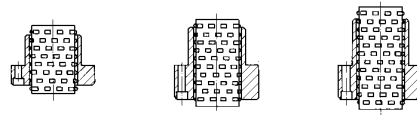
Add **30 x 072**

Order number **ST 7426. 30 x 072**

without roller cage

Order number **ST 7426. □ x □ x □**

Add
size to
order number



Order example:

Guide bush **ST 7423**

with roller cage

$d_1 = 40$, $l_1 = 55$, $l_2 = 58$ mm

Add **40 x 055 x 058**

Order number **ST 7423. 40 x 055 x 058**

with roller cage

Order number **ST 7423. □ x □ x □**

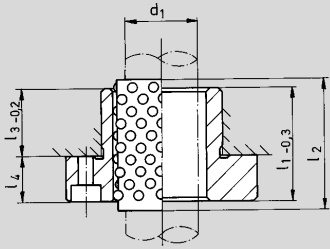
Add
size to
order number

d_{1h3}	d_2	d_{3js4}	d_5	d_8	d_9	k	t	$l_{1-0,3}$	$l_{2-0,2}$	l_3	l_4	▲
19	25	32	50	40	4.5	18	4.6	38	43	23	15	19 x 038 x 043
								45	54	30	15	19 x 045 x 054
								51	63	36	15	19 x 051 x 063
20	26	32	50	40	4.5	18	4.6	38	43	23	15	20 x 038 x 043
								45	54	30	15	20 x 045 x 054
								51	63	36	15	20 x 051 x 063
24	30	40	63	50	5.5	23	5.7	38	43	23	15	24 x 038 x 043
								55	63	30	25	24 x 055 x 063
								62	74	37	25	24 x 062 x 074
25	31	40	63	50	5.5	23	5.7	38	43	23	15	25 x 038 x 043
								55	63	30	25	25 x 055 x 063
								62	74	37	25	25 x 062 x 074
30	38	48	72	58	5.5	28	5.7	45	54	30	15	30 x 045 x 054
								62	74	37	25	30 x 062 x 074
								72	83	47	25	30 x 072 x 083
32	40	48	72	58	5.5	28	5.7	45	54	30	15	32 x 045 x 054
								62	74	37	25	32 x 062 x 074
								72	83	47	25	32 x 072 x 083
38	46	58	85	70	6.6	33	6.8	55	58	30	25	38 x 055 x 058
								67	88	37	30	38 x 067 x 088
								77	94	47	30	38 x 077 x 094
40	48	58	85	70	6.6	33	6.8	55	58	30	25	40 x 055 x 058
								67	88	37	30	40 x 067 x 088
								77	94	47	30	40 x 077 x 094
48	56	70	104	86	9	38	9	62	74	37	25	48 x 062 x 074
								89	108	47	42	48 x 089 x 108
								102	128	60	42	48 x 102 x 128
50	58	70	104	86	9	38	9	62	74	37	25	50 x 062 x 074
								89	108	47	42	50 x 089 x 108
								102	128	60	42	50 x 102 x 128
60	70	85	120	100	9	46	9	89	113	47	42	60 x 089 x 113
								102	128	60	42	60 x 102 x 128
								89	113	47	42	63 x 089 x 113
63	73	85	120	100	9	46	9	102	128	60	42	63 x 102 x 128
								89	113	47	42	63 x 089 x 113
								102	128	60	42	63 x 102 x 128
80	92	105	148	125	11	56	11	125	138	75	50	80 x 125 x 138
								89	113	47	42	63 x 089 x 113
								102	128	60	42	63 x 102 x 128

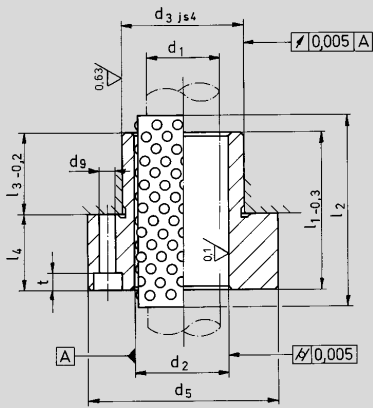
Guide bushes ST 7424

with flange, ball guide brass

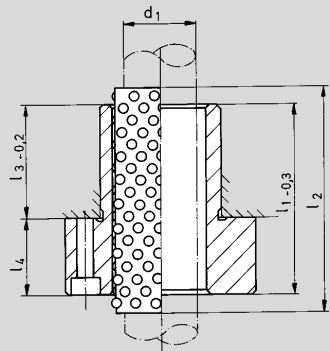
STEINEL[®]
NORMALIEN



Short version



Mid-length version



Long version
Cage travel = 1/2 length of stroke



Material:

Guide bush made of steel 1.7131 (16 Mn Cr5) case hardened, hardness 61-63 HRC.
Ball cage made of brass,
balls made of steel, hardened, grade 1, sorted.

Guide diameter honed, suitable to ball cage and guide pillar.
Mounting diameter ISO js4, ground.

Important:

If possible, order the complete ball guide, so that it can be matched with the correct fit

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

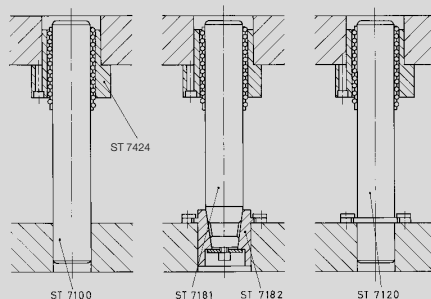
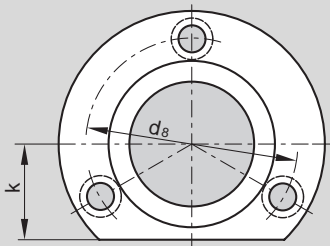
Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 cheese-head screws (like our SZ 8510, not included).
The flange surface, right-angled ground to the guide bore, will be squeezed onto the plate by the screws and guarantees an absolutely rigid clamping of the guide bush.

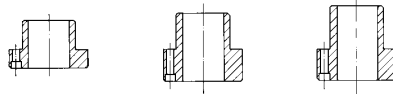
Guide bush without ball cage ST 7426
Ball cage brass only ST 7150

DIN 9831/ISO 9448

Technical description:
see page 3.04



Matching possibilities



Order example:

Guide bush **ST 7426**

without ball cage

$d_1 = 30, l_1 = 72$ mm

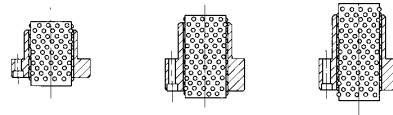
Add **30 x 072**

Order number **ST 7426. 30 x 072**

without ball cage

Order number **ST 7426. □ x □ x □**

Add
size to
order number



Order example:

Guide bush **ST 7424**

with ball cage

$d_1 = 40, l_1 = 67, l_2 = 88$ mm

Add **40 x 067 x 088**

Order number **ST 7424. 40 x 067 x 088**

with ball cage

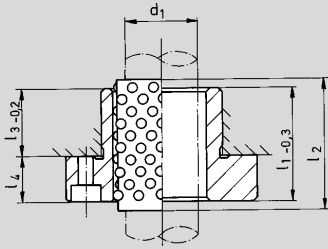
Order number **ST 7424. □ x □ x □**

Add
size to
order number

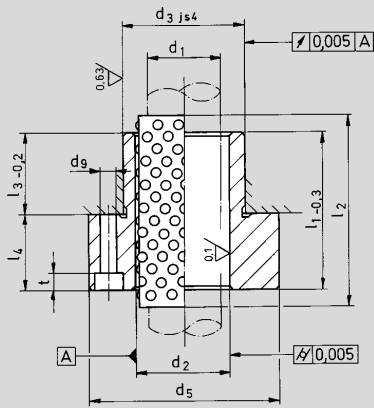
d_{1h3}	d_2	d_{3js4}	d_5	d_8	d_9	k	t	$l_{1-0,3}$	$l_{2-0,2}$	l_3	l_4	▲
15	21	28	45	35	4.5	15	3.5	29	43	23	6	15 x 029 x 043
								36	43	30	6	15 x 036 x 043
16	22	28	45	35	4.5	15	3.5	29	43	23	6	16 x 029 x 043
								36	43	30	6	16 x 036 x 043
19	25	32	50	40	4.5	18	4.6	38	43	23	15	19 x 038 x 043
								45	54	30	15	19 x 045 x 054
								51	63	36	15	19 x 051 x 063
20	26	32	50	40	4.5	18	4.6	38	43	23	15	20 x 038 x 043
								45	54	30	15	20 x 045 x 054
								51	63	36	15	20 x 051 x 063
24	30	40	63	50	5.5	23	5.7	38	43	23	15	24 x 038 x 043
								55	63	30	25	24 x 055 x 063
								62	74	37	25	24 x 062 x 074
25	31	40	63	50	5.5	23	5.7	38	43	23	15	25 x 038 x 043
								55	63	30	25	25 x 055 x 063
								62	74	37	25	25 x 062 x 074
30	38	48	72	58	5.5	28	5.7	45	54	30	15	30 x 045 x 054
								62	74	37	25	30 x 062 x 074
								72	83	47	25	30 x 072 x 083
32	40	48	72	58	5.5	28	5.7	45	54	30	15	32 x 045 x 054
								62	74	37	25	32 x 062 x 074
								72	83	47	25	32 x 072 x 083
38	46	58	85	70	6.6	33	6.8	55	58	30	25	38 x 055 x 058
								67	88	37	30	38 x 067 x 088
								77	94	47	30	38 x 077 x 094
40	48	58	85	70	6.6	33	6.8	55	58	30	25	40 x 055 x 058
								67	88	37	30	40 x 067 x 088
								77	94	47	30	40 x 077 x 094
48	56	70	104	86	9	38	9	62	74	37	25	48 x 062 x 074
								89	108	47	42	48 x 089 x 108
								102	128	60	42	48 x 102 x 128
50	58	70	104	86	9	38	9	62	74	37	25	50 x 062 x 074
								89	108	47	42	50 x 089 x 108
								102	128	60	42	50 x 102 x 128
60	70	85	120	100	9	46	9	89	113	47	42	60 x 089 x 113
								102	128	60	42	60 x 102 x 128
63	73	85	120	100	9	46	9	89	113	47	42	63 x 089 x 113
								102	128	60	42	63 x 102 x 128
80	92	105	148	125	11	56	11	125	138	75	50	80 x 125 x 138

Guide bushes ST 7425

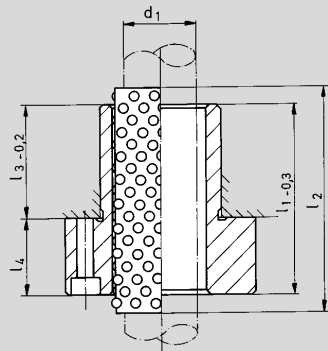
with flange, ball guide plastic



Short version



Mid-length version



Long version
Cage travel = 1/2 length of stroke



Material:

Guide bushes made of steel 1.7131 (16 Mn Cr5) case hardened, hardness 61-63 HRC.
Ball cage made of plastic,
balls made of steel, hardened, grade 1, sorted.

Guide diameter honed, matched to ball cage and guide pillar.
Mounting diameter ground to ISO js4.

Important:

If possible, order the complete ball guide so that it can be matched with the correct preload.

Matching guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

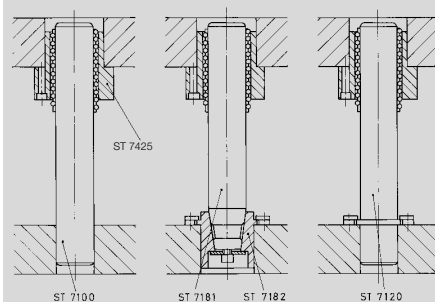
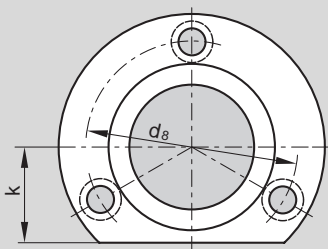
Fit in mounting bore hole to ISO H6.
Fasten with 3 socket-head cap screws.
The shoulder surface is right-angled ground to the guide bore and pressed into the base plate. It is held by the clamps, which provide a rigid mounting of the guide bush.

Guide bushes without ball cage ST 7426
Ball cage only ST 7133

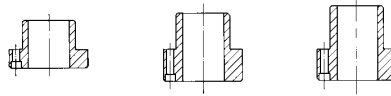
DIN 9831/ISO 9448

Technical description:

see page 3.04



Matching possibilities



Order example:

Guide bush **ST 7426**

without ball cage

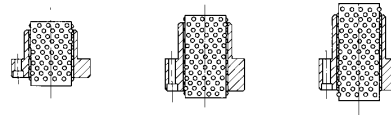
$d_1 = 30, l_1 = 72$ mm

Add **30 x 072**

Order number **ST 7426. 30 x 072**

without ball cage

Add size to order number
Order number **ST 7426. □ x □ x □**



Order example:

Guide bush **ST 7425**

with plastic ball cage

$d_1 = 40, l_1 = 67, l_2 = 88$ mm

Add **40 x 067 x 088**

Order number **ST 7425. 40 x 067 x 088**

with ball cage

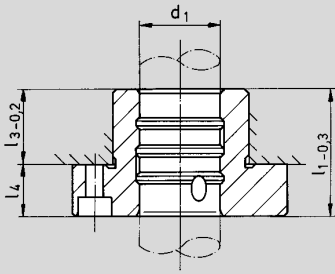
Add size to order number
Order number **ST 7425. □ x □ x □**

d_{1h3}	d_2	d_{3js4}	d_5	d_8	d_9	k	t	$l_{1-0,3}$	$l_{2-0,2}$	l_3	l_4	▲
15	21	28	45	35	4.5	15	3.5	29 36	43 43	23 30	6 6	15 x 029 x 043 15 x 036 x 043
16	22	28	45	35	4.5	15	3.5	29 36	43 43	23 30	6 6	16 x 029 x 043 16 x 036 x 043
19	25	32	50	40	4.5	18	4.6	38 45 51	43 54 63	23 30 36	15 15 15	19 x 038 x 043 19 x 045 x 054 19 x 051 x 063
20	26	32	50	40	4.5	18	4.6	38 45 51	43 54 63	23 30 36	15 15 15	20 x 038 x 043 20 x 045 x 054 20 x 051 x 063
24	30	40	63	50	5.5	23	5.7	38 55 62	43 63 74	23 30 37	15 25 25	24 x 038 x 043 24 x 055 x 063 24 x 062 x 074
25	31	40	63	50	5.5	23	5.7	38 55 62	43 63 74	23 30 37	15 25 25	25 x 038 x 043 25 x 055 x 063 25 x 062 x 074
30	38	48	72	58	5.5	28	5.7	45 62 72	54 74 83	30 37 47	15 25 25	30 x 045 x 054 30 x 062 x 074 30 x 072 x 083
32	40	48	72	58	5.5	28	5.7	45 62 72	54 74 83	30 37 47	15 25 25	32 x 045 x 054 32 x 062 x 074 32 x 072 x 083
38	46	58	85	70	6.6	33	6.8	55 67 77	58 88 94	30 37 47	25 30 30	38 x 055 x 058 38 x 067 x 088 38 x 077 x 094
40	48	58	85	70	6.6	33	6.8	55 67 77	58 88 94	30 37 47	25 30 30	40 x 055 x 058 40 x 067 x 088 40 x 077 x 094
48	56	70	104	86	9	38	9	62 89 102	74 108 128	37 47 60	25 42 42	48 x 062 x 074 48 x 089 x 108 48 x 102 x 128
50	58	70	104	86	9	38	9	62 89 102	74 108 128	37 47 60	25 42 42	50 x 062 x 074 50 x 089 x 108 50 x 102 x 128

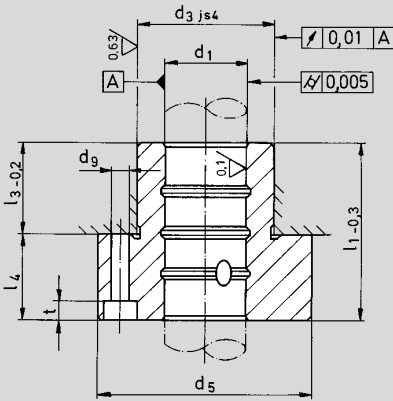
Guide bushes ST 7429

with flange, sliding guide steel bronze plated

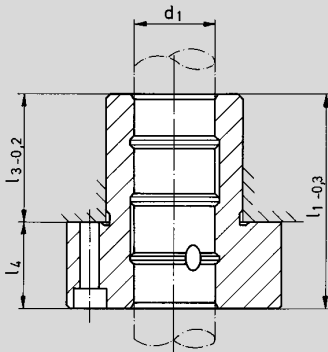
STEINEL[®]
NORMALIEN



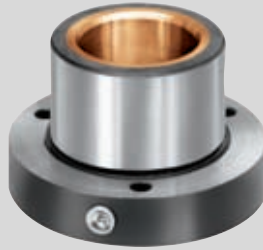
Short version



Mid-length version



Long version



Material: steel 1.7131 (16 Mn Cr5)
case hardened, hardness 61-63 HRC
sliding surface bronze plated

Guide diameter ISO H5, honed
mounting diameter ISO js4, ground.

Important: Due to the galvanically applied bronze plating onto the hardened steel jacket, this bush is suitable especially for high sliding speeds and strong lateral forces.

Lubrication

Lubrication by funnel grease nipple
Connection M 8 x 1 provided for central lubrication.

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120,
ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 cheese-head screws (like our SZ 8510,
not included).

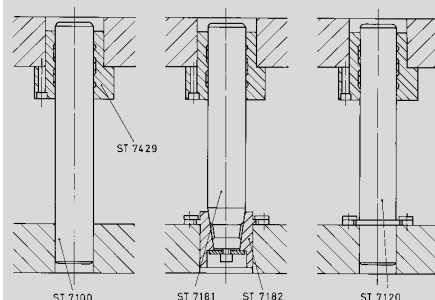
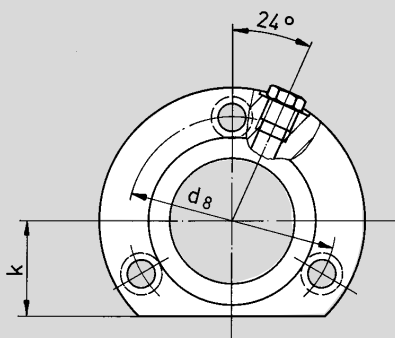
The flange surface, right-angled ground to the guide bore, will be squeezed onto the plate by the screws clamps and guarantees an absolutely rigid clamping of the guide bush.

At dia. 15 and 16 the bore hole for lubrication is at the shank d_3 .

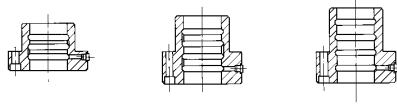
Technical description:

see page 3.03

DIN 9831/ISO 9448



Matching possibilities



Order example:

Guide bush **ST 7429**

$d_1 = 24$, $l_1 = 38$ mm

Add **24 x 038**

Order number **ST 7429. 24 x 038**

Add
size to
order number

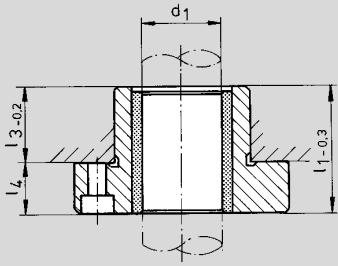
Order number **ST 7429.** x

d_1^{H5}	$d_{3\beta 4}$	d_5	d_8	d_9	k	t	$l_{1-0,3}$	$l_{3-0,2}$	l_4	▲
15	28	45	35	4.5	15	3.5	29	23	6	15 x 029
							36	30	6	15 x 036
16	28	45	35	4.5	15	3.5	29	23	6	16 x 029
							36	30	6	16 x 036
19	32	50	40	4.5	18	4.6	38	23	15	19 x 038
							45	30	15	19 x 045
							51	36	15	19 x 051
20	32	50	40	4.5	18	4.6	38	23	15	20 x 038
							45	30	15	20 x 045
							51	36	15	20 x 051
24	40	63	50	5.5	23	5.7	38	23	15	24 x 038
							55	30	25	24 x 055
							62	37	25	24 x 062
25	40	63	50	5.5	23	5.7	38	23	15	25 x 038
							55	30	25	25 x 055
							62	37	25	25 x 062
30	48	72	58	5.5	28	5.7	45	30	15	30 x 045
							62	37	25	30 x 062
							72	47	25	30 x 072
32	48	72	58	5.5	28	5.7	45	30	15	32 x 045
							62	37	25	32 x 062
							72	47	25	32 x 072
38	58	85	70	6.6	33	6.8	55	30	25	38 x 055
							67	37	30	38 x 067
							77	47	30	38 x 077
40	58	85	70	6.6	33	6.8	55	30	25	40 x 055
							67	37	30	40 x 067
							77	47	30	40 x 077
48	70	104	86	9	38	9	62	37	25	48 x 062
							89	47	42	48 x 089
							102	60	42	48 x 102
50	70	104	86	9	38	9	62	37	25	50 x 062
							89	47	42	50 x 089
							102	60	42	50 x 102
60	85	120	100	9	46	9	89	47	42	60 x 089
							102	60	42	60 x 102
63	85	120	100	9	46	9	89	47	42	63 x 089
							102	60	42	63 x 102
80	105	148	125	11	56	11	125	75	50	80 x 125

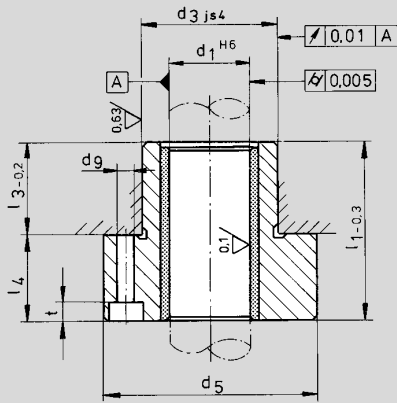
Guide bushes ST 7481

with flange, sliding guide with solid lubricant

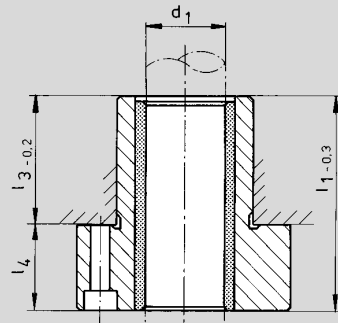
STEINEL[®]
NORMALIEN



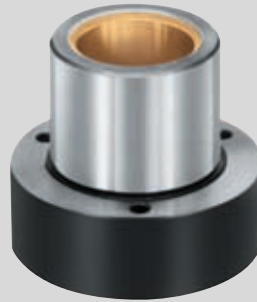
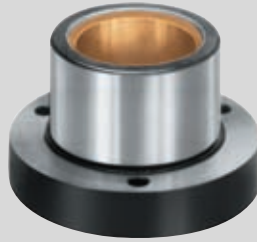
Short version



Mid-length version



Long version



Material:

Steel with insert of solid lubricant

Due to the solid lubricant inserts, the sliding guide is self-lubricating and is suited for higher loads.

Guide diameter ISO H6, precision turned.
Mounting diameter ISO js4, precision turned.

Lubrication:

The solid lubricant greasing will be described as a lubricating status by which solid lubricant particles, which have a low shearing resistance within their crystal structure, are available between two surfaces and taking over the lubricating functions.

Matching Guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

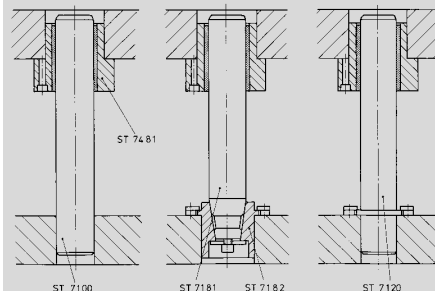
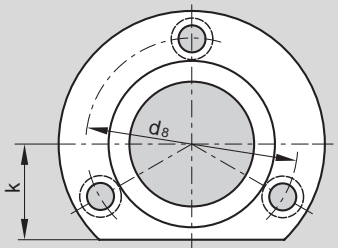
Mounting instructions:

Fit in mounting bore hole ISO H6.
Fix with 3 cheese-head screws (like our SZ 8510, not included).
The flange surface, right-angled ground to the guide bore, will be squeezed onto the plate by the screws clamps and guarantees an absolutely rigid clamping of the guide bush.

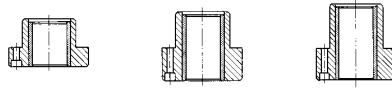
Technical description:

see page 3.03

Dimensions according to DIN 9831/ISO 9448



Matching possibilities



Order example:

Guide bush **ST 7481.**

$d_1 = 24$, $l_1 = 38$ mm

Add **24 x 038**

Order number **ST 7481. 24 x 038**

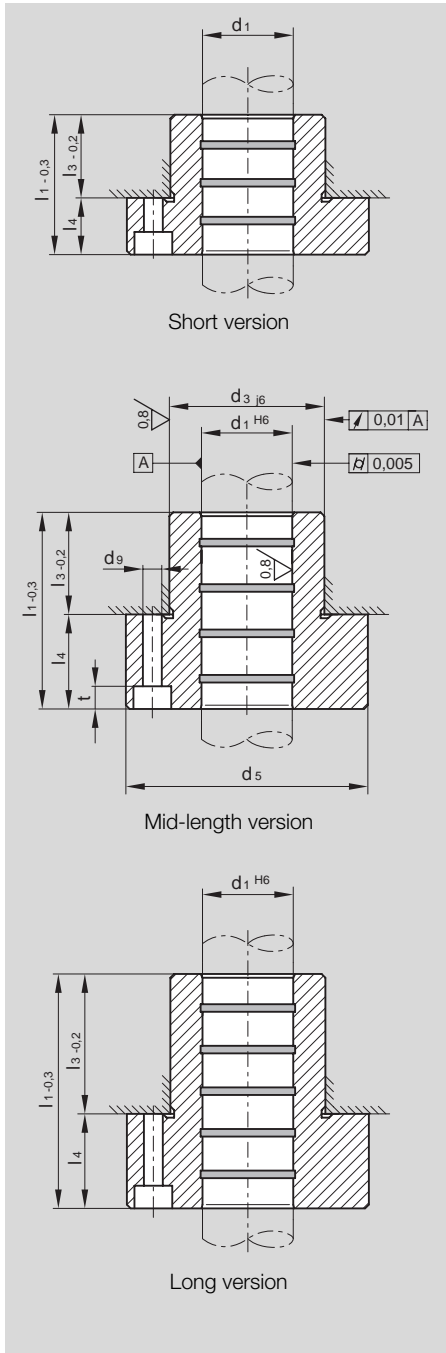
Add
size to
order number

Order number **ST 7481.** x

d_1^{H6}	$d_{3\beta 4}$	d_5	d_8	d_9	k	t	$l_{1-0,3}$	$l_{3-0,2}$	l_4	▲
15	28	45	35	4.5	15	3.5	29	23	6	15 x 029
							36	30	6	15 x 036
16	28	45	35	4.5	15	3.5	29	23	6	16 x 029
							36	30	6	16 x 036
19	32	50	40	4.5	18	4.6	38	23	15	19 x 038
							45	30	15	19 x 045
							51	36	15	19 x 051
20	32	50	40	4.5	18	4.6	38	23	15	20 x 038
							45	30	15	20 x 045
							51	36	15	20 x 051
24	40	63	50	5.5	23	5.7	38	23	15	24 x 038
							55	30	25	24 x 055
							62	37	25	24 x 062
25	40	63	50	5.5	23	5.7	38	23	15	25 x 038
							55	30	25	25 x 055
							62	37	25	25 x 062
30	48	72	58	5.5	28	5.7	45	30	15	30 x 045
							62	37	25	30 x 062
							72	47	25	30 x 072
32	48	72	58	5.5	28	5.7	45	30	15	32 x 045
							62	37	25	32 x 062
							72	47	25	32 x 072
38	58	85	70	6.6	33	6.8	55	30	25	38 x 055
							67	37	30	38 x 067
							77	47	30	38 x 077
40	58	85	70	6.6	33	6.8	55	30	25	40 x 055
							67	37	30	40 x 067
							77	47	30	40 x 077
48	70	104	86	9	38	9	62	37	25	48 x 062
							89	47	42	48 x 089
							102	60	42	48 x 102
50	70	104	86	9	38	9	62	37	25	50 x 062
							89	47	42	50 x 089
							102	60	42	50 x 102
60	85	120	100	9	46	9	89	47	42	60 x 089
							102	60	42	60 x 102
63	85	120	100	9	46	9	89	47	42	63 x 089
							102	60	42	63 x 102
80	105	148	125	11	56	11	125	75	50	80 x 125

Guide bushes ST 7441

with flange, sliding guide with solid lubricant



Material:

Bronze with solid lubricant bands.

Due to the solid lubricant bands, the sliding guide is self-lubricating and suitable for higher loads.

Guide diameter ISO H6, precision turned
Mounting diameter ISO j6, precision turned

Lubrication:

In the solid lubricant construction, the particles of the solid lubricant have a low shearing resistance in their crystalline structure. They are between two surfaces and take over the lubricating function.

Matching guide pillars:

ST 7100, ST 7106, ST 7107, ST 7108, ST 7120, ST 7126, ST 7127, ST 7128 and ST 7181/82

Mounting instructions:

Fit in mounting bore hole to ISO H6.

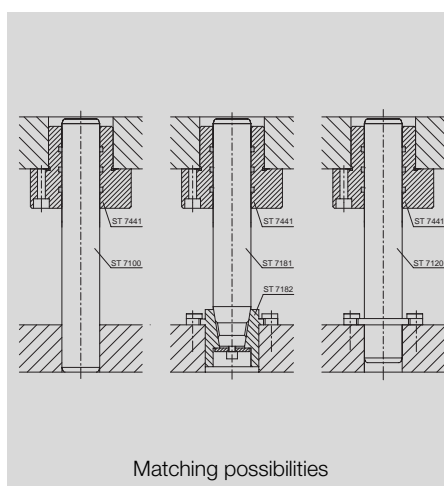
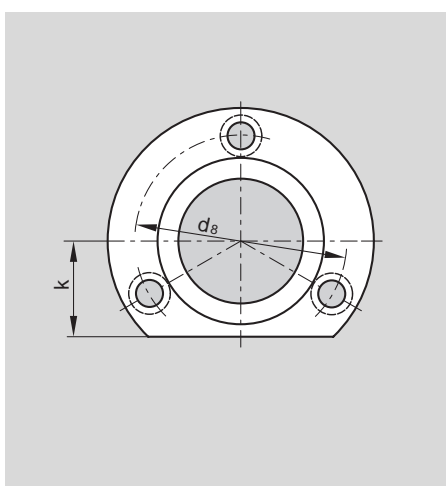
Fasten with 3 socket-head cap screws.

The shoulder surface is right-angled ground to the guide bore and pressed into the base plate. It is held by the clamps, which provide a rigid mounting of the guide bush.

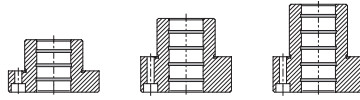
Technical description:

see page 3.03

Dimensions according to DIN 9831/ISO 9448



Matching possibilities



Order example:

Guide bush **ST 7441.**

$d_1 = 24$, $l_1 = 38$ mm

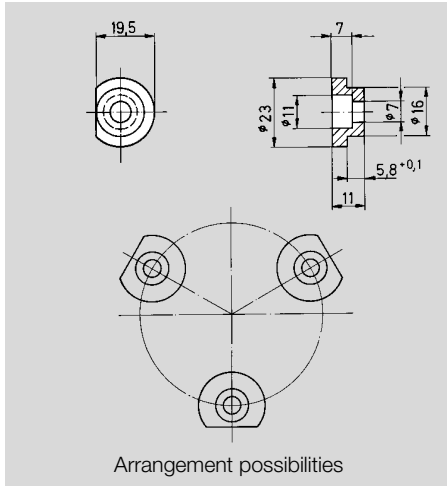
Add **24 x 038**

Order number **ST 7441. 24 x 038**

Add
size to
order number

Order number **ST 7441.** x

d_1^{H6}	$d_{3/6}$	d_5	d_8	d_9	k	t	$l_{1-0,3}$	$l_{3-0,2}$	l_4	▲
15	28	45	35	4.5	15	3.5	29	23	6	15 x 029
							36	30	6	15 x 036
16	28	45	35	4.5	15	3.5	29	23	6	16 x 029
							36	30	6	16 x 036
19	32	50	40	4.5	18	4.6	38	23	15	19 x 038
							45	30	15	19 x 045
							51	36	15	19 x 051
20	32	50	40	4.5	18	4.6	38	23	15	20 x 038
							45	30	15	20 x 045
							51	36	15	20 x 051
24	40	63	50	5.5	23	5.7	38	23	15	24 x 038
							55	30	25	24 x 055
							62	37	25	24 x 062
25	40	63	50	5.5	23	5.7	38	23	15	25 x 038
							55	30	25	25 x 055
							62	37	25	25 x 062
30	48	72	58	5.5	28	5.7	45	30	15	30 x 045
							62	37	25	30 x 062
							72	47	25	30 x 072
32	48	72	58	5.5	28	5.7	45	30	15	32 x 045
							62	37	25	32 x 062
							72	47	25	32 x 072
38	58	85	70	6.6	33	6.8	55	30	25	38 x 055
							67	37	30	38 x 067
							77	47	30	38 x 077
40	58	85	70	6.6	33	6.8	55	30	25	40 x 055
							67	37	30	40 x 067
							77	47	30	40 x 077
48	70	104	86	9	38	9	62	37	25	48 x 062
							89	47	42	48 x 089
							102	60	42	48 x 102
50	70	104	86	9	38	9	62	37	25	50 x 062
							89	47	42	50 x 089
							102	60	42	50 x 102
60	85	120	100	9	46	9	89	47	42	60 x 089
							102	60	42	60 x 102
63	85	120	100	9	46	9	89	47	42	63 x 089
							102	60	42	63 x 102
80	105	148	125	11	56	11	125	75	50	80 x 125

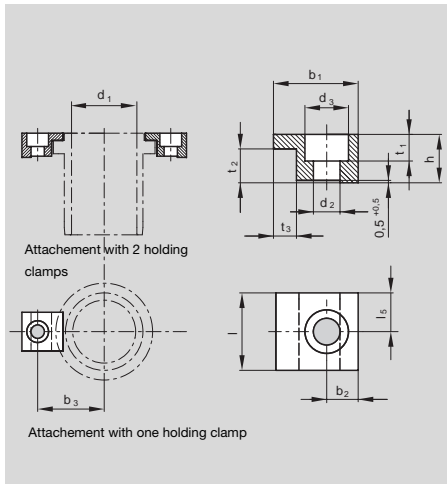


Holding clamps ST 7367

Material: 1.0715 (9 S Mn 28 K)

Fitting guide pillars ST 7118, ST 7120, ST 7126, ST 7127, ST 7128
pillar holding bushes ST 7182,
guide bushes with shoulder ST 7412, ST 7413,
ST 7414, ST 7415, ST 7416, ST 7419,
ST 7431 and ST 7471.

Order example: holding clamp **ST 7367**
Order number **ST 7367**



Holding clamps ST 7377

DIN 9832

Material: steel

Attachment

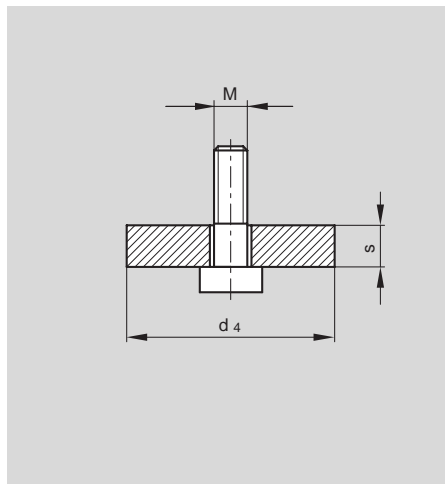
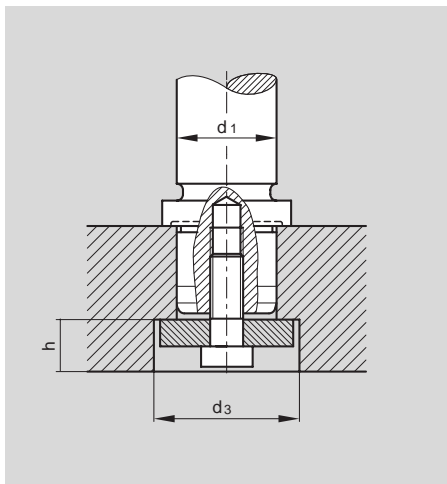
Suitable hexagon socket screws DIN 912
order number SZ 8510

Order example: Holding clamp **ST 7377**
diameter d₁ = 32 mm
Add **032**
Order number **ST 7377.032**

Add
size to
order number

Order number **ST 7377.**

d ₁	d ₂	d ₃	b ₁	b ₂	b ₃	h	l	l ₅	t ₁	t ₂	t ₃	screw	▲
25	7	11	20	7.5	29	10	20	10	7	6.3	5	M6 x 16	01
32					33								01
40					39.5								01
50					44.5								01
63	11.5	17.5	32	11	61.5	16	32	16	11.5	10	10	M10 x 25	02
80					71.5								02
100					84								02
125					101.5								02
160					121.5								02



Holding disc with screw ST 7387

Material: 1.0503 (C 45)

Order example: Holding disc **ST 7387**

d₁ = 25 mm

Add **25**

Order number **ST 7387.25**

Add
size to
order number

Order number **ST 7387.**

d ₁	d ₃	d ₄	s	h _{min}	M	▲
15 and 16	23	21	6	13	8	16
19 and 20	27	25	6	13	8	20
24 and 25	34	32	6	13	8	25
30 and 32	42	40	7	14	8	32
38 and 40	52	50	7	16	10	40
48 and 50	62	60	8	17	10	50
60 and 63	72	70	8	19	12	63
80	98	95	10	15	12	80

Fitting to guide pillars ST 7106, ST 7107,
ST 7126, ST 7127

Suitable hexagon socket screws DIN 6912
(included).

Guide plates ST 7571

with solid lubricant



VDI 3357

Material: bronze with solid lubricant

Attachement

Suitable hexagon socket screws DIN 912
Order number **SZ 8510.12 x 025**

Order example: guide plate **ST 7571**

Size $b_1 \times l_1 = 80 \times 125$

Add **080 x 125**

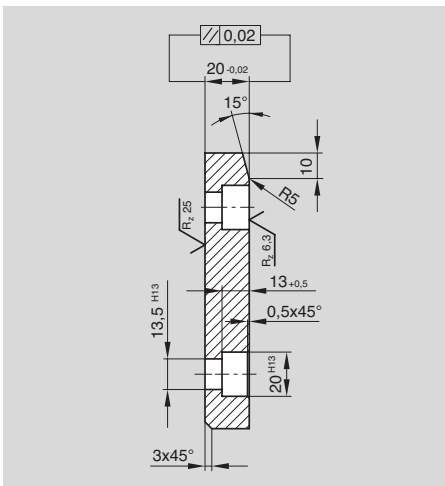
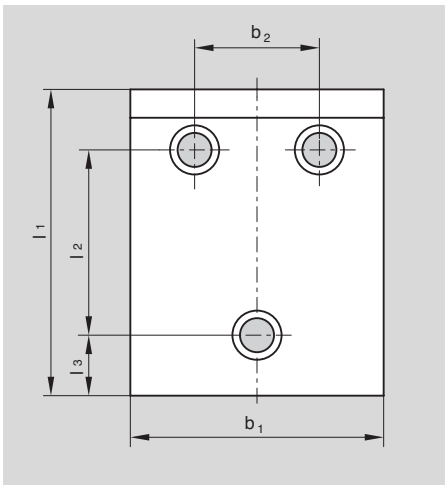
Order number **ST 7571.080 x 125**

Function:

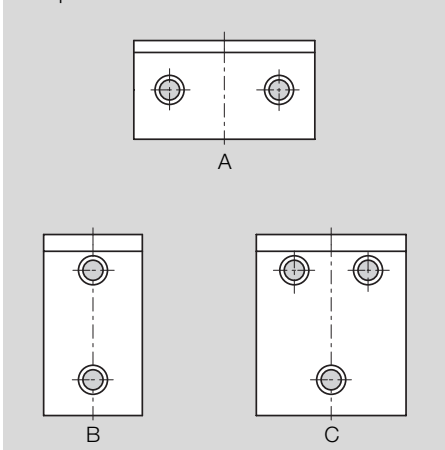
Guide plates will preferably be used when moving within the limits of mixed friction or solid-state friction, that means, with very low sliding speeds and high specific surface pressures.

They are insensible against impacts and pushes and have very good wearing properties.

Due to the integrate solid lubricant inserts the sliding guide is self-lubricating and for that reason without maintenance.



Hole picture:



Add size to order number

Order number **ST 7571**

x

b_1 - 0,2	l_1 - 0,2	b_2 $\pm 0,2$	l_2 $\pm 0,2$	l_3 $\pm 0,2$	hole picture	▲
50	80*	—	30	25	B	050 x 080
	100	—	50	25	B	050 x 100
	125	—	75	25	B	050 x 125
	160	—	110	25	B	050 x 160
	200	—	150	25	B	050 x 200
80	50*	30	—	25	A	080 x 050
	80	—	30	25	B	080 x 080
	100	—	50	25	B	080 x 100
	125	—	75	25	B	080 x 125
	160	—	110	25	B	080 x 160
	200	—	150	25	B	080 x 200
100	50	50	—	25	A	100 x 050
	80	50	—	40	A	100 x 080
	100	—	50	25	B	100 x 100
	125	—	75	25	B	100 x 125
	160	—	110	25	B	100 x 160
125	200	—	150	25	B	100 x 200
	50	75	—	25	A	125 x 050
	80	75	—	40	A	125 x 080
	100	75	50	25	C	125 x 100
	125	75	75	25	C	125 x 125
	160	75	110	25	C	125 x 160
160	200	75	150	25	C	125 x 200
	50	110	—	25	A	160 x 050
	80	110	—	40	A	160 x 080
	100	110	50	25	C	160 x 100
	125	110	75	25	C	160 x 125
	160	110	110	25	C	160 x 160
200	110	150	25	C	160 x 200	

special sizes upon request

* fastening drill hole for M8

Guide plates ST 7561

with solid lubricant

STEINEL[®]
NORMALIEN



ISO 9183

Material: Bronze with solid lubricant

Attachement

Suitable hexagon socket screws DIN 912
order number **SZ 8510.12 x 025**

Order example: guide plate ST 7561

Size $b_1 \times l_1 \times t = 80 \times 125 \times 20$

Add **080 x 125 x 20**

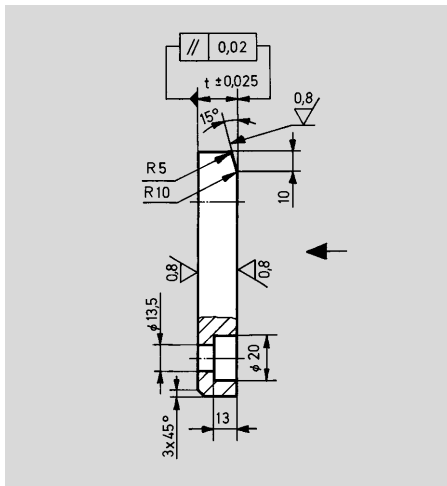
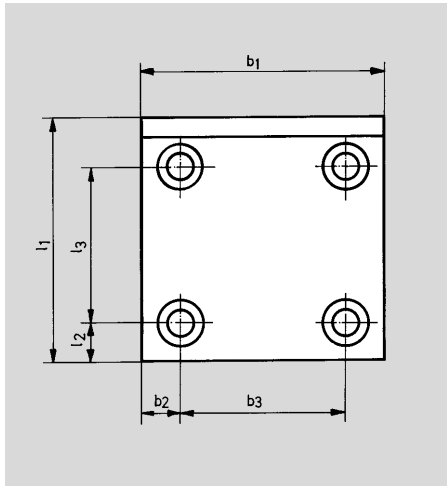
Order number **ST 7561.080 x 125 x 20**

Function:

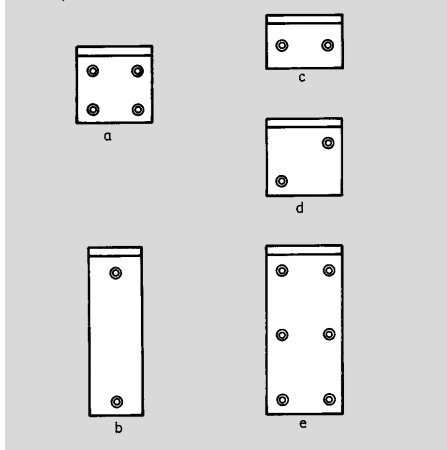
Guide plates will preferably be used when moving within the limits of mixed friction or solid-state friction, that means, with very low sliding speeds and high specific surface pressures.

They are insensible against impacts and pushes and have very good wearing properties.

Due to the integrate solid lubricant inserts the sliding guide is self-lubricating and for that reason without maintenance.



Hole picture:



Add size to order number

Order number **ST 7561**

x x

b_1 ± 1	l_1 ± 1	t $\pm 0,025$	l_2 $\pm 0,2$	l_3 $\pm 0,1$	b_2 $\pm 0,2$	b_3 $\pm 0,1$	hole picture	▲					
50	80	20	20	35	25	—	b	050 x 080 x 20					
	100			b			050 x 100 x 20						
	125			b			050 x 125 x 20						
	160			b			050 x 160 x 20						
	200			b			050 x 200 x 20						
	250			b			050 x 250 x 20						
80	50	20	25	—	20	40	c	080 x 050 x 20					
	80		35				d	080 x 080 x 20					
	100		55				d	080 x 100 x 20					
	125		80				d	080 x 125 x 20					
	160		115				a	080 x 160 x 20					
	200		155				a	080 x 200 x 20					
	250		100				e	080 x 250 x 20					
	315		132				e	080 x 315 x 20					
	100		50				20	25	—	20	60	c	100 x 050 x 20
			80					35				d	100 x 080 x 20
100		55	d	100 x 100 x 20									
125		80	a	100 x 125 x 20									
160		115	a	100 x 160 x 20									
200		155	a	100 x 200 x 20									
250		100	e	100 x 250 x 20									
315		132	e	100 x 315 x 20									
125		50	20	25	—	20		85				c	125 x 050 x 20
		80		35								d	125 x 080 x 20
	100	55		a			125 x 100 x 20						
	125	80		a			125 x 125 x 20						
	160	115		a			125 x 160 x 20						
	200	155		a			125 x 200 x 20						
	250	100		a			125 x 250 x 20						
	315	132		e			125 x 315 x 20						
	160	50		20			25		—	20	120	c	160 x 050 x 20
		80					35					a	160 x 080 x 20
100		55	a		160 x 100 x 20								
125		80	a		160 x 125 x 20								
160		115	a		160 x 160 x 20								
200		155	a		160 x 200 x 20								
250		100	e		160 x 250 x 20								
315		132	e		160 x 315 x 20								











































special sizes upon request

Cutting Units

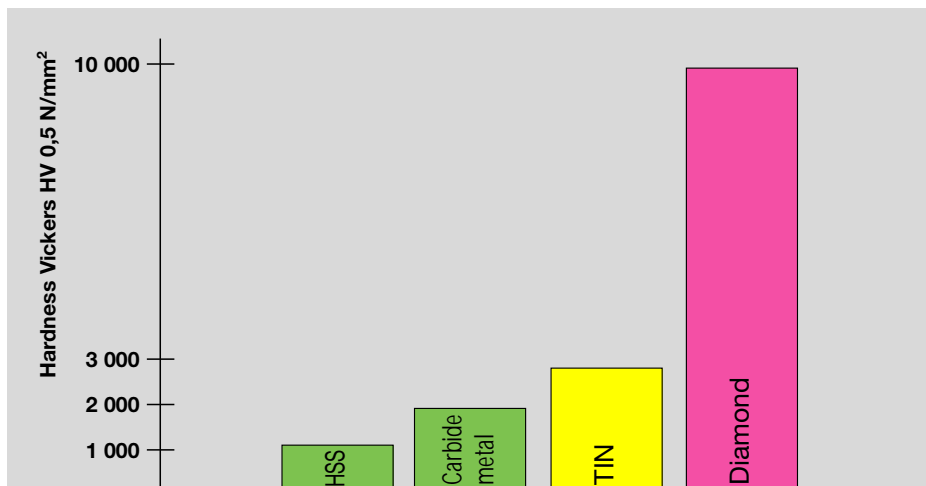
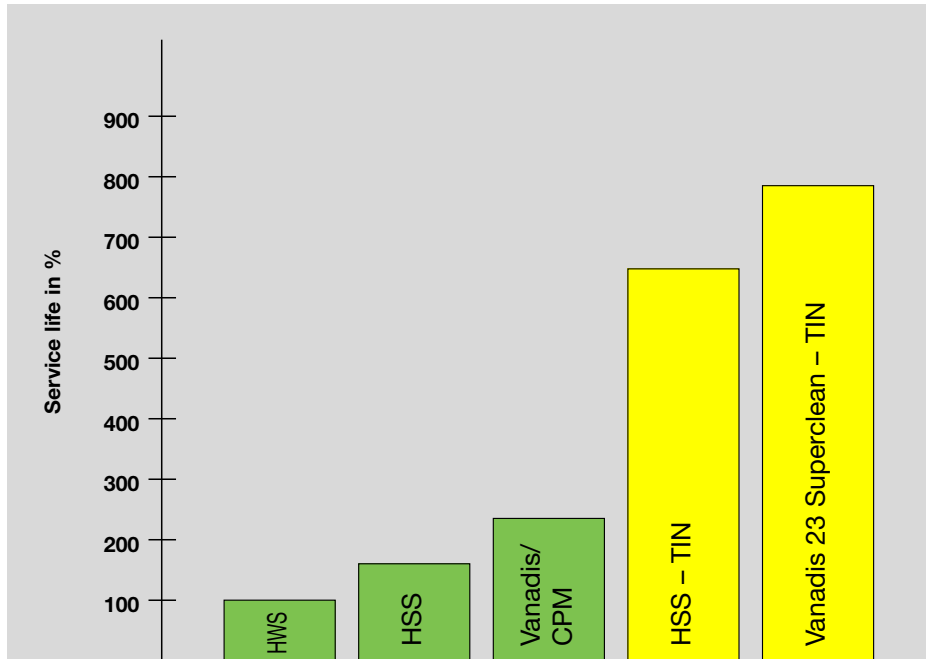
- Round punches with conical head according to DIN, with cylindrical head and quick-change cutting punches in standardized sizes on stock
- Vanadis 23 Superclean / CPM and HSS punches with TIN coating
- Form cutting punches according to your drawing
- Ejector pins
- Cutting bushes
- Punch guide bushes
- Receiving-tubes for punches
- Receiving plates for quick change and cylindrical head punches
- Polyurethane strippers



Cutting Units

<p>SZ 6149 page 4.06</p> 	<p>SZ 60.. page 4.07</p> <p>SZ 6013 SZ 6014 SZ 6015 SZ 6016 SZ 6028 SZ 6040 SZ 6043 SZ 6046 SZ 6050</p> 	<p>SZ 6141 page 4.08</p> 	<p>SZ 613. page 4.10</p> <p>SZ 6134 SZ 6137 SZ 6138 SZ 6139</p> 	<p>SZ 612. page 4.11</p> <p>SZ 6124 SZ 6127 SZ 6128 SZ 6129</p> 	<p>SZ 5.00 page 4.12</p> <p>SZ 5500 SZ 5600 SZ 5700</p> 
<p>SZ 55.. page 4.13</p> <p>SZ 5513 SZ 5514 SZ 5515 SZ 5516 SZ 5528 SZ 5540 SZ 5543 SZ 5546 SZ 5550 SZ 5555</p> 	<p>SZ 56.. page 4.13</p> <p>SZ 5613 SZ 5614 SZ 5615 SZ 5616 SZ 5628 SZ 5640 SZ 5643 SZ 5646 SZ 5650 SZ 5655</p> 	<p>SZ 57.. page 4.13</p> <p>SZ 5713 SZ 5714 SZ 5715 SZ 5716 SZ 5728 SZ 5740 SZ 5743 SZ 5746 SZ 5750 SZ 5755</p> 	<p>SZ 5900 page 4.14</p> 	<p>SZ 53.. page 4.15</p> <p>SZ 5306 SZ 5308 SZ 5310 SZ 5313 SZ 5316 SZ 5320 SZ 5325</p> 	<p>SZ 59.. page 4.15</p> <p>SZ 5906 SZ 5908 SZ 5910 SZ 5913 SZ 5916 SZ 5920 SZ 5925</p> 
<p>SZ 6120 page 4.16</p> 	<p>SZ 6121 page 4.16</p> 	<p>SZ 6126 page 4.17</p> 	<p>SZ 6700 page 4.18</p> 	<p>SZ 6210 page 4.18</p> 	<p>SZ 67.. page 4.19</p> <p>SZ 6706 SZ 6710 SZ 6713 SZ 6716 SZ 6720 SZ 6725</p> 
<p>SZ 68.. page 4.20</p> <p>SZ 6836 SZ 6840 SZ 6840 SZ 6846 SZ 6850 SZ 6855</p> 	<p>SZ 6771 page 4.21</p> 	<p>SZ 6221 page 4.21</p> 	<p>SZ 6772 page 4.22</p> 	<p>SZ 6222 page 4.22</p> 	<p>SZ 6773 page 4.23</p> 
<p>SZ 6223 page 4.23</p> 	<p>SZ 5470 page 4.24</p> 	<p>SZ 5410 page 4.24</p> 	<p>SZ 5420 page 4.25</p> 	<p>SZ 5430 page 4.25</p> 	<p>SZ 5484 page 4.26</p> 
<p>SZ 5442 page 4.26</p> 	<p>SZ 5422 page 4.27</p> 	<p>SZ 5498 page 4.27</p> 	<p>SZ 5485 page 4.28</p> 	<p>SZ 5443 page 4.28</p> 	<p>SZ 5424 page 4.29</p> 
<p>SZ 5691 page 4.30</p> 	<p>SZ 6391 page 4.30</p> 	<p>SZ 5693 page 4.31</p> 	<p>SZ 6393 page 4.31</p> 	<p>SZ 5692 page 4.32</p> 	<p>SZ 6392 page 4.32</p> 

Cutting units with titane-nitride coating



TiN-coated tools

to increase the efficiency and profitability of your punching and deform tools.

TiN-coated tools

are manufactured out of the base metal HSS or Vanadis 23 Superclean and coated with titane-nitride (gold-coloured).

TiN-coated tools increase

- the surface hardness toward 2 fold
- service life towards 3-7 fold
- wear resistance
- the temperature resistance
- the corrosion resistance
- the surface finish quality

TiN-coated tool reduce

- the setup periods
- the costs of repair
- the costs of production
- the costs of regrinding
- the cold fusing
- the retraction forces

Method characteristics

Coating: Hard-material compound of titane and nitrogen according to the PVC-method

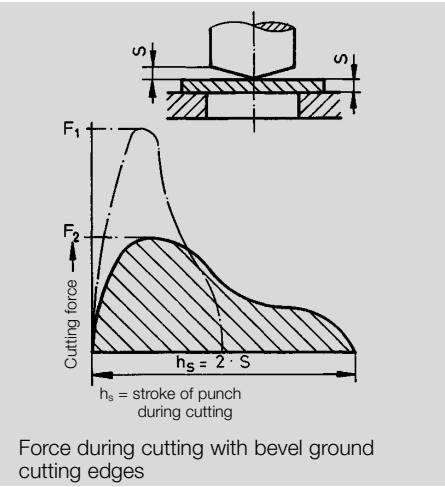
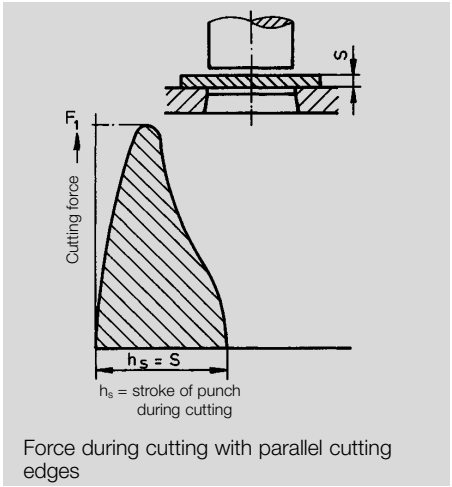
Thickness of coat: 2-3 µm

Coating temperature: about 500 °C

Hardness of coat: 2200-2600 HV

Cutting forces

Shearing strengths



Forces during the cutting

Following factors influence the size of the cutting force: Length, location and condition of the cutting edges of punch and matrix, thickness and material (shearing strength) of the parts, which have to be cut, cutting clearance.

The stripping force can be assumed with sufficient accuracy to be 10% of the cutting force F_1 , respectively F_2 .

The following diagram is of use to determine the cutting area and cutting force quickly

Parallel ground cutting edges

If the cutting edges of punch and die are parallel, the cutting force will be calculated in the following way:

$$F_1 = k_s \cdot L \cdot s \quad (N)$$

k_s = shearing strength (N/mm²)
 L = length of cutting edges (mm)
 s = sheet thickness (mm)

Bevel ground cutting edges

The cutting force can be considerably reduced by bevel grinding or cylindrical grinding on punch or die. Depending on type of edges, the cutting force will be reduced to 0,5 – 0,67 · F_1 .

$$F_2 = 0,67 k_s \cdot L \cdot s \quad (N)$$

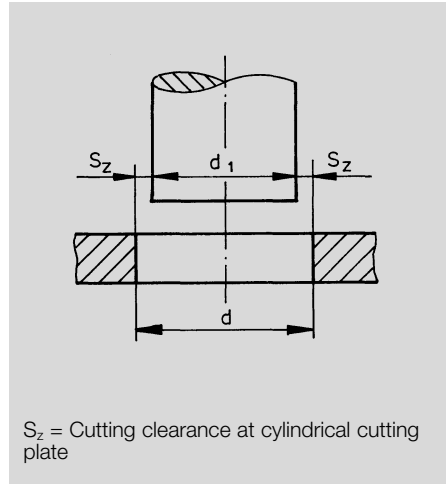
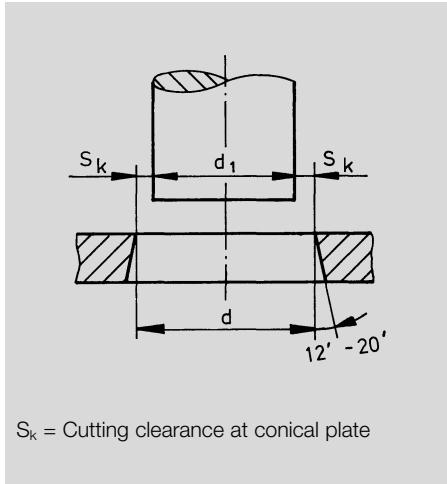
Steel	Non-ferrous metals		Non-metals			
Light steel	St 10	220-400	Al 99-99,5 soft	60- 80	Leather	7
	St 12	220-340	Al 99-99,5 semihard	80-100	Soft rubber	7
	St 13	220-320	Al Mg 5/7/9 soft	190-300	Hard rubber	20- 60
	St 14	220-300	Al Mg 5/7/9 semihard	200-360	Wood	10- 30
Structural steel	St 33	340-400	Al Cu soft	130-170	Birch plywood	20- 30
	St 37	300-360	Al Cu semihard	300-350	Paper card-board	20- 50
	St 42	340-400	Copper (Cu)	210-240	Hardboard	70- 90
	St 50	400-480	Tin (Sn)	30- 35	Synth. resin pur	20- 30
	St 52	420-500	Zinc (Zn)	120-140	S. resin tissue	90-120
	St 60	480-580	Nickel (Ni)	320-400	S. resin hard	100-140
Casehardening steel	St 70	560-680	Lead (Pb)	20- 30	Celluloid	40- 60
	Ck 10	270-320	Sn Bz 6	350-450	Mica	50- 80
	Ck 15	300-360	Al Bz 4	240-330	Klingerit a. similars	40- 60
	16 MnCr5	440-560	Ms 63 soft	240-300		
Heat treatable steel	20 MnCr5	480-600	Ms 63 semihard	300-370		
	Ck 35	400-480	Ms 72 soft	200-250		
	Ck 45	480-580	Gold	110		
Nirosta	34 CrMo4	480-600	Platinum	300		
	V 2A	500-600	Silver	280		

Shearing strength

of different materials k_s in N/mm²

Cutting clearance

Location of the strip

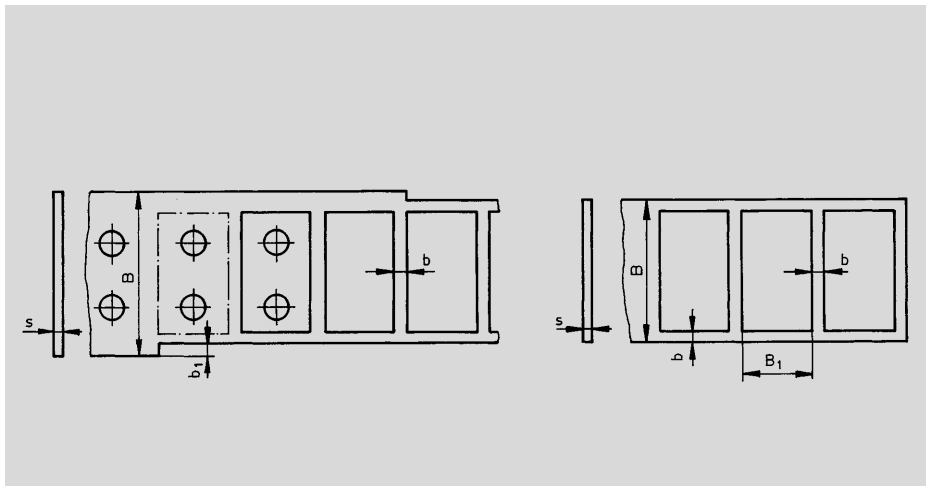


Cutting split

The size of the cutting split is depending on the thickness of the sheet s and on the shearing strength k_s of the metal.

Punch clearance $S_p = 2 \times S_k$ respectively S_z or $S_p = d - d_1$

Determinative for the dimension sizes of the workpiece are: during cutting out, the rupture of the cutting plate, during punching, the piercing punch.



Location of the strip, gauges of edges and crosspieces

With an optimum location of the cutouts in the strip, the discard can be reduced most. At some forms of workpieces, cutting without crosspieces or even without any discard is possible. This result can be obtained with small corrections at the outside form of the workpiece.

Example: Cutting out of round sheet bars
 in one row: 30% discard
 in two rows: 20% discard
 in three rows: 17% discard

Sheet thickness s Nominal size (mm)		0,2	0,25	0,3	0,35	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,2	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0	
Cutting clearance in μm with a shearing strength k_s of	up to 250 N/mm^2	s_k	3	4	5	5	7	8	10	11	13	14	15	18	23	30	37	45	53	60	68	75
		s_z	6	7	9	10	13	15	18	21	25	28	30	34	45	60	75	90	105	120	135	150
	250-400 N/mm^2	s_k	5	6	8	9	10	13	15	18	20	22	25	30	38	50	62	70	85	100	112	125
		s_z	8	10	12	14	15	20	22	28	30	35	40	48	60	80	100	120	140	160	180	200
	400-630 N/mm^2	s_k	7	8	10	12	14	17	20	25	28	30	35	42	52	70	88	100	122	140	157	175
		s_z	10	12	15	18	20	25	28	35	40	44	50	60	75	100	125	150	175	200	225	250
Strip gauge B	20	Gauge of edge and crosspiece b for metallic materials																				
	50	1,3	1,3	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,4	1,7	2,1	2,5	2,7	2,9	3,2	3,4	3,7	
	75	2,2	2,1	2,0	1,8	1,6	1,4	1,5	1,5	1,6	1,6	1,7	1,8	1,9	2,2	2,6	3,2	3,7	4,0	4,2	4,5	
	100	2,6	2,4	2,2	2,1	1,9	1,7	1,8	1,8	1,9	1,9	2,1	2,2	2,5	2,9	3,4	4,0	4,2	4,4	4,8		
Diagonal cutting pliers b_1		1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,8	2,2	3,0	3,5	4,0	4,5	4,8	5,0	5,5	

Table of diagram to determine the cutting clearance as well as gauge of edge and crosspiece

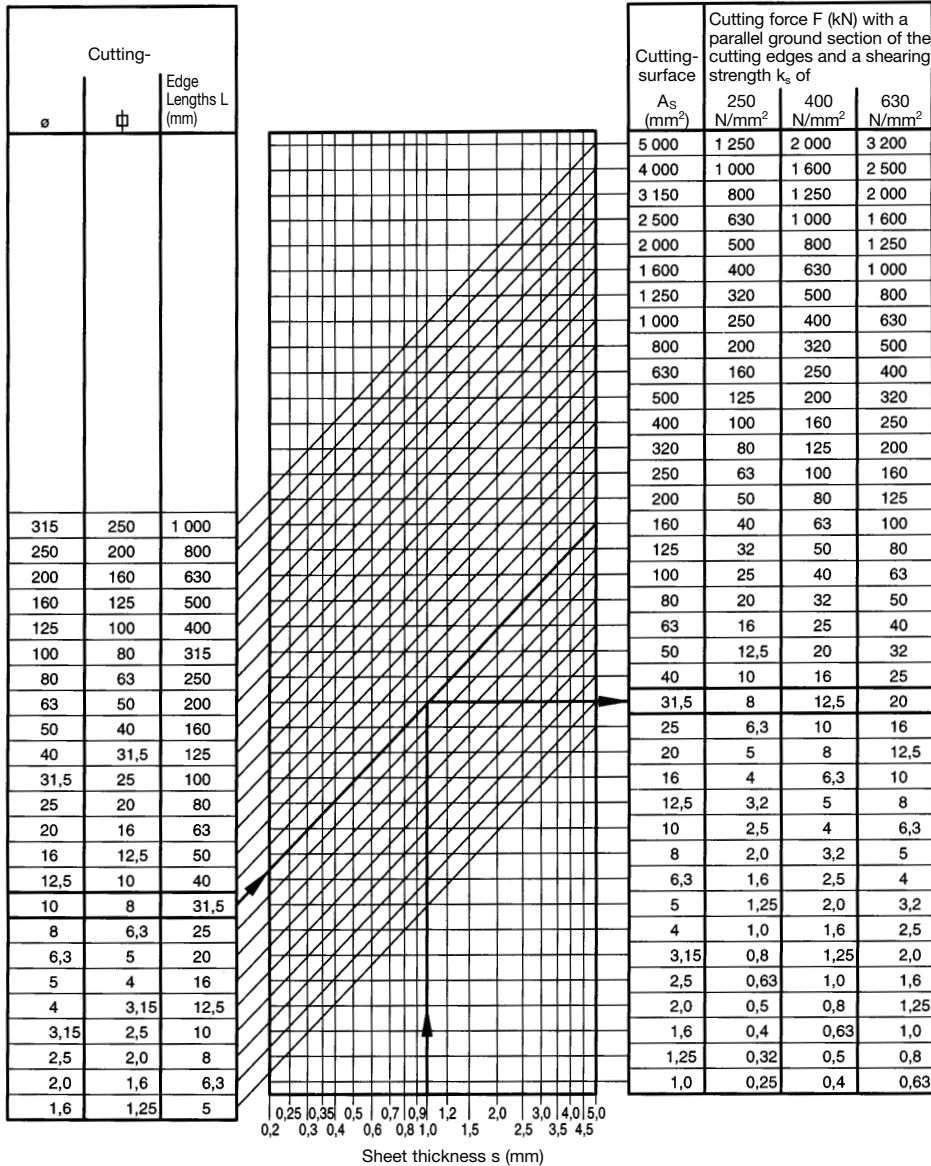
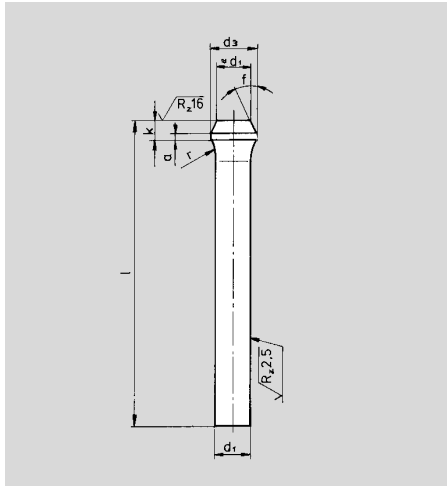


Diagramm to determine the cutting surface and the cutting force

Example: With a length of cutting edges $l = 31,5$ mm (corresponding cutting diameter 10 mm or $\varnothing 8$ mm) and a sheet thickness $s = 1$ mm the cutting surface $A_s = 31,5$ mm. At parallel ground cutting edges and a shearing strength $k_s = 400$ N/mm² there will result a cutting force $F_1 = 12,5$ kN (1250 kp).



Round cutting punches with trumpet throat and straight shank

Form D

Precision finish

Head and shank are puncture-polished after hammering

Order example: Round cutting punch with trumpet throat and straight shank in HSS
SZ 6149

d₁ = 4 mm, length 80 mm

Add **040 x 080**

Order number **SZ 6149.040 x 080**

HSS high performance
high speed steel
shank hardness HRC 64 ± 2
head hardness HRC 50 ± 5

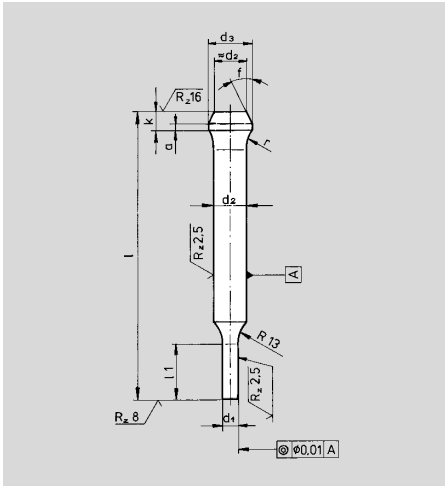
Add
size to
order number

Order number **SZ 6149.**

x

d _{1h6}	d ₃	k ₀ ^{+0,2}	a	f	r _{-0,2} ⁰	l ^{+0,5}	Pieces/standard packing	▲
3,0	4,5	3	1,0	20°	6,5	71 80 100	5	030 x 071 x 080 x 100
4,0	5,5	4	1,5	15°	8,0	71 80 100	5	040 x 071 x 080 x 100
5,0	7,0	4	1,5	20°	10,0	71 80 100	5	050 x 071 x 080 x 100
6,0	9,0	4	1,5	30°	10,0	71 80 100	5	060 x 071 x 080 x 100
8,0	11,0	4	1,5	35°	12,0	71 80 100	5	080 x 071 x 080 x 100
10,0	14,0	4	1,5	40°	15,0	71 80 100	3	100 x 071 x 080 x 100
13,0	17,0	4	1,5	40°	15,0	71 80 100	3	130 x 071 x 080 x 100
16,0	20,0	4	1,5	40°	15,0	71 80 100	2	160 x 071 x 080 x 100
20,0	25,0	4	1,5	45°	15,0	71 80 100	2	200 x 071 x 080 x 100

Intermediate dimensions or other materials on request



Round cutting punches with trumpet throat and recessed shank

Form C

Precision finish

Head and shank are puncture-polished after hammering

Order example: Round cutting punch with trumpet throat and recessed shank in HSS **SZ 6028**

$d_1 = 4,5$ mm, $d_2 = 8,0$ mm, length 71 mm

Add **045 x 071**

Order number **SZ 6028.045 x 071**

HSS high performance

high speed steel

shank hardness HRC 64 ± 2

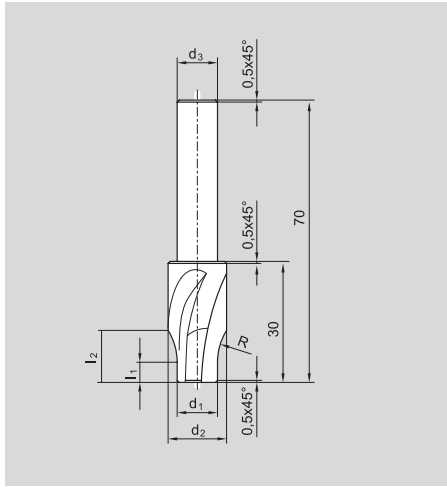
head hardness HRC 50 ± 5

Add size to order number

Order number SZ 6013.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6014.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6015.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6016.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6028.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6040.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6043.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6046.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 6050.	<input type="checkbox"/> x <input type="checkbox"/>

d_{1h6}	Step-up distance	d_{2h6}	d_3	$k_{0.02}^{+0.2}$	a	f	$r_{-0.2}^0$	l	l_1	▲
1,0 – 2,5	0,1	3	4,5	3	1,0	20°	6,5	71 80 100	10	SZ 6013.010-025 x 071 x 080 x 100
1,0 – 3,5	0,1	4	5,5	4	1,5	15°	8,0	71 80 100	10	SZ 6014.010-035 x 071 x 080 x 100
2,0 – 4,5	0,1	5	7,0	4	1,5	20°	10,0	71 80 100	10	SZ 6015.020-045 x 071 x 080 x 100
2,5 – 5,5	0,1	6	9,0	4	1,5	30°	10,0	71 80 100	10	SZ 6016.025-055 x 071 x 080 x 100
3,0 – 7,5	0,1	8	11,0	4	1,5	35°	12,0	71 80 100	13	SZ 6028.030-075 x 071 x 080 x 100
5,0 – 9,5	0,5	10	14,0	4	1,5	40°	15,0	71 80 100	17	SZ 6040.050-095 x 071 x 080 x 100
7,5 – 12,5	0,5	13	17,0	4	1,5	40°	15,0	71 80 100	17	SZ 6043.075-125 x 071 x 080 x 100
10,0 – 15,5	0,5	16	20,0	4	1,5	40°	15,0	71 80 100	17	SZ 6046.100-155 x 071 x 080 x 100
15,0 – 19,5	0,5	20	25,0	4	1,5	45°	15,0	71 80 100	17	SZ 6050.150-195 x 071 x 080 x 100

Facing cutter



Facing cutter for cutting punches with trumpet throat

Material:
High performance steel for high-speed use (HSS)

Characteristics:
hardened, tempered and highly polished
hardness 61–65 HRC

Order example: Facing cutter for cutting punches with trumpet throat

SZ 6141
d₁ = 4 mm,
Add **04**
Order number **SZ 6141.04**

Add size to order number

Order number **SZ 6141.**



d _{1f7}	d _{2h8}	d _{3h11}	R	l ₁	L ₂	▲
3	4,9	8	6,5	5	8,4	03
4	5,9	8	8,0	5	8,8	04
5	7,4	8	10,0	5	9,7	05
6	9,5	8	10,0	5	10,6	06
8	11,5	8	12,0	5	11,2	08
10	14,5	10	15,0	8	15,9	10
13	17,5	10	15,0	8	15,9	13
16	20,5	10	15,0	8	15,8	16
20	25,5	16	15,0	8	16,7	20

Intermediate dimensions or other materials on request

Special cutting units

Precision cutting punches

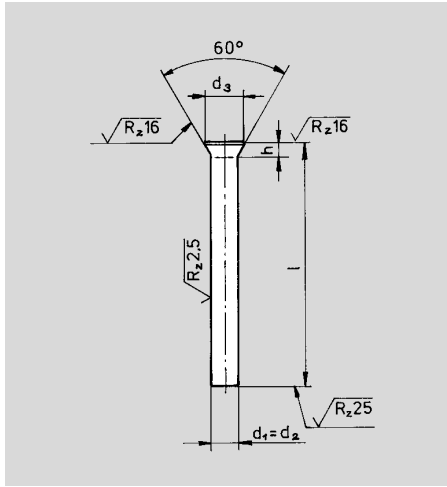
Precision cutting bushes



Special cutting units can be manufactured according to your specifications and drawings in the following materials HWS, HSS, CPM and Vanadis 23 Superclean.

All sizes in HSS, CPM and Vanadis 23 Superclean can be supplied with the following coatings: TIN, TIC, TiCN or TiC/TiN.

You can reach us at +49 (0) 77 20/6928 17 or you can fax your request to +49 (0) 77 20/692870.



Round cutting punches with conical head and straight shank

DIN 9861, Form D, ISO 6752

Precision finish

Head and shank are puncture-polished after hammering

Indication: All dimension sizes in HSS, CPM and Vanadis 23 Superclean are available short dated with TIN-coating too.

Order example: Cutting punch with conical head and straight shank in HSS **SZ 6139**

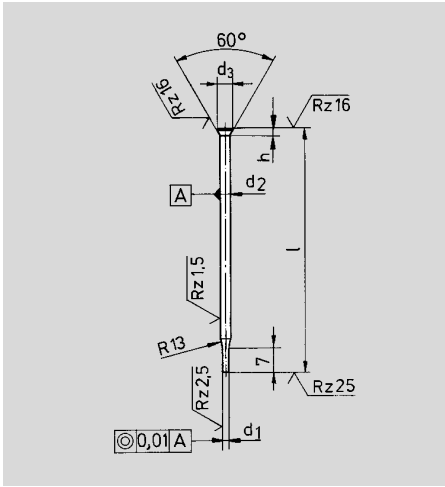
$d_1 = 4$ mm, length 80 mm

Add **040 x 080**

Order number **SZ 6139.040 x 080**

Length l ^{+0,5}	HWS high performance tool steel 12% CR shank hardness HRC 62 ± 2 head hardness HRC 50 ± 5	Vanadis 23 Superclean powder metallurgical high precision steel shank hardness HRC 64 ± 2 head hardness HRC 50 ± 5	CPM powder metallurgical high precision steel shank hardness HRC 62 ± 2 head hardness HRC 50 ± 5	HSS high performance high speed steel shank hardness HRC 64 ± 2 head hardness HRC 50 ± 5	Add size to order number
71	Order number SZ 6134.	Order number SZ 6137.	Order number SZ 6138.	Order number SZ 6139.	<input type="checkbox"/> x 071
80	Order number SZ 6134.	Order number SZ 6137.	Order number SZ 6138.	Order number SZ 6139.	<input type="checkbox"/> x 080
100	Order number SZ 6134.	Order number SZ 6137.	Order number SZ 6138.	Order number SZ 6139.	<input type="checkbox"/> x 100

$d_1 = d_{2h6}$	Step-up distance	d_3	$h_0^{+0,2}$	Pieces/standard packing	▲
0,8		1,4	0,92	10	008
0,9		1,6	1,01	10	009
1,0		1,8	1,19	10	010
1,1		1,8	1,11	10	011
1,2		2,0	1,19	10	012
1,3		2,0	1,11	10	013
1,4		2,2	1,19	10	014
1,5		2,2	1,11	10	015
1,6		2,5	1,28	10	016
1,7		2,5	1,19	10	017
1,8		2,8	1,37	10	018
1,9		2,8	1,28	10	019
2,0		3,0	1,37	10	020
2,1		3,2	1,45	10	021
2,2		3,2	1,37	10	022
2,3 - 2,5	0,1	3,5	1,37	10	023 - 025
2,6 - 2,9	0,1	4,0	1,54	10	026 - 029
3,0 - 3,4	0,1	4,5	1,54	5	030 - 034
3,5 - 3,9	0,1	5,0	1,54	5	035 - 039
4,0 - 4,4	0,1	5,5	1,63	5	040 - 044
4,5 - 4,9	0,1	6,0	1,63	5	045 - 049
5,0 - 5,4	0,1	6,5	1,63	5	050 - 054
5,5 - 5,9	0,1	7,0	1,71	5	055 - 059
6,0 - 6,4	0,1	8,0	2,06	5	060 - 064
6,5 - 6,9	0,1	9,0	3,17	5	065 - 069
7,0 - 7,4	0,1	9,0	2,73	5	070 - 074
7,5 - 7,9	0,1	10,0	3,17	5	075 - 079
8,0 - 8,4	0,1	10,0	2,73	5	080 - 084
8,5 - 8,9	0,1	11,0	3,17	5	085 - 089
9,0 - 9,4	0,1	11,0	2,73	5	090 - 094
9,5 - 9,9	0,1	12,0	3,17	5	095 - 099
10,0		12,0	2,73	5	100
10,5		13,0	3,17	5	105
11,0		13,0	2,73	5	110
11,5		14,0	3,17	3	115
12,0		14,0	2,73	3	120
12,5		15,0	3,17	3	125
13,0		15,0	2,73	3	130
13,5		16,0	3,67	3	135
14,0		16,0	3,23	3	140
14,5		17,0	3,67	3	145
15,0		17,0	3,23	3	150
15,5		18,0	3,67	3	155
16,0		18,0	3,23	3	160



Round cutting punches with conical head and recessed shank

DIN 9861, Form C, ISO 9181

Precision finish

Head and shank are puncture-polished after hammering

Indication: All dimension sizes in HSS are available short dated with TIN-coating too.

Order example: Punches with conical head and recessed shank in HWS **SZ 6124**

$d_1 = 1,5$ mm, length 71 mm

Add **015 x 71**

Order number **SZ 6124.015 x 71**

HWS high performance
tool steel
12% CR
shank hardness HRC 62 ± 2
head hardness HRC 50 ± 5

HSS high performance
high speed steel
shank hardness HRC 64 ± 2
head hardness HRC 50 ± 5

Add size to order number

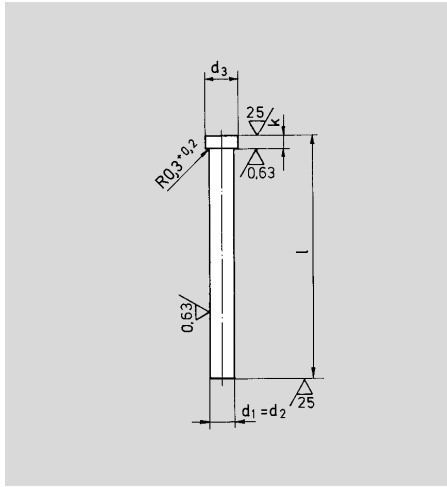
Order number **SZ 6124.**

Order number **SZ 6129.**

x

d_{1h6}	Step-up dist.	d_{2h6}	d_3	$h_{0,2}^{+0,2}$	$l^{+0,5}$	Pieces/standard packing	▲
0,5 – 1,5	0,1	2,0	3,0	1,37	71	10	005 – 015 x 71
					80	10	x 80
1,6 – 2,9	0,1	3,0	4,5	1,80	71	5	016 – 029 x 71
					80	5	x 80

Vanadis 23 Superclean (SZ 6127) and CPM (SZ 6128) upon request



Round cutting punches with cylindrical head and straight shank

ISO 8020, Form A

Precision finish

Indication: All dimension sizes in HSS and Vanadis 23 Superclean are available short dated with TIN-coating too

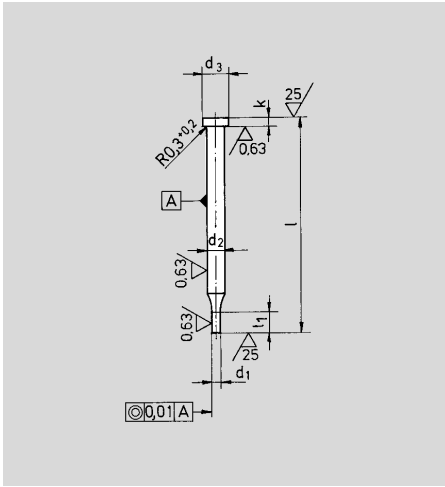
Order example: Cutting punch with cylindrical head and straight shank in HWS **SZ 5500**
d₁ = 8,0 mm, length 71 mm
Add **080 x 071**
Order number **SZ 5500.080 x 071**

HWS high performance
tool steel
12% CR
shank hardness HRC 62 ± 2
head hardness HRC 50 ± 5
Order number **SZ 5500.**

HSS high performance
high speed steel
shank hardness HRC 64 ± 2
head hardness HRC 50 ± 5
Order number **SZ 5600.**

Vanadis 23 Superclean
powder metallurgical
high precision steel
shank hardness HRC 64 ± 2
head hardness HRC 50 ± 5
Order number **SZ 5700.** x

d _{1m5}	d ₃	k ^{+0,25} ₀	l ^{+0,5}	Pieces/standard packing	▲
3,0	5	3	63	5	030 x 063 x 071 x 080
			71	5	
			80	5	
4,0	6	3	63	5	040 x 063 x 071 x 080
			71	5	
			80	5	
5,0	8	5	63	5	050 x 063 x 071 x 080 x 090
			71	5	
			80	5	
			90	5	
6,0	9	5	63	5	060 x 063 x 071 x 080 x 090 x 100
			71	5	
			80	5	
			90	5	
			100	5	
8,0	11	5	63	3	080 x 063 x 071 x 080 x 090 x 100
			71	3	
			80	3	
			90	3	
			100	3	
10,0	13	5	63	3	100 x 063 x 071 x 080 x 090 x 100
			71	3	
			80	3	
			90	3	
			100	3	
13,0	16	5	71	3	130 x 071 x 080 x 090 x 100
			80	3	
			90	3	
			100	3	
16,0	19	5	71	3	160 x 071 x 080 x 090 x 100
			80	3	
			90	3	
			100	3	
20,0	24	5	80	2	200 x 080 x 090 x 100
			90	2	
			100	2	
25,0	29	5	80	2	250 x 080 x 090 x 100
			90	2	
			100	2	



Round cutting punches with cylindrical head and recessed shank

ISO 8020, Form B

Precision finish

Indication: All dimension sizes in HSS and Vanadis 23 Superclean are available short dated with TIN-coating too.

Order example: Cutting punch with cylindrical head and recessed shank in HSS **SZ 5628**
 $d_1 = 4,5 \text{ mm}$, $d_2 = 8,0 \text{ mm}$, length 71 mm
 Add **045 x 071**
 Order number **SZ 5628.045 x 071**

HWS high performance
 tool steel
 12% CR
 shank hardness HRC 62 ± 2
 head hardness HRC 50 ± 5

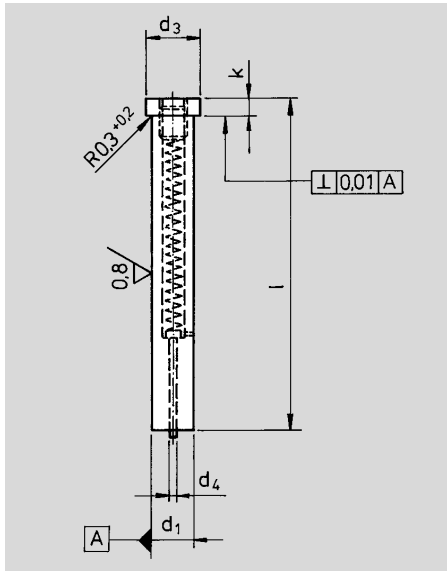
HSS high performance
 high speed steel
 shank hardness HRC 64 ± 2
 head hardness HRC 50 ± 5

Vanadis 23 Superclean
 powder metallurgical
 high precision steel
 shank hardness HRC 64 ± 2
 head hardness HRC 50 ± 5 Add size to order number

Order number SZ 5513.	Order number SZ 5613.	Order number SZ 5713.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5514.	Order number SZ 5614.	Order number SZ 5714.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5515.	Order number SZ 5615.	Order number SZ 5715.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5516.	Order number SZ 5616.	Order number SZ 5716.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5528.	Order number SZ 5628.	Order number SZ 5728.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5540.	Order number SZ 5640.	Order number SZ 5740.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5543.	Order number SZ 5643.	Order number SZ 5743.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5546.	Order number SZ 5646.	Order number SZ 5746.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5550.	Order number SZ 5650.	Order number SZ 5750.	<input type="checkbox"/> x <input type="checkbox"/>
Order number SZ 5555.	Order number SZ 5655.	Order number SZ 5755.	<input type="checkbox"/> x <input type="checkbox"/>

$d_{1\phi}$	Step-up dist.	d_{2m5}	d_3	$k_{+0,25}^0$	$l_{+0,5}$	$l_1^{+0,5}$	Pieces/standard packing	▲
1,0 – 2,5	0,1	3	5	3	71 80	10	3 3	SZ 5513./SZ 5613./SZ 5713. 010 – 025 x 071 x 080
1,0 – 3,5	0,1	4	6	3	71 80	10	3 3	SZ 5514./SZ 5614./SZ 5714. 010 – 035 x 071 x 080
2,0 – 4,5	0,1	5	8	5	71 80	10	3 3	SZ 5515./SZ 5615./SZ 5715. 020 – 045 x 071 x 080
2,5 – 5,5	0,1	6	9	5	71 80 90 100	10	3 3 3 3	SZ 5516./SZ 5616./SZ 5716. 025 – 055 x 071 x 080 x 090 x 100
3,0 – 7,5	0,1	8	11	5	71 80 90 100	13	3 3 3 3	SZ 5528./SZ 5628./SZ 5728. 030 – 075 x 071 x 080 x 090 x 100
5,0 – 9,5	0,1	10	13	5	71 80 90 100	17	3 3 3 3	SZ 5540./SZ 5640./SZ 5740. 050 – 095 x 071 x 080 x 090 x 100
7,5 – 12,5	0,1	13	16	5	71 80 90 100	17	3 3 3 3	SZ 5543./SZ 5643./SZ 5743. 075 – 125 x 071 x 080 x 090 x 100
10,0 – 15,5	0,1	16	19	5	80 90 100	17	2 2 2	SZ 5546./SZ 5646./SZ 5746. 100 – 155 x 080 x 090 x 100
15,0 – 19,5	0,5	20	24	5	80 90 100	17	2 2 2	SZ 5550./SZ 5650./SZ 5750. 150 – 195 x 080 x 090 x 100
20,0 – 24,5	0,5	25	29	5	80 90 100	17	2 2 2	SZ 5555./SZ 5655./SZ 5755. 200 – 245 x 080 x 090 x 100

Cutting punches



Round cutting punches with pressure pin, cylindrical head and straight shank

ISO 8020, Form E

Precision finish

Indication: All dimension sizes in HSS and CPM are available short dated with TIN-coating too

Order example: Cutting punch with pressure pin, cylindrical head and straight shank in HSS **SZ 5900**

$d_1 = 8,0$ mm, length 80 mm

Add **080 x 080**

Order number **SZ 5900.080 x 080**

CPM powder metallurgical
high precision steel
shank hardness HRC 62 ± 2
head hardness HRC 50 ± 5

Order number **SZ 5300.**

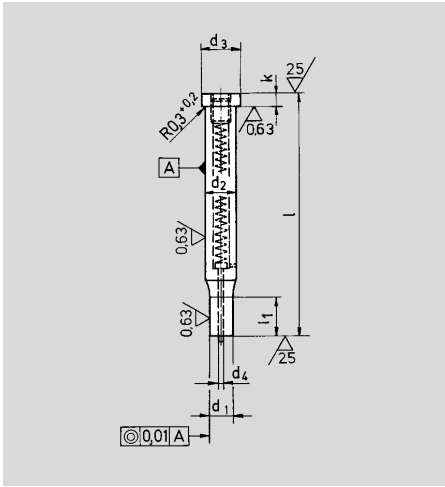
HSS high performance
high speed steel
shank hardness HRC 64 ± 2
head hardness HRC 50 ± 5

Add
size to
order number

Order number **SZ 5900.**

x

d_{1m5}	d_3	d_4	$k \begin{smallmatrix} +0,25 \\ 0 \end{smallmatrix}$	$l \begin{smallmatrix} +0,5 \\ \end{smallmatrix}$	▲
6,0	9	0,8	5	71	060 x 071
				80	x 080
				90	x 090
				100	x 100
8,0	11	1,2	5	71	080 x 071
				80	x 080
				90	x 090
				100	x 100
10,0	13	1,5	5	71	100 x 071
				80	x 080
				90	x 090
				100	x 100
13,0	16	1,5	5	71	130 x 071
				80	x 080
				90	x 090
				100	x 100
16,0	19	2,0	5	71	160 x 071
				80	x 080
				90	x 090
				100	x 100
20,0	24	2,5	5	80	200 x 080
				90	x 090
				100	x 100
25,0	29	2,5	5	80	250 x 080
				90	x 090
				100	x 100



Round cutting punches with pressure pin, cylindrical head and recessed shank

ISO 8020, Form F

Precision finish

Indication: All dimension sizes in HSS and CPM are available short dated with TIN-coating too

Order example: Cutting punch with pressure pin, cylindrical head and recessed shank in HSS **SZ 5906**

$d_1 = 2,7 \text{ mm}$, $d_2 = 6,0 \text{ mm}$, length 80 mm

Add **027 x 080**

Order number **SZ 5906.027 x 080**

Time of delivery upon request

CPM powder metallurgical
high precision steel
shank hardness HRC 62 ± 2
head hardness HRC 50 ± 5

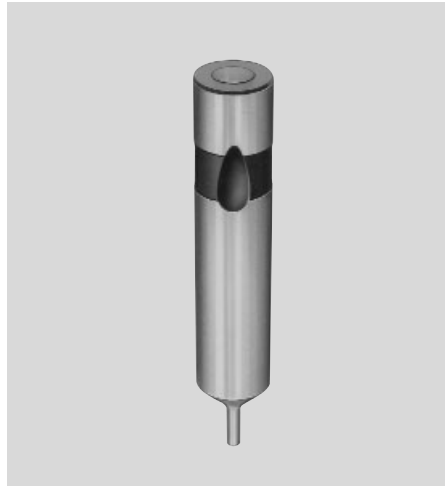
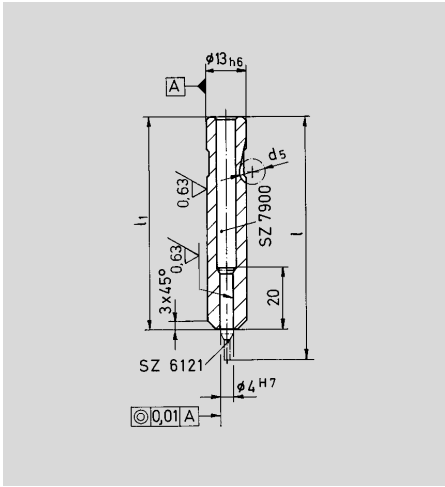
HSS high performance
high speed steel
shank hardness HRC 64 ± 2
head hardness HRC 50 ± 5

Add
size to
order number

Order number SZ 5306.	Order number SZ 5906.	<input type="text"/> x <input type="text"/>
Order number SZ 5308.	Order number SZ 5908.	<input type="text"/> x <input type="text"/>
Order number SZ 5310.	Order number SZ 5910.	<input type="text"/> x <input type="text"/>
Order number SZ 5313.	Order number SZ 5913.	<input type="text"/> x <input type="text"/>
Order number SZ 5316.	Order number SZ 5916.	<input type="text"/> x <input type="text"/>
Order number SZ 5320.	Order number SZ 5920.	<input type="text"/> x <input type="text"/>
Order number SZ 5325.	Order number SZ 5925.	<input type="text"/> x <input type="text"/>

$d_{1\beta}$	Step-up distance	d_{2m5}	d_3	d_4	$k^{+0,25}_0$	$l^{+0,5}$	$l_1^{+0,5}$	▲
1,6 – 5,9	0,1	6	9	0,8	5	71 80 90 100	10	SZ 5306./SZ 5906. 016 – 059 x 071 x 080 x 090 x 100
2,5 – 7,9	0,1	8	11	1,2	5	71 80 90 100	13	SZ 5308./SZ 5908. 025 – 079 x 071 x 080 x 090 x 100
5,0 – 9,9	0,1	10	13	1,5	5	71 80 90 100	17	SZ 5310./SZ 5910. 050 – 099 x 071 x 080 x 090 x 100
6,0 – 12,9	0,1	13	16	1,5	5	71 80 90 100	17	SZ 5313./SZ 5913. 060 – 129 x 071 x 080 x 090 x 100
8,0 – 15,9	0,1	16	19	2,0	5	71 80 90 100	17	SZ 5316./SZ 5916. 080 – 159 x 071 x 080 x 090 x 100
12,0 – 19,5	0,5	20	24	2,5	5	80 90 100	17	SZ 5320./SZ 5920. 120 – 195 x 080 x 090 x 100
16,5 – 24,5	0,5	25	29	2,5	5	80 90 100	17	SZ 5325./SZ 5925. 165 – 245 x 080 x 090 x 100

Quick-change receiving-tubes Cutting punches



Round quick-change receiving-tubes with straight shank

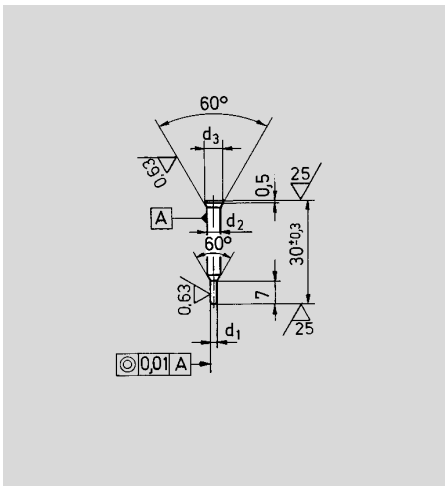
Material: Steel 1.0503 (C 45)
heat-treated to 800 N/mm²

Order example: Quick-change receiving-tube
with straight shank **SZ 6120**
Length $l = 80$ mm
Add **80**
Order number **SZ 6120.80**

Add
size to
order number

Order number **SZ 6120.**

l	l_1	d_5	with cylindrical pin SZ 7900	▲
63	53	8	6 x 36	63
71	61	8	6 x 45	71
80	70	8	6 x 55	80



Round cutting punches with conical head and recessed shank for receiving-tubes

Convenient to receiving-tubes SZ 6120 and
SZ 6126

Material: HWS high performance tool steel
12% CR, shank hardness HRC 62 ± 2,
head hardness HRC 52 ± 3

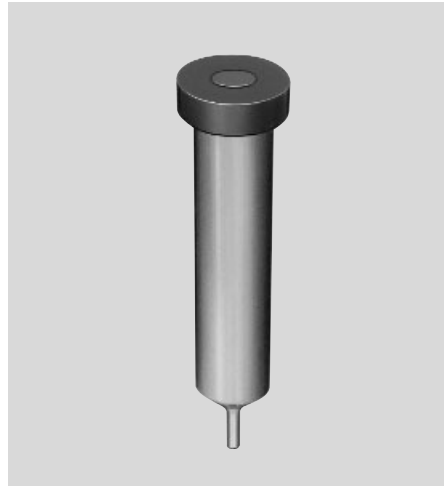
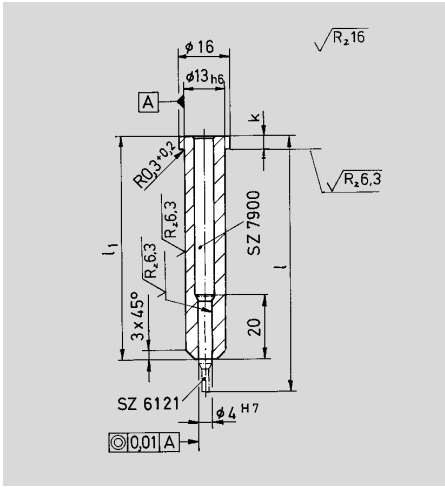
Order example: Cutting punch with
conical head and recessed shank
SZ 6121
 $d_1 = 2,5$ mm, length 30 mm
Add **025 x 030**
Order number **SZ 6121.025 x 30**

Add
size to
order number

Order number **SZ 6121.**

d_{1h6}	Step-up distance	d_{2h6}	d_3	Pieces/standard packing	▲
2,0 – 4,0	0,1	4	5,5	5	020 – 040 x 30

Receiving tube



Round receiving-tube with cylindrical head and straight shank

Material: Steel 1.0503 (C 45)
heat-treated to 800 N/mm²

Order example: Receiving tube with cylindrical head and straight shank **SZ 6126**
Length l = 63 mm
Add **63**
Order number **SZ 6126.63**

Add size to order number

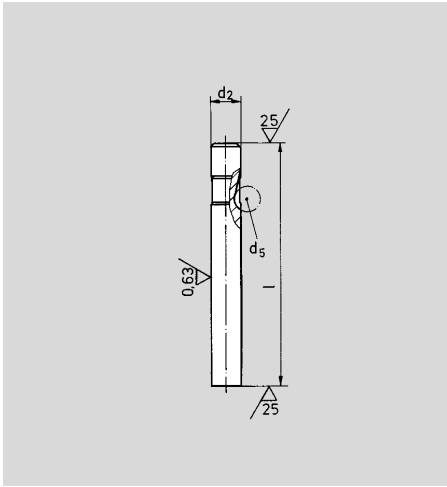
Order number **SZ 6126.**



l	l ₁	k ^{+0.25} ₀	with cylindrical pin SZ 7900	▲
63	53	5	6 x 36	63
71	61	5	6 x 45	71
80	70	5	6 x 55	80

Quick-change cutting punches

Quick-change cutting bushes



Round quick-change cutting punches with straight shank

DIN ISO 10 071

Order example: Quick change cutting punch with straight shank in HWS

SZ 6700

$d_2 = 6,0$ mm, length 71 mm

Add **060 x 71**

Order number **SZ 6700.060 x 71**

HWS high performance tool steel

12% CR

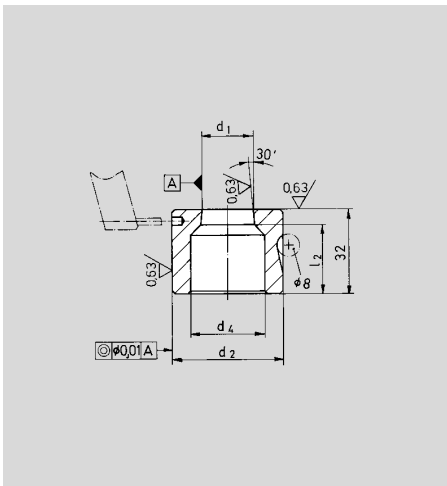
shank hardness HRC 62 ± 2

Add size to order number

Order number **SZ 6700.**

x

d_{g5}	d_5	$d^{+0.5}_0$	Pieces/standard packing	▲
6,0	6	63	5	060 x 63 x 71 x 80
		71	5	
		80	5	
10,0	8	63	5	100 x 63 x 71 x 80
		71	5	
		80	5	
13,0	8	63	5	130 x 63 x 71 x 80
		71	5	
		80	5	
16,0	8	71	3	160 x 71 x 80
		80	3	
20,0	8	80	3	200 x 80
25,0	8	80	3	250 x 80



Quick-change cutting bushes round with barrel-shaped cutting borehole
(upon request available cylindrical too)

Material: HWS high performance tool steel
12% CR, hardness HRC 60 ± 2

Indication: With matching punch and bush pay attention to the cutting clearance.

Order example: Quick change cutting bush round **SZ 6210**

$d_1 = 8,5$ mm, length 32 mm

Add **085 x 32**

Order number **SZ 6210.085 x 32**

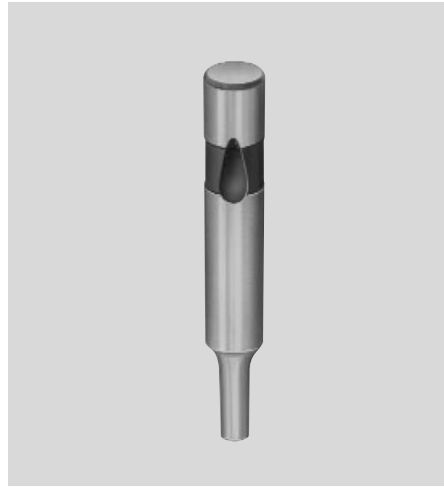
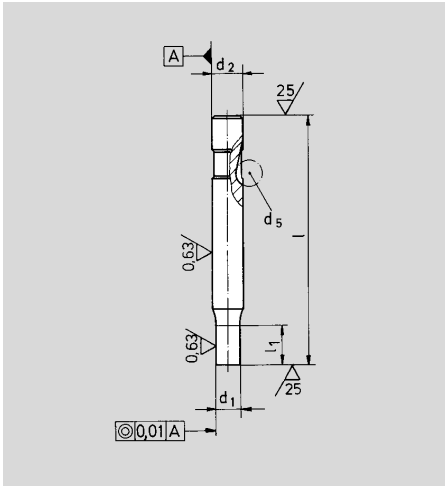
Add size to order number

Order number **SZ 6210.**

x

d_1^{H8}	Step-up distance	d_{2H6}	d_4	l_2	▲
2,0 – 3,9	0,1	16	6	29	020 – 039 x 32
4,0 – 7,9	0,1	20	10	28	040 – 079 x 32
8,0 – 9,9	0,1	25	14	28	080 – 099 x 32
10,0 – 11,5	0,5	25	14	28	100 – 115 x 32
12,0 – 15,5	0,5	32	18	27	120 – 155 x 32
16,0 – 19,5	0,5	42	22	26	160 – 195 x 32
20,0 – 25,0	1,0	42	28	26	200 – 250 x 32

Quick-change cutting punches



Round quick-change cutting punches with recessed shank

DIN ISO 10 071

Order example: Quick change punches with recessed shank in HWS

SZ 6710

$d_1 = 8,5 \text{ mm}$, $d_2 = 10 \text{ mm}$, $l = 80 \text{ mm}$

Add **085 x 80**

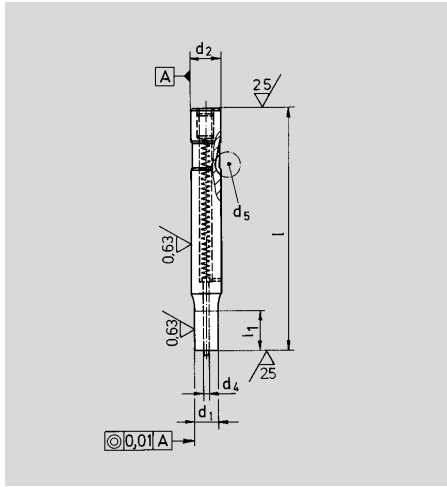
Order number **SZ 6710.085 x 80**

HWS high performance
tool steel
12% CR
shank hardness HRC 64 ± 2
Add size to order number

Order number SZ 6706.	<input type="text"/> x <input type="text"/>
Order number SZ 6710.	<input type="text"/> x <input type="text"/>
Order number SZ 6713.	<input type="text"/> x <input type="text"/>
Order number SZ 6716.	<input type="text"/> x <input type="text"/>
Order number SZ 6720.	<input type="text"/> x <input type="text"/>
Order number SZ 6725.	<input type="text"/> x <input type="text"/>

$d_{1\phi}$	Step-up distance d_{95}	d_5	l_1	$l^{+0,5}$	Pieces/standard packing	▲
2,5 – 4,5	0,1	6	6	13	63	SZ 6706.025 – 045 x 63
					71	x 71
					80	x 80
5,0 – 5,5	0,1	6	6	13	63	SZ 6706.050 – 055 x 63
					71	x 71
					80	x 80
5,0 – 5,5	0,1	10	8	13	63	SZ 6710.050 – 055 x 63
					71	x 71
					80	x 80
6,0 – 6,5	0,1	10	8	13	63	SZ 6710.060 – 065 x 63
					71	x 71
					80	x 80
7,0 – 7,5	0,1	10	8	13	63	SZ 6710.070 – 075 x 63
					71	x 71
					80	x 80
8,0 – 8,5	0,1	10	8	13	63	SZ 6710.080 – 085 x 63
					71	x 71
					80	x 80
6,0 – 6,5	0,1	13	8	13	71	SZ 6713.060 – 065 x 71
					80	x 80
7,0 – 12,0	0,5	13	8	13	71	SZ 6713.070 – 120 x 71
					80	x 80
12,0 – 15,5	0,5	16	8	13	71	SZ 6716.120 – 155 x 71
					80	x 80
16,0 – 19,5	0,5	20	8	13	80	SZ 6720.160 – 195 x 80
20,0 – 24,5	0,5	25	8	13	80	SZ 6725.200 – 245 x 80

Quick-change cutting punches



Round quick-change cutting punches with pressure pin and recessed shank

Price and time of delivery upon request

Order example: Quick-change cutting punch with pressure pin and recessed shank **SZ 6836**
d₁ = 3,4 mm, length 80 mm
Add **034 x 80**
Order number **SZ 6836.034 x 80**

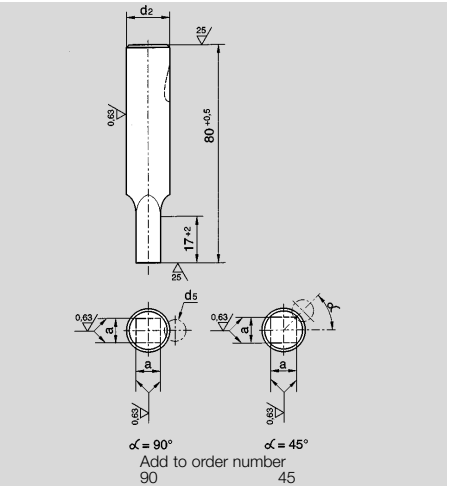
HWS high performance
tool steel
12% CR
shank hardness HRC 64 ± 2
Add size to order number

Order number SZ 6836.	<input type="text"/>	x	<input type="checkbox"/>
Order number SZ 6840.	<input type="text"/>	x	<input type="checkbox"/>
Order number SZ 6843.	<input type="text"/>	x	<input type="checkbox"/>
Order number SZ 6846.	<input type="text"/>	x	<input type="checkbox"/>
Order number SZ 6850.	<input type="text"/>	x	<input type="checkbox"/>
Order number SZ 6855.	<input type="text"/>	x	<input type="checkbox"/>

d _{1j6}	Step-up distance	d ₉₅	d ₄	d ₅	l ⁺¹	l ₁	▲
2,5 – 6,0	0,1	6	0,8	6	80	13	SZ 6836.025 – 060 x 80
5,0 – 10,0	0,1	10	1,5	8	80	13	SZ 6840.050 – 100 x 80
6,0 – 13,0	0,1	13	1,5	8	80	17	SZ 6843.060 – 130 x 80
8,0 – 16,0	0,1	16	2,0	8	80	17	SZ 6846.080 – 160 x 80
10,0 – 20,0	0,1	20	2,5	8	80	17	SZ 6850.100 – 200 x 80
12,0 – 25,0	0,1	25	2,5	8	80	17	SZ 6855.120 – 250 x 80

Quick-change cutting punches

Quick-change cutting bushes



Quick-change form cutting punches square

ISO 10071

Material: HWS high performance tool steel
12% CR
shank hardness HRC 62 ± 2

Price and time of delivery upon request

Dimensions a x b free at choice,
diagonal dimension max. d₂ – 0,2 mm

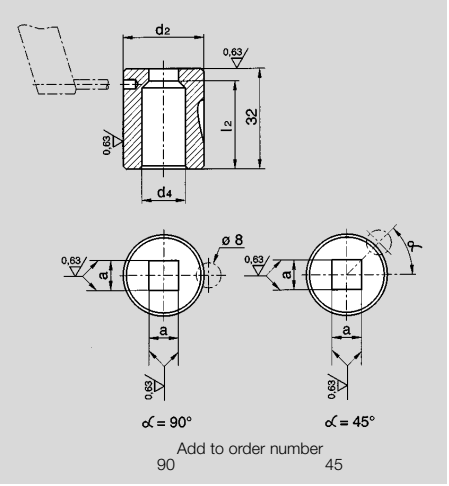
Length 80 mm, other lengths are possible

Order example: Quick-change form punch square, in HWS **SZ 6771**
d₂ = 13 mm, a = 4,5 mm, l = 80 mm, α = 45°
Add **13.075 x 80.45**
Order number **SZ 6771.16.075 x 80.45**

Add size to order number

Order number **SZ 6771.** . x 80.

a _{k8}	d _{g5}	d ₅	a ▲	α
1,6 – 4,1	6	6	06. <input type="text"/> x 80. <input type="text"/>	
2,0 – 6,9	10	8	10. <input type="text"/> x 80. <input type="text"/>	
2,5 – 9,0	13	8	13. <input type="text"/> x 80. <input type="text"/>	
3,2 – 11,1	16	8	16. <input type="text"/> x 80. <input type="text"/>	
4,0 – 14,0	20	8	20. <input type="text"/> x 80. <input type="text"/>	
5,0 – 17,5	25	8	25. <input type="text"/> x 80. <input type="text"/>	



Quick-change form cutting bushes square

Material: HWS high performance tool steel
12% CR
hardness HRC 60 ± 2

Price and time of delivery upon request

Dimension a free at choice,
diagonal dimension max. d₄ – 1,0 mm

Indication: When matching punch and bush pay attention to the cutting clearance.

Order example: Quick-change form bush square, in HWS **SZ 6221**
d₂ = 25 mm, a = 4,8 mm, α = 90°
Add **25.048.90**
Order number **SZ 6221.25.048.90**

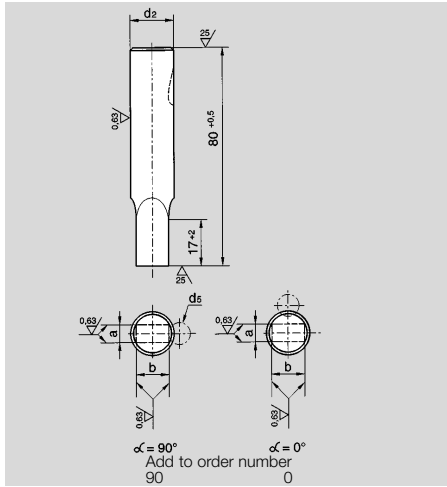
Add size to order number

Order number **SZ 6221.** . .

a ^{H8}	d _{2h6}	d ₄	l ₂	▲
1,6 – 3,5	16	6	29	16. <input type="text"/> . <input type="text"/>
2,0 – 6,3	20	10	28	20. <input type="text"/> . <input type="text"/>
2,5 – 9,1	25	14	28	25. <input type="text"/> . <input type="text"/>
3,2 – 12,0	32	18	27	32. <input type="text"/> . <input type="text"/>
4,0 – 14,8	42	22	26	42. <input type="text"/> . <input type="text"/>

Quick-change cutting punches

Quick-change cutting bushes



Quick-change form cutting punches rectangular

ISO 10071

Material: HWS high performance tool steel
12% CR
shank hardness HRC 62 ± 2

Price and time of delivery upon request

Dimensions a x b free at choice,
diagonal dimension max. $d_2 - 0,2$ mm

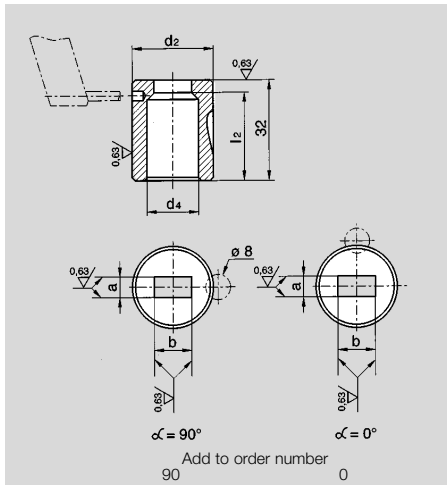
Length 80 mm, other lengths are possible

Order example: Quick-change form cutting punch rectangular, in HWS **SZ 6772**
 $d_2 = 13$ mm, $a = 4,5$ mm, $b = 7,5$ mm,
 $l = 80$ mm, $\alpha = 0^\circ$
Add **13.045 x 075 x 80.00**
Order number **SZ 6772.13.045 x 075 x 80.00**

Add size to order number

Order number **SZ 6772.** . x x **80.**

a_{k8}	b_{k8}	d_{g5}	d_5	a	b ▲	α
1,6 – 5,4	2,0 – 5,5	6	6	06. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
2,0 – 9,3	2,5 – 9,5	10	8	10. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
2,5 – 12,3	3,2 – 12,5	13	8	13. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
3,2 – 15,2	4,0 – 15,4	16	8	16. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
4,0 – 19,1	5,0 – 19,3	20	8	20. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
5,0 – 23,9	5,0 – 24,2	25	8	25. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		



Quick-change form cutting bushes rectangular

Material: HWS high performance tool steel
12% CR
hardness HRC 60 ± 2

Price and time of delivery upon request

Dimensions a x b free at choice,
diagonal dimension max. $d_4 - 1,0$ mm

Indication: When matching punch and bush pay attention to the cutting clearance.

Order example: Quick-change form bush rectangular, in HWS **SZ 6222**
 $d_2 = 16$ mm, $a = 2,5$ mm, $b = 3,5$ mm, $\alpha = 90^\circ$
Add **16.025 x 035.90**
Order number **SZ 6222.16.025 x 035.90**

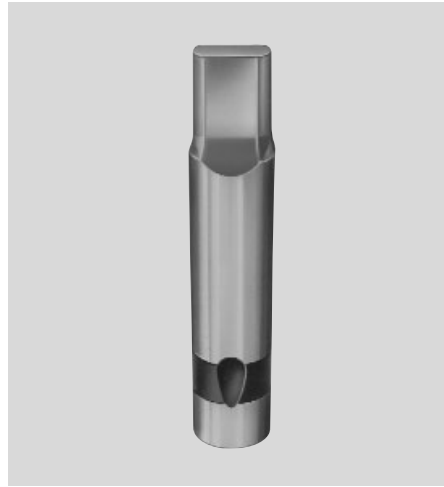
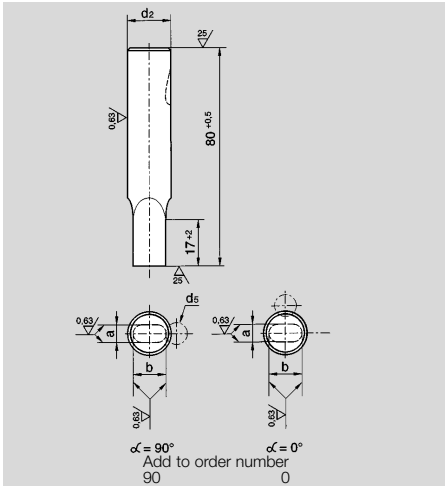
Add size to order number

Order number **SZ 6222.** . x .

a^{H8}	b^{H8}	d_{2H6}	d_4	l_2	a ▲	b	α
1,6 – 4,5	2,0 – 4,7	16	6	29	16. <input type="text"/> x <input type="text"/> . <input type="text"/>		
2,0 – 8,6	2,5 – 8,7	20	10	28	20. <input type="text"/> x <input type="text"/> . <input type="text"/>		
2,5 – 12,6	3,2 – 12,7	25	14	28	25. <input type="text"/> x <input type="text"/> . <input type="text"/>		
3,2 – 16,5	4,0 – 16,6	32	18	27	32. <input type="text"/> x <input type="text"/> . <input type="text"/>		
4,0 – 20,3	5,0 – 20,6	42	22	26	42. <input type="text"/> x <input type="text"/> . <input type="text"/>		

Quick-change cutting punches

Quick-change cutting bushes



Quick-change form cutting punches oval

ISO 10071

Material: HWS high performance tool steel
12% CR
shank hardness HRC 62 ± 2

Price and time of delivery upon request

Dimensions a x b free at choice

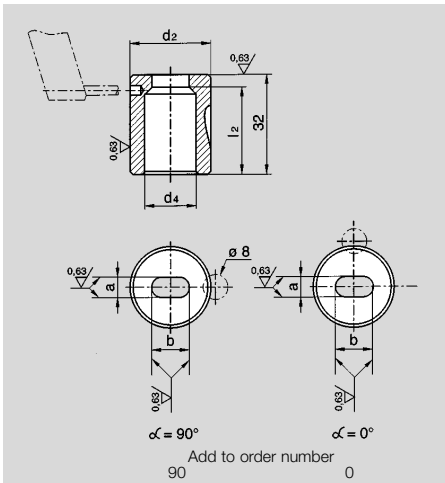
Length 80 mm, other lengths are possible

Order example: Quick-change form cutting punch oval, in HWS **SZ 6773**
d₂ = 13 mm, a = 4,5 mm, b = 7,5 mm,
l = 80 mm, α = 0°
Add **13.045 x 075.80.00**
Order number **SZ 6773.13.045 x 075.80.00**

Add size to order number

Order number **SZ 6773.** . x x **80.**

a _{k8}	b _{k8}	d _{g5}	d ₅	a	b ▲	α
1,6 – 5,4	2,0 – 5,6	6	6	06. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
2,0 – 9,5	2,5 – 9,6	10	8	10. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
2,5 – 12,5	3,2 – 12,6	13	8	13. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
3,2 – 15,5	4,0 – 15,6	16	8	16. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
4,0 – 19,5	5,0 – 19,6	20	8	20. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		
5,0 – 24,5	5,0 – 24,6	25	8	25. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>		



Quick-change form cutting bushes oval

Material: HWS high performance tool steel
12% CR
hardness HRC 60 ± 2

Price and time of delivery upon request

Dimensions a x b free at choice

Indication: When matching punch and bush pay attention to the cutting clearance.

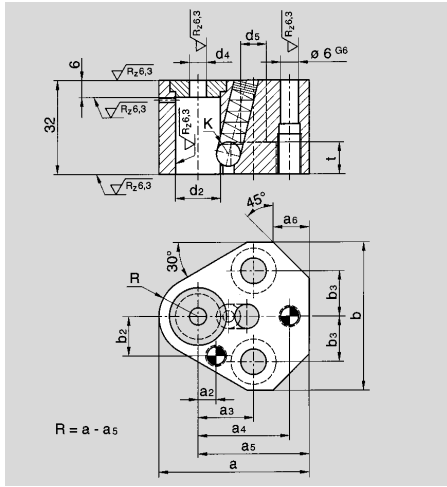
Order example: Quick-change form bush oval, in HWS **SZ 6223**
d₂ = 16 mm, a = 2,5 mm, b = 3,5 mm, α = 90°
Add **16.025 x 035.90**
Order number **SZ 6223.16.025 x 035.90**

Add size to order number

Order number **SZ 6223.** . x .

a ^{H8}	b ^{H8}	d _{2h6}	d ₄	l ₂	a ▲	b	α
1,6 – 4,9	2,0 – 5,0	16	6	29	16. <input type="text"/> x <input type="text"/> . <input type="text"/>		
2,0 – 8,9	2,5 – 9,0	20	10	28	20. <input type="text"/> x <input type="text"/> . <input type="text"/>		
2,5 – 12,9	3,2 – 13,0	25	14	28	25. <input type="text"/> x <input type="text"/> . <input type="text"/>		
3,2 – 16,9	4,0 – 17,0	32	18	27	32. <input type="text"/> x <input type="text"/> . <input type="text"/>		
4,0 – 20,9	5,0 – 21,0	42	22	26	42. <input type="text"/> x <input type="text"/> . <input type="text"/>		

Receiving plates



Polygonal holding plate for quick-change cutting elements

Material: Stamp plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Polygonal holding plate for quick-change cutting units **SZ 5470**
 $d_2 = 16$ mm
Add **16**
Order number **SZ 5470.16**

Characteristics:

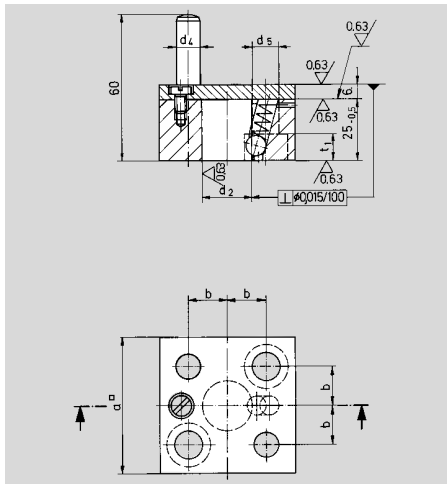
The stamp receiver bore d_2 is prepared for the pin bores 6 G6 with a precision of ± 0.0005 mm. This guarantees the interchangeability of the holding plate with other polygonal products.

Add size to order number

Order number **SZ 5470.**



d_2^{H6}	a	b	$\varnothing K$	$a_2^{\pm 0,005}$	a_3	$a_4^{\pm 0,005}$	a_5	a_6	$b_2^{\pm 0,005}$	b_3	d_4^{G6}	d_5	t	▲
10	43,5	41,0	8	7,5	19,05	26,92	34,0	10	9,0	11,12	6	9,0	9	10
13	49,5	48,5	8	6,5	19,05	29,97	37,0	12	12,0	14,27	6	9,0	9	13
16	52,5	51,5	8	6,0	19,05	31,75	38,5	13	13,5	15,87	6	9,0	9	16
20	59,0	56,5	8	5,0	19,05	33,53	42,0	14	16,5	17,47	6	11,0	11	20
25	68,5	64,5	8	7,0	23,82	40,64	46,5	16	22,0	19,84	6	13,5	13	25



Receiving plates square for quick-change cutting units centric mounting borehole

Material: Punch plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Receiving plate square for quick-change cutting units, centric mounting borehole **SZ 5410**
 $d_2 = 20$ mm
Add **20**
Order number **SZ 5410.20**

Execution

The punch mounting borehole d_2 will be manufactured with precision of ± 0.0005 mm to the pin boreholes. Therefore the interchangeability of receiving plate is guaranteed.

Add size to order number

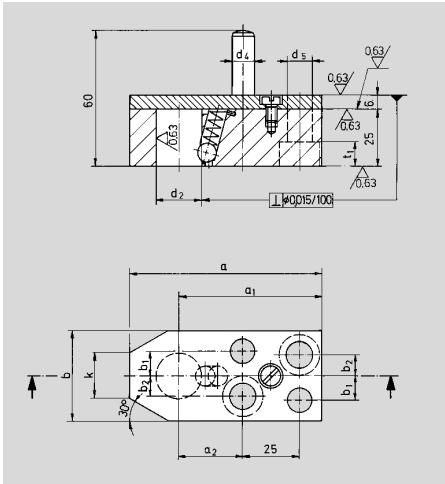
Order number **SZ 5410.**



d_2^{H7}	a	$b^{\pm 0,005}$	d_{4m6}	d_5	t_1	▲
6	45	13	8	9	9	06
10	45	13	8	9	9	10
13	45	13	8	9	9	13
16	45	13	8	9	9	16
20	56	16	10	11	11	20
25	63	20	10	13,5	13	25
32	63	20	10	13,5	13	32*)

*) For size 32 price and time of delivery upon request

Receiving plates



Receiving plates rectangular for quick-change cutting units

Material: Stamp plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal thread SZ 7905

Order example: Receiving plate rectangular for quick-change cutting units **SZ 5420**
 $d_2 = 16$ mm
Add **16**
Order number **SZ 5420.16**

Characteristics

The punch mounting borehole d_2 will be manufactured with precision of ± 0.0005 mm to the pin boreholes. Therefore the interchangeability of receiving plate is guaranteed.

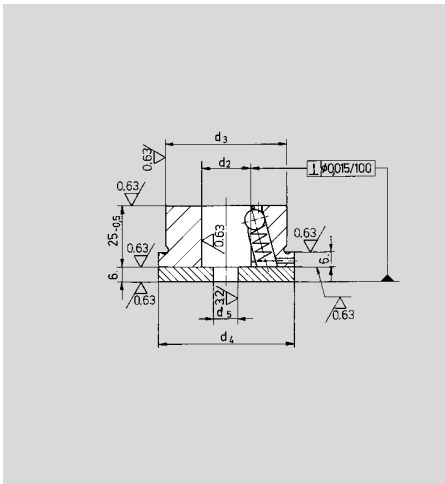
Add size to order number

Order number **SZ 5420.**



d_2^{H7}	a	a_1	$a_2^{\pm 0,005}$	b	$b_1^{\pm 0,005}$	b_2	d_{4m6}	d_5	k	t_1	▲
6	75	60	25	32	9	7	8	9	16	9	06
10	75	60	25	32	9	7	8	9	16	9	10
13	75	60	25	32	9	7	8	9	16	9	13
16	75	60	25	32	9	7	8	9	16	9	16
20	85	63	28	40	11	9	10	11	20	11	20
25	85	63	28	40	11	9	10	11	20	11	25
32	100	72	30	56	17	14	10	13,5	28	13	32*)

*) For size 32 Price and time of delivery upon request



Receiving plates round for quick-change cutting units

Material: Stamp plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Order example: Receiving plate round for quick-change cutting units **SZ 5430**
 $d_2 = 25$ mm
Add **25**
Order number **SZ 5430.25**

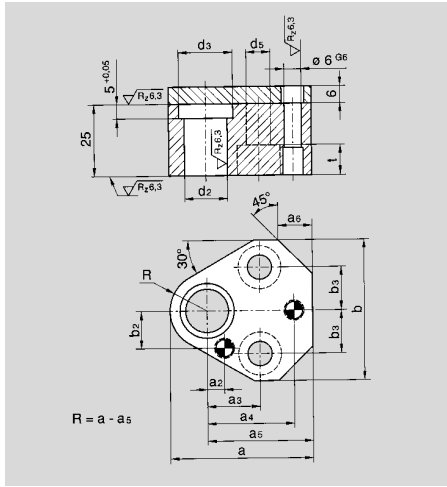
Add size to order number

Order number **SZ 5430.**



d_2^{H7}	d_{3h6}	d_4	d_5	▲
6	40	45	–	06
10	40	45	–	10
13	40	45	–	13
16	40	45	6	16
20	50	56	10	20
25	50	56	14	25
32	56	63	18	32
42	67	75	26	42

Receiving plates



Polygonal receiving plates for cutting punches as per ISO 8020

Material: Stamp plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Polygonal holding plate for cutting units with cylindrical head,
SZ 5484

$d_2 = 20$ mm
Add **20**
Order number **SZ 5484.20**

Characteristics:

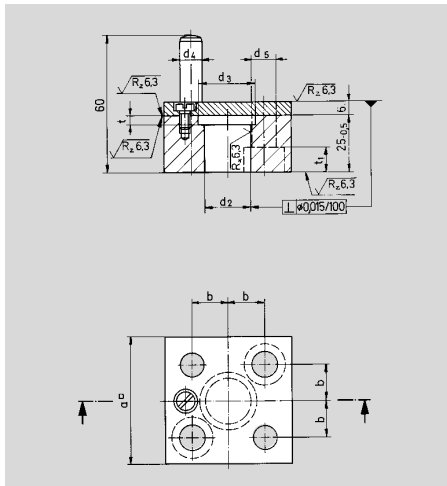
The stamp receiver bore d_2 is prepared for the pin bores 6 G6 with a precision of ± 0.0005 mm. This guarantees the interchangeability of the holding plate with other polygonal products.

Add size to order number

Order number **SZ 5484.**



d_2^{H6}	a	b	$a_2^{\pm 0,005}$	a_3	$a_4^{\pm 0,005}$	a_5	a_6	$b_2^{\pm 0,005}$	b_3	d_3	d_5	t	▲
10	43,5	41,0	7,5	19,05	26,92	34,0	10	9,0	11,12	14	9,0	9	10
13	49,5	48,5	6,5	19,05	29,97	37,0	12	12,0	14,27	17	9,0	9	13
16	52,5	51,5	6,0	19,05	31,75	38,5	13	13,5	15,87	20	9,0	9	16
20	59,0	56,5	5,0	19,05	33,53	42,0	14	16,5	17,47	25	11,0	11	20
25	68,5	64,5	7,0	23,82	40,64	46,5	16	22,0	19,84	30	13,5	13	25



Receiving plates square for cutting punches as per ISO 8020 centric mounting borehole

Material: Stamp plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Receiving plate square for cutting stamp with cylindrical head, centric mounting borehole **SZ 5442**

$d_2 = 20$ mm
Add **20**
Order number **SZ 5442.20**

Characteristics

The punch mounting borehole d_2 will be manufactured with precision of ± 0.0005 mm to the pin boreholes. Therefore the interchangeability of receiving plate is guaranteed.

Add size to order number

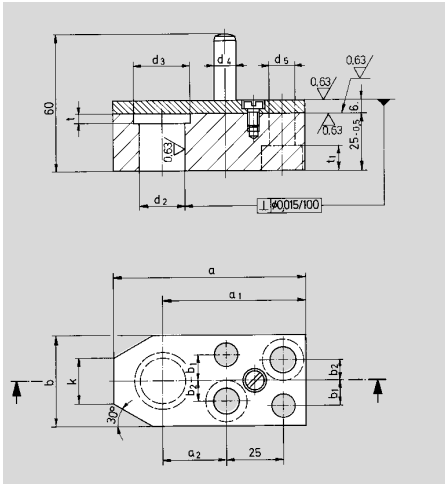
Order number **SZ 5442.**



d_2^{H7}	a	$b^{\pm 0,005}$	d_3	d_{4m6}	d_5	t	t_1	▲
10	45	13	14	8	9	5	9	10
13	45	13	17	8	9	5	9	13
16	45	13	20	8	9	5	9	16
20	56	16	25	10	11	5	11	20
25	63	20	30	10	13,5	5	13	25
32	63	20	37	10	13,5	5	13	32*)

*) For size 32 price and time of delivery upon request

Receiving plates Ball lifter



Receiving plates rectangular for cutting punches as per ISO 8020

Material: Punch plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Receiving plate rectangular for punches with cylindrical head,
SZ 5422

$d_2 = 10$ mm

Add **10**

Order number **SZ 5422.10**

Execution

The punch mounting borehole d_2 will be manufactured with precision of ± 0.0005 mm to the pin boreholes. Therefore the interchangeability of receiving plate is guaranteed.

Add size to order number

Order number **SZ 5422.**



d_2^{H7}	a	a_1	$a_2^{+0,005}$	b	$b_1^{+0,005}$	b_2	d_3	d_{4m6}	d_5	k	t	t_1	▲
6	75	60	25	32	9	7	10	8	9	16	5	9	06
10	75	60	25	32	9	7	14	8	9	16	5	9	10
13	75	60	25	32	9	7	17	8	9	16	5	9	13
16	75	60	25	32	9	7	20	8	9	16	5	9	16
20	85	63	28	40	11	9	25	10	11	20	5	11	20
25	85	63	28	40	11	9	30	10	11	20	5	11	25
32	100	72	30	56	17	14	37	10	13,5	28	5	13	32*)

*) For size 32 price and time of delivery upon request



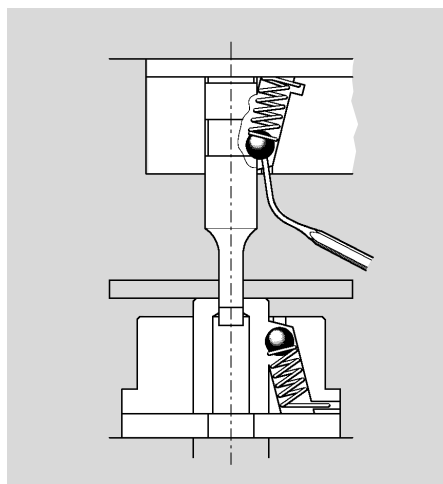
Ball lifter for receiving plates

Material: Grip made of structural steel black finished cylindrical pin made of tool steel finished black.

Ball lifters are used to lift the balls at the replacing of quick-change punches respectively quick-changes bushes in receiving plates SZ 54..

Order example: Ball lifter for receiving plates
SZ 5498

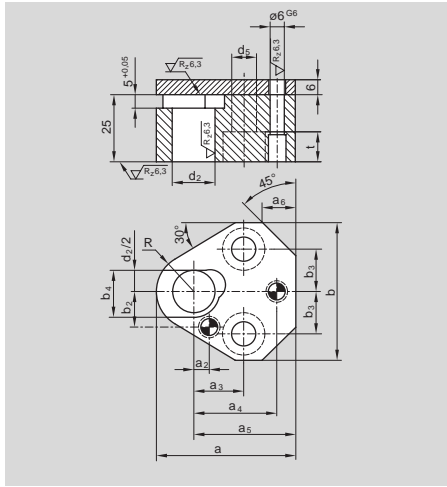
Order number **SZ 5498**



Sample application

Diagram of a hole tool with quick-change cutting elements

Receiving plates



Polygonal receiving plates for form cutting punches as per ISO 8020

Material: Stamp plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Polygonal holding plate for cutting units with cylindrical head,
SZ 5485

$d_2 = 20$ mm

Add **20**

Order number **SZ 5485.20**

Characteristics:

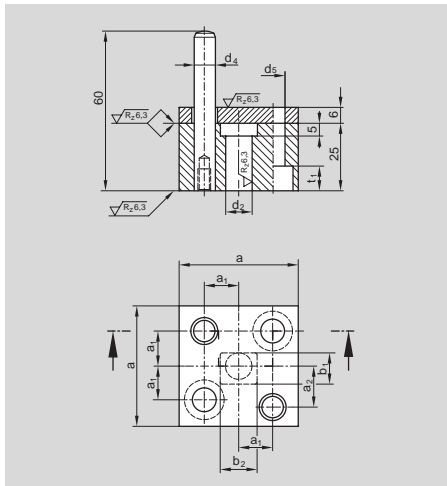
The stamp receiver bore d_2 is prepared for the pin bores 6 G6 with a precision of ± 0.0005 mm. This guarantees the interchangeability of the holding plate with other polygonal products.

Add size to order number

Order number **SZ 5485.**



d_2^{H6}	a	b	$a_2^{\pm 0,005}$	a_3	$a_4^{\pm 0,005}$	a_5	a_6	$b_2^{\pm 0,005}$	b_3	b_4	d_5	t	▲
10	43,5	41,0	7,5	19,05	26,92	34,0	10	9,0	11,12	12	9,0	9	10
13	49,5	48,5	6,5	19,05	29,97	37,0	12	12,0	14,27	15	9,0	9	13
16	52,5	51,5	6,0	19,05	31,75	38,5	13	13,5	15,87	18	9,0	9	16
20	59,0	56,5	5,0	19,05	33,53	42,0	14	16,5	17,47	23	11,0	11	20
25	68,5	64,5	7,0	23,82	40,64	46,5	16	22,0	19,84	28	13,5	13	25



Receiving plates square for form cutting punches as per ISO 8020 centric mounting borehole

Material: Stamp plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Receiving plate square for cutting stamp with cylindrical head, centric mounting borehole **SZ 5443**

$d_2 = 20$ mm

Add **20**

Order number **SZ 5443.20**

Characteristics

The punch mounting borehole d_2 will be manufactured with precision of ± 0.0005 mm to the pin boreholes. Therefore the interchangeability of receiving plate is guaranteed.

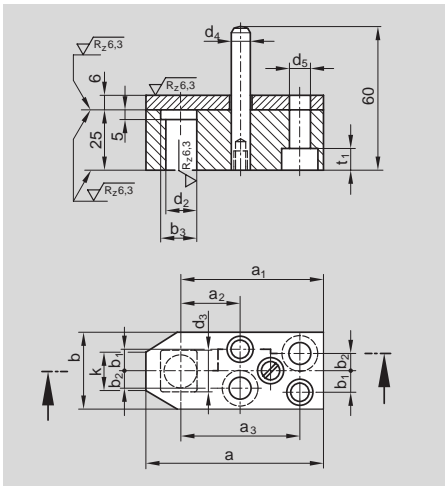
Add size to order number

Order number **SZ 5443.**



d_2^{H7}	d_{4m6}	d_5	a	$a_1^{\pm 0,005}$	$a_2^{\pm 0,005}$	$b_1^{\pm 0,2}$	$b_2^{\pm 0,2}$	t1	▲
10	8	9	45	13	15,5	12	14	9	10
13	8	9	45	13	15,5	15	17	9	13
16	8	9	45	13	15,5	18	20	9	16
20	10	11	56	16	19	22,5	25	11	20
25	10	13,5	63	20	22,5	27,5	30	13	25

Receiving plates



Receiving plates rectangular for form cutting punches as per ISO 8020

Material: Punch plate 1.0401 (C 15) case hardened, hardness HRC 58-60
Press plate 1.1750 (C 75 W 3) hardened, hardness HRC 60-62

Cylinder pins with internal threading SZ 7905

Order example: Receiving plate rectangular for punches with cylindrical head,
SZ 5424

$d_2 = 10$ mm

Add **10**

Order number **SZ 5424.10**

Characteristics

The punch mounting borehole d_2 will be manufactured with precision of ± 0.0005 mm to the pin boreholes. Therefore the interchangeability of receiving plate is guaranteed.

Add size to order number

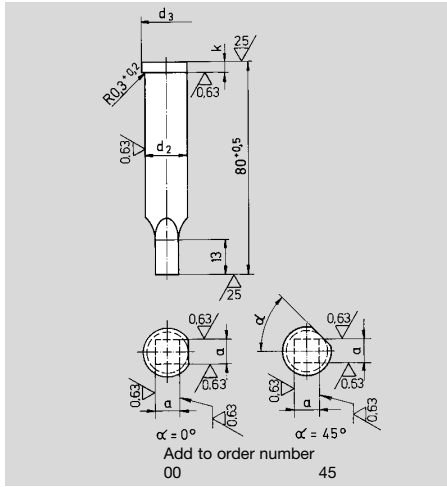
Order number **SZ 5424.**



d_2^{H7}	d_3	d_{4m6}	d_5	a	a_1	$a_2^{\pm 0,005}$	$a_3^{\pm 0,005}$	b	$b_1^{\pm 0,005}$	$b_2^{\pm 0,2}$	b_3	k	t_1	▲
10	14	8	9	60	50	15	40	32	9	7	12	11	9	10
13	17	8	9	67	53	18	43	32	9	7	15	16	9	13
16	20	8	9	67	53	18	43	32	9	7	18	16	9	16
20	25	10	11	80	60	25	50	40	11	9	22,5	22	11	20
25	30	10	11	80	60	25	50	40	11	9	27,5	22	11	25

Cutting punches

Cutting bushes



Form cutting punches with cylindrical head, square, with protection against torsion

ISO 8020

Price and time of delivery upon request

Dimension a free at choice,
diagonal dimension max. $d_2 = 0,2 \text{ mm}$

Length 80 mm, other lengths are possible

Indication: All dimension sizes in HSS are available short dated with TIN-coating too.

Order example: Form cutting punch with cylindrical head, square, in HSS

SZ 5691

$d_2 = 6 \text{ mm}$, $a = 2,8 \text{ mm}$, $l = 80 \text{ mm}$, $\alpha = 0^\circ$

Add **06.028 x 80.00**

Order number **SZ 5691.06.028 x 80.00**

HSS high performance

high speed steel

shank hardness HRC 64 ± 2

head hardness HRC 52 ± 3

Add

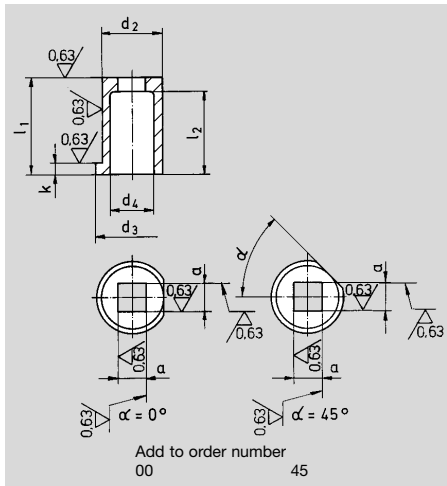
size to

order number

Order number **SZ 5691.**

. x 80.

a_{j6}	d_{2m5}	d_3	$k^{+0,25}_0$	$a \blacktriangle$	α
1,6 – 4,1	6	9	5	06. <input type="checkbox"/> x 80. <input type="checkbox"/>	<input type="checkbox"/>
2,0 – 5,5	8	11	5	08. <input type="checkbox"/> x 80. <input type="checkbox"/>	<input type="checkbox"/>
2,0 – 6,9	10	13	5	10. <input type="checkbox"/> x 80. <input type="checkbox"/>	<input type="checkbox"/>
2,5 – 9,0	13	16	5	13. <input type="checkbox"/> x 80. <input type="checkbox"/>	<input type="checkbox"/>
3,2 – 11,1	16	19	5	16. <input type="checkbox"/> x 80. <input type="checkbox"/>	<input type="checkbox"/>
4,0 – 14,0	20	24	5	20. <input type="checkbox"/> x 80. <input type="checkbox"/>	<input type="checkbox"/>
5,0 – 17,5	25	29	5	25. <input type="checkbox"/> x 80. <input type="checkbox"/>	<input type="checkbox"/>



Form cutting bushes with shoulder, square, with protection against torsion

DIN/ISO 8977

Material: HWS high performance tool steel

12% CR

hardness HRC 60-62

Price and time of delivery upon request

Dimension a free at choice,
diagonal dimension max. $d_4 = 1,0 \text{ mm}$

Indication: When matching punch and bush pay attention to the cutting clearance.

Order example: Form cutting punch with shoulder, square **SZ 6391**

$d_2 = 16 \text{ mm}$, $a = 4,0 \text{ mm}$, $l_1 = 32 \text{ mm}$, $\alpha = 0^\circ$

Add **16.040 x 32.00**

Order number **SZ 6391.16.040 x 32.00**

Add
size to
order number

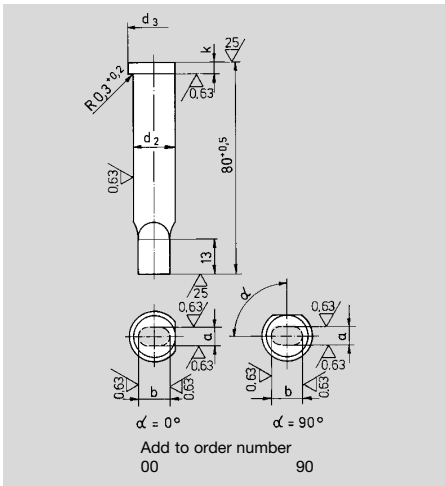
Order number **SZ 6391.**

. x 32.

a^{H8}	d_{2m5}	d_3	d_4	$k^{+0,25}_0$	$l_1^{+0,5}$	l_2	$a \blacktriangle$	α
1,6 – 3,5	10	13	5,8	5	32	29	10. <input type="checkbox"/> x 32. <input type="checkbox"/>	<input type="checkbox"/>
2,0 – 5,0	13	16	8,0	5	32	28	13. <input type="checkbox"/> x 32. <input type="checkbox"/>	<input type="checkbox"/>
2,0 – 6,4	16	19	9,5	5	32	28	16. <input type="checkbox"/> x 32. <input type="checkbox"/>	<input type="checkbox"/>
2,5 – 7,8	20	24	12,0	5	32	27	20. <input type="checkbox"/> x 32. <input type="checkbox"/>	<input type="checkbox"/>
3,2 – 11,3	25	29	17,3	5	32	27	25. <input type="checkbox"/> x 32. <input type="checkbox"/>	<input type="checkbox"/>
4,0 – 14,2	32	36	20,7	5	32	26	32. <input type="checkbox"/> x 32. <input type="checkbox"/>	<input type="checkbox"/>
5,0 – 19,0	40	44	27,7	5	32	24	40. <input type="checkbox"/> x 32. <input type="checkbox"/>	<input type="checkbox"/>

Cutting punches

Cutting bushes



Form cutting punches with cylindrical head oval, with protection against torsion

ISO 8020

Price and time of delivery upon request

Dimension a x b free at choice.

Length 80 mm, other lengths are possible

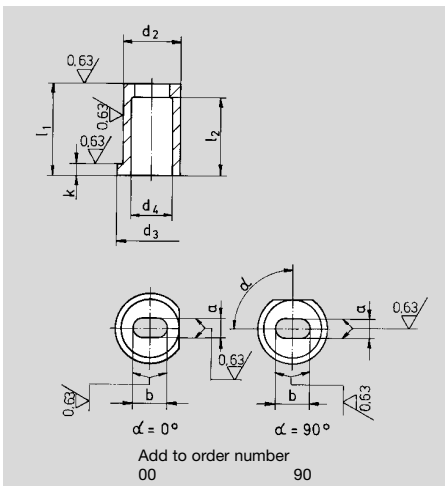
Indication: All dimension sizes in HSS are available short dated with TIN-coating too.

Order example: Form cutting punch with cylindrical head, oval, in HSS **SZ 5693**
d₂ = 25 mm, a = 5,3 mm, b = 21,5 mm,
l = 80 mm, α = 90°
Add **25.053 x 215 x 80.90**
Order number **SZ 5693.25.053 x 215 x 80.90**

Form cutting punches with pressure pin upon request

HSS high performance
high speed steel
shank hardness HRC 64 ± 2
head hardness HRC 52 ± 3
Add size to order number
Order number **SZ 5693. □. □ x □ x 80. □**

a ₆	b ₆	d _{2m5}	d ₃	k ^{+0,25} ₀	a ▲ b	α
1,6 – 5,5	2,0 – 5,6	6	9	5	06. □ x □ x 80. □	□
2,0 – 7,5	2,5 – 7,6	8	11	5	08. □ x □ x 80. □	□
2,0 – 9,5	2,5 – 9,6	10	13	5	10. □ x □ x 80. □	□
2,5 – 12,5	3,2 – 12,6	13	16	5	13. □ x □ x 80. □	□
3,2 – 15,5	4,0 – 15,6	16	19	5	16. □ x □ x 80. □	□
4,0 – 19,5	5,0 – 19,6	20	24	5	20. □ x □ x 80. □	□
5,0 – 24,5	6,3 – 24,6	25	29	5	25. □ x □ x 80. □	□



Form cutting bushes with shoulder, oval, with protection against torsion

DIN/ISO 8977

Material: HWS high performance tool steel,
12% CR
hardness HRC 60-62

Price and time of delivery upon request

Dimension a x b free at choice

Indication: When matching punch and bush pay attention to the cutting clearance

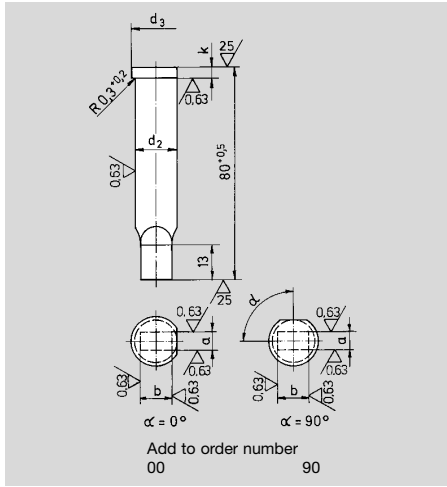
Order example: Form cutting bush with shoulder, oval **SZ 6393**
d₂ = 25 mm, a = 5,5 mm, b = 12,5 mm,
l₁ = 32 mm, α = 90°
Add **25.055 x 125 x 32.90**
Order number **SZ 6393.25.055 x 125 x 32.90**

Add size to order number
Order number **SZ 6393. □. □ x □ x 32. □**

a ^{H8}	b ^{H8}	d _{2m5}	d ₃	d ₄	k ^{+0,25} ₀	l ₁ ^{+0,5}	l ₂	a ▲ b	α
1,6 – 5,4	2,0 – 5,5	10	13	5,8	5	32	29	10. □ x □ x 32. □	□
2,0 – 7,4	2,5 – 7,5	13	16	8,0	5	32	28	13. □ x □ x 32. □	□
2,0 – 8,9	2,5 – 9,0	16	19	9,5	5	32	28	16. □ x □ x 32. □	□
2,5 – 10,9	3,2 – 11,0	20	24	12,0	5	32	27	20. □ x □ x 32. □	□
3,2 – 15,9	4,0 – 16,0	25	29	17,3	5	32	27	25. □ x □ x 32. □	□
4,0 – 19,9	5,0 – 20,0	32	36	20,7	5	32	26	32. □ x □ x 32. □	□
5,0 – 26,9	6,3 – 27,0	40	44	27,7	5	32	24	40. □ x □ x 32. □	□

Cutting punches

Cutting bushes



Form cutting punches with cylindrical head rectangular, with protection against torsion

ISO 8020

Price and time of delivery upon request

Dimension a x b free at choice, diagonal dimension max. $d_2 = 0,2$ mm

Length 80 mm, other lengths are possible

Indication: All dimension sizes in HSS are available short dated with TIN-coating too.

Order example: Form cutting punch with cylindrical head, rectangular, in HSS

SZ 5692

$d_2 = 25$ mm, $a = 8,5$ mm, $b = 9,5$ mm, $l = 80$ mm, $\alpha = 0^\circ$

Add **25.085 x 095 x 80.00**

Order number **SZ 5692.25.085 x 095 x 80.00**

HSS high performance

high speed steel

shank hardness HRC 64 ± 2

head hardness HRC 52 ± 3

Add

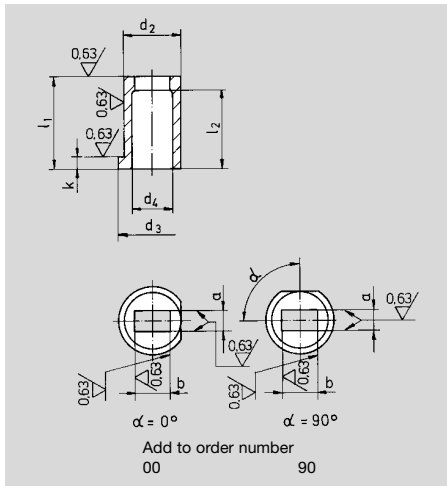
size to

order number

Order number **SZ 5692.** x x

Form cutting punches with pressure pin upon request

a_{j6}	b_{j6}	d_{2m5}	d_3	$k^{+0,25}_0$	$a \blacktriangle b$	α
1,6 – 5,4	2,0 – 5,5	6	9	5	06. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>	
2,0 – 7,3	2,5 – 7,5	8	11	5	08. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>	
2,0 – 9,3	2,5 – 9,5	10	13	5	10. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>	
2,5 – 12,3	3,2 – 12,5	13	16	5	13. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>	
3,2 – 15,2	4,0 – 15,4	16	19	5	16. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>	
4,0 – 19,1	5,0 – 19,3	20	24	5	20. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>	
5,0 – 23,9	6,3 – 24,2	25	29	5	25. <input type="text"/> x <input type="text"/> x 80. <input type="text"/>	



Form cutting bushes with shoulder, rectangular, with protection against torsion

DIN/ISO 8977

Material: HWS high performance tool steel

12% CR

hardness HRC 60-62

Price and time of delivery upon request

Dimension a x b free at choice, diagonal dimension max. $d_4 = 1,0$ mm

Indication: When matching punch and bush pay attention to the cutting clearance

Order example: Form cutting bush with shoulder, rectangular **SZ 6392**

$d_2 = 25$ mm, $a = 5,5$ mm, $b = 12,5$ mm,

$l_1 = 32$ mm, $\alpha = 90^\circ$

Add **25.055 x 125 x 32.90**

Order number **SZ 6392.25.055 x 125 x 32.90**

Add

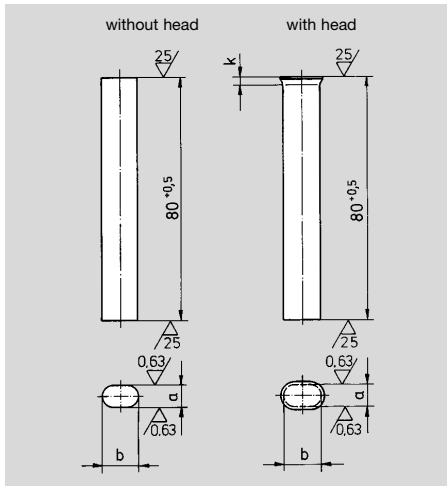
size to

order number

Order number **SZ 6392.** x x

a^{H8}	b^{H8}	d_{2m5}	d_3	d_4	$k^{+0,25}_0$	$l_1^{+0,5}$	l_2	$a \blacktriangle b$	α
1,6 – 5,1	2,0 – 5,2	10	13	5,8	5	32	29	10. <input type="text"/> x <input type="text"/> x 32. <input type="text"/>	
2,0 – 7,0	2,5 – 7,2	13	16	8,0	5	32	28	13. <input type="text"/> x <input type="text"/> x 32. <input type="text"/>	
2,0 – 8,9	2,5 – 9,0	16	19	9,5	5	32	28	16. <input type="text"/> x <input type="text"/> x 32. <input type="text"/>	
2,5 – 10,9	3,2 – 11,0	20	24	12,0	5	32	27	20. <input type="text"/> x <input type="text"/> x 32. <input type="text"/>	
3,2 – 15,4	4,0 – 15,6	25	29	17,3	5	32	27	25. <input type="text"/> x <input type="text"/> x 32. <input type="text"/>	
4,0 – 19,9	5,0 – 20,0	32	36	20,7	5	32	26	32. <input type="text"/> x <input type="text"/> x 32. <input type="text"/>	
5,0 – 26,2	6,3 – 26,5	40	44	27,7	5	32	24	40. <input type="text"/> x <input type="text"/> x 32. <input type="text"/>	

Cutting punches



Form cutting punches throughout profiled, oval

Price and time of delivery upon request

Length 80 mm, shank superfinished, head compressed and strain relieved

Other lengths and intermediate sizes a x b are possible

Indication: All dimension sizes in HSS are available short dated with TIN-coating too.

Order example: Form cutting punch throughout profiled, oval, with head, in HSS

SZ 6993

a = 8,0 mm, b = 20,0 mm, l = 80 mm

Add **080 x 200 x 80**

Order number **SZ 6993.080 x 200 x 80**

HSS high performance

high speed steel

shank hardness HRC 64 ± 2

head hardness HRC 52 ± 3

Add

size to

order number

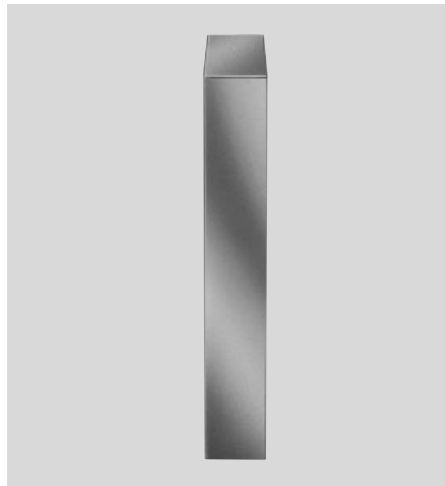
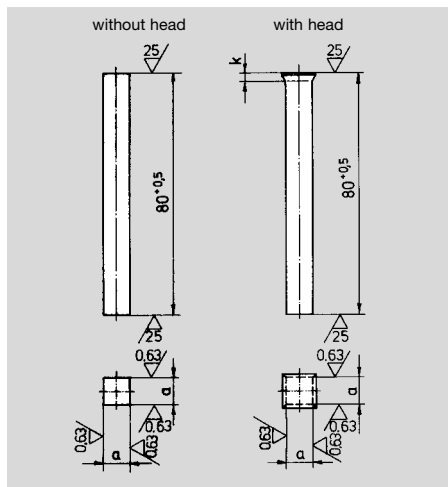
without head

Order number **SZ 6983.** x x **80**

with head

Order number **SZ 6993.** x x **80**

a ^{±0,01}	b ^{±0,01}	Step-up distance	k	▲
1,0	2,0 – 8,0	1	1,2	010 x 020 – 080
2,0	3,0 – 10,0	1	1,4	020 x 030 – 100
3,0	4,0 – 10,0	1	1,8	030 x 040 – 100
4,0	5,0 – 12,0	1	1,8	040 x 050 – 120
5,0	6,0 – 15,0	1	1,8	050 x 060 – 150
6,0	7,0 – 16,0	1	2,2	060 x 070 – 160
	16,0 – 20,0	2	2,2	060 x 160 – 200
7,0	8,0 – 16,0	1	2,8	070 x 080 – 160
	16,0 – 24,0	2	2,8	070 x 160 – 240
8,0	9,0 – 16,0	1	2,8	080 x 090 – 160
	16,0 – 24,0	2	2,8	080 x 160 – 240
9,0	10,0 – 16,0	1	2,8	090 x 100 – 160
	16,0 – 28,0	2	2,8	090 x 160 – 280
10,0	11,0 – 16,0	1	2,8	100 x 110 – 160
	16,0 – 34,0	2	2,8	100 x 160 – 340



Form cutting punches throughout profiled, square

Price and time of delivery upon request

Length 80 mm, shank superfinished, head compressed and strain relieved

Other lengths and intermediate sizes of a are possible

Indication: All dimension sizes in HSS are available short dated with TIN-coating too.

Order example: Form cutting punch throughout profiled, square, without head, in HSS

SZ 6981

a = 6,0 mm, l = 80 mm

Add **060 x 80**

Order number **SZ 6981.060 x 80**

HSS high performance

high speed steel

shank hardness HRC 64 ± 2

head hardness HRC 52 ± 3

Add size to order number

without head

Order number **SZ 6981.**

x 80

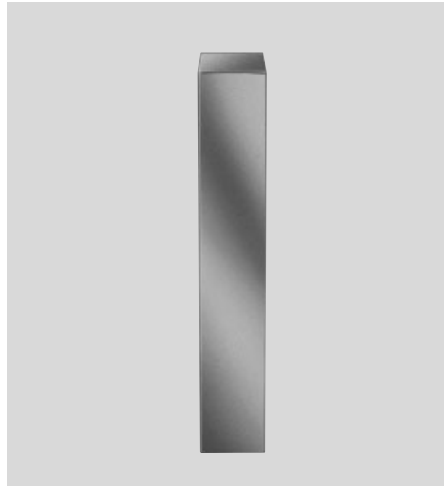
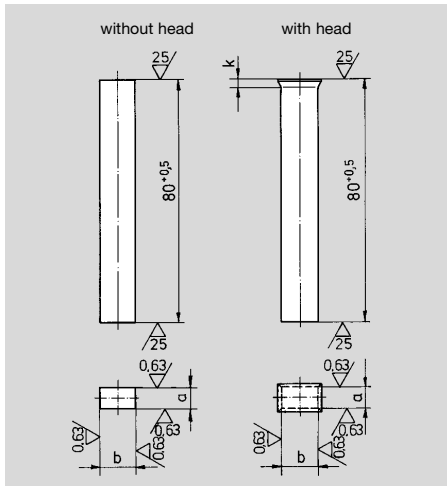
with head

Order number **SZ 6991.**

x 80

a ^{+0,01}	k	▲
1,0	1,2	010
2,0	1,4	020
3,0	1,8	030
4,0	1,8	040
5,0	1,8	050
6,0	2,2	060
7,0	2,8	070
8,0	2,8	080
9,0	2,8	090
10,0	2,8	100

Cutting punches



Form cutting punches throughout profiled, rectangular

Price and time of delivery upon request

Length 80 mm, shank superfinished, head heat compressed and strain relieved

Other lengths and intermediate sizes of a x b are possible

Indication: All dimension sizes in HSS are available short dated with TIN-coating too.

Order example: Form cutting punch throughout profiled, rectangular, with head, in HSS **SZ 6992**

a = 3,0 mm, b = 5,0 mm, l = 80 mm

Add **030 x 050 x 80**

Order number **SZ 6992.030 x 050 x 80**

HSS high performance

high speed steel

shank hardness HRC 64 ± 2

head hardness HRC 52 ± 3

Add

size to

order number

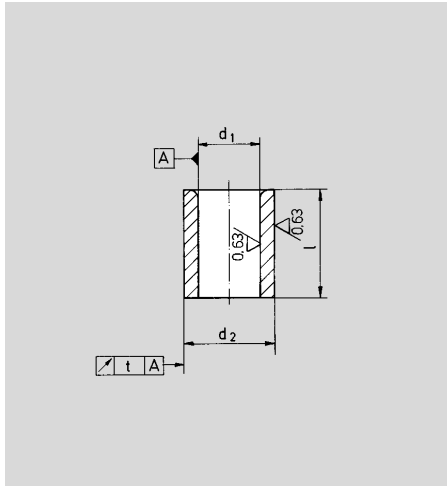
without head

Order number **SZ 6982.** x x **80**

with head

Order number **SZ 6992.** x x **80**

a ^{±0,01}	b ^{±0,01}	Step-up distance	k	▲
1,0	2,0 – 8,0	1	1,2	010 x 020 – 080
2,0	3,0 – 10,0	1	1,4	020 x 030 – 100
3,0	4,0 – 10,0	1	1,8	030 x 040 – 100
4,0	5,0 – 12,0	1	1,8	040 x 050 – 120
5,0	6,0 – 15,0	1	1,8	050 x 060 – 150
6,0	7,0 – 16,0	1	2,2	060 x 070 – 160
	16,0 – 20,0	2	2,2	060 x 160 – 200
7,0	8,0 – 16,0	1	2,8	070 x 080 – 160
	16,0 – 24,0	2	2,8	070 x 160 – 240
8,0	9,0 – 16,0	1	2,8	080 x 090 – 160
	16,0 – 24,0	2	2,8	080 x 160 – 240
9,0	10,0 – 16,0	1	2,8	090 x 100 – 160
	16,0 – 28,0	2	2,8	090 x 160 – 280
10,0	11,0 – 16,0	1	2,8	100 x 110 – 160
	16,0 – 34,0	2	2,8	100 x 160 – 340



Drill bushes to press in

DIN 179, Form A, ISO 4247

Material: Case hardening steel
hardness HRC 60-64

Intermediate sizes as well as special designs according to customers drawings are available upon request.

Order example: Drill bush **SZ 6250**

$d_1 = 3,5 \text{ mm}$, $l = 12 \text{ mm}$

Add **035 x 12**

Order number **SZ 6250.035 x 12**

Add size to order number

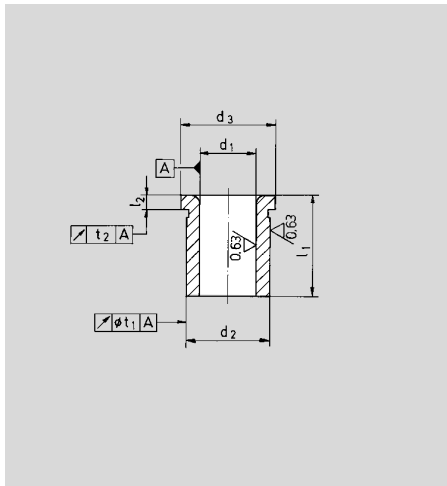
Add size to order number

Order number **SZ 6250.**

x

x

d_1^{F7}	Step-up distance	d_{2H6}	t	Pieces/standard packing	l	▲	l	▲
0,4 – 0,6	0,1	3	0,01	5	6	004 – 006 x 06	–	–
0,7 – 1,0	0,1	3	0,01	5	6	007 – 010 x 06	9	007 – 010 x 09
1,1 – 1,8	0,1	4	0,01	10	6	011 – 018 x 06	9	011 – 018 x 09
1,9 – 2,6	0,1	5	0,01	10	6	019 – 026 x 06	9	019 – 026 x 09
2,7 – 3,3	0,1	6	0,01	10	8	027 – 033 x 08	12	027 – 033 x 12
3,4 – 4,0	0,1	7	0,01	10	8	034 – 040 x 08	12	034 – 040 x 12
4,1 – 5,0	0,1	8	0,01	10	8	041 – 050 x 08	12	041 – 050 x 12
5,1 – 6,0	0,1	10	0,02	10	10	051 – 060 x 10	16	051 – 060 x 16
6,1 – 8,0	0,1	12	0,02	10	10	061 – 080 x 10	16	061 – 080 x 16
8,1 – 10,0	0,1	15	0,02	10	12	081 – 100 x 12	20	081 – 100 x 20
10,1 – 12,0	0,1	18	0,02	5	12	101 – 120 x 12	20	101 – 120 x 20
12,5 – 15,0	0,5	22	0,02	5	16	125 – 150 x 16	28	125 – 150 x 28
15,5 – 18,0	0,5	26	0,02	5	16	155 – 180 x 16	28	155 – 180 x 28
18,5 – 20,0	0,5	30	0,02	5	20	185 – 200 x 20	36	185 – 200 x 36
21,0 – 22,0	1,0	30	0,02	5	20	210 – 220 x 20	36	210 – 220 x 36
23,0 – 26,0	1,0	35	0,02	5	20	230 – 260 x 20	36	230 – 260 x 36
27,0 – 30,0	1,0	42	0,02	2	25	270 – 300 x 25	45	270 – 300 x 45
31,0 – 35,0	1,0	48	0,04	2	25	310 – 350 x 25	45	310 – 350 x 45
36,0 – 42,0	1,0	55	0,04	2	30	360 – 420 x 30	56	360 – 420 x 56
43,0 – 48,0	1,0	62	0,04	2	30	430 – 480 x 30	56	430 – 480 x 56



Drill bushes with shoulder to press in

DIN 172, Form A, ISO 4247

Material: Casehardening steel
hardness HRC 60-64

Intermediate sizes as well as special designs according to customers drawings are available upon request.

Price and time of delivery upon request

Order example: Drill bush **SZ 6255**

$d_1 = 8,3 \text{ mm}$, $l_1 = 20 \text{ mm}$

Add **083 x 20**

Order number **SZ 6255.083 x 20**

Add
size to
order number

Add
size to
order number

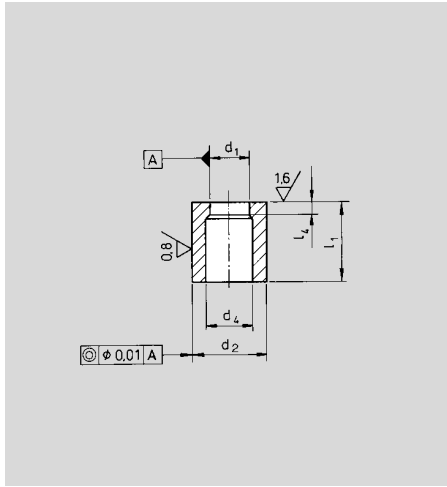
Order number **SZ 6255.**

x

x

d_1^{F7}	Step-up distance	d_{2n6}	d_3	l_2	t_1	t_2	Pieces/standard packing	l_1	▲	l_1	▲
0,4 – 0,6	0,1	3	5	2,0	0,01	0,03	5	6	004 – 006 x 06	–	–
0,7 – 1,0	0,1	3	6	2,0	0,01	0,03	5	6	007 – 010 x 06	9	007 – 010 x 09
1,1 – 1,8	0,1	4	7	2,0	0,01	0,03	10	6	011 – 018 x 06	9	011 – 018 x 09
1,9 – 2,6	0,1	5	8	2,0	0,01	0,03	10	6	019 – 026 x 06	9	019 – 026 x 09
2,7 – 3,3	0,1	6	9	2,5	0,01	0,03	10	8	027 – 033 x 08	12	027 – 033 x 12
3,4 – 4,0	0,1	7	10	2,5	0,01	0,03	10	8	034 – 040 x 08	12	034 – 040 x 12
4,1 – 5,0	0,1	8	11	2,5	0,01	0,03	10	8	041 – 050 x 08	12	041 – 050 x 12
5,1 – 6,0	0,1	10	13	3,0	0,02	0,03	10	10	051 – 060 x 10	16	051 – 060 x 16
6,1 – 8,0	0,1	12	15	3,0	0,02	0,03	10	10	061 – 080 x 10	16	061 – 080 x 16
8,1 – 10,0	0,1	15	18	3,0	0,02	0,03	10	12	081 – 100 x 12	20	081 – 100 x 20
10,1 – 12,0	0,1	18	22	4,0	0,02	0,03	10	12	101 – 120 x 12	20	101 – 120 x 20
12,5 – 15,0	0,5	22	26	4,0	0,02	0,03	5	16	125 – 150 x 16	28	125 – 150 x 28
15,5 – 18,0	0,5	26	30	4,0	0,02	0,03	5	16	155 – 180 x 16	28	155 – 180 x 28
18,5 – 20,0	0,5	30	34	5,0	0,02	0,03	5	20	185 – 200 x 20	36	185 – 200 x 36
21,0 – 22,0	1,0	30	34	5,0	0,02	0,03	5	20	210 – 220 x 20	36	210 – 220 x 36
23,0 – 26,0	1,0	35	39	5,0	0,02	0,05	5	20	230 – 260 x 20	36	230 – 260 x 36
27,0 – 30,0	1,0	42	46	5,0	0,02	0,05	2	25	270 – 300 x 25	45	270 – 300 x 45
31,0 – 35,0	1,0	48	52	5,0	0,04	0,05	2	25	310 – 350 x 25	45	310 – 350 x 45
36,0 – 42,0	1,0	55	59	5,0	0,04	0,05	2	30	360 – 420 x 30	56	360 – 420 x 56
43,0 – 48,0	1,0	62	66	6,0	0,04	0,05	2	30	430 – 480 x 30	56	430 – 480 x 56

Cutting bushes



**Cutting bushes to press in,
without shoulder, round**

ISO 8977, Form A

Material: HWS high performance tool steel
12% CR, hardness HRC 60-62

Indication: When matching punch and bush
pay attention to the high cutting clearance.

**Same external diameters as punch guide
bushes SZ 6225**

Order example: Cutting bush to press in,
without shoulder, round **SZ 6265**
 $d_1 = 5,2$ mm, $l_1 = 20$ mm
Add **052 x 20**
Order number **SZ 6265.052 x 20**

Add size to order number

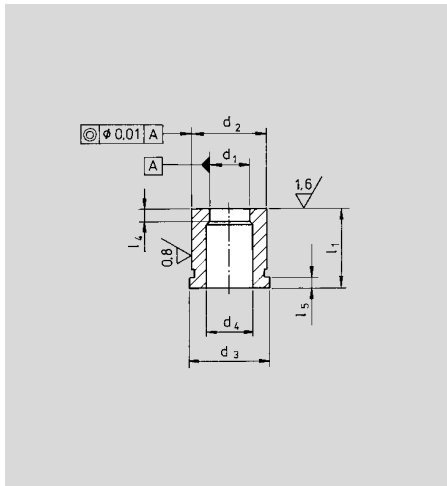
Add size to order number

Order number **SZ 6265.** x

x

d_1^{H8}	Step-up distance	d_{2m5}	d_4	Pieces/standard packing	$l_1^{+0,5}$	l_4	▲	$l_1^{+0,5}$	l_4	▲
1,0 – 2,0	0,1	5	2,8	5	20	2	010 – 020 x 20	25	2	010 – 020 x 25
2,1 – 3,0	0,1	6	3,5	5	20	3	021 – 030 x 20	25	3	021 – 030 x 25
3,1 – 3,5	0,1	8	4,0	5	20	4	031 – 035 x 20	25	4	031 – 035 x 25
3,6 – 5,0	0,1	10	5,8	5	20	4	036 – 050 x 20	25	4	036 – 050 x 25
5,1 – 7,0	0,1	13	8,0	5	20	5	051 – 070 x 20	25	5	051 – 070 x 25
7,1 – 8,8	0,1	16	9,5	5	20	5	071 – 088 x 20	25	5	071 – 088 x 25
8,9 – 11,0	0,1	20	12,0	5	20	8	089 – 110 x 20	25	8	089 – 110 x 25
11,1 – 15,0	0,1	25	17,3	5	20	8	111 – 150 x 20	25	8	111 – 150 x 25
15,5 – 20,0	0,5	32	20,7	5	20	8	155 – 200 x 20	25	8	155 – 200 x 25
20,5 – 25,0	0,5	40	27,7	5	20	8	205 – 250 x 20	25	8	205 – 250 x 25

Length 32 upon request



**Cutting bushes to press in,
with shoulder, round**

ISO 8977, Form B

Material: HWS high performance tool steel
12% CR, hardness HRC 60-62

Indication: When matching punch and bush
pay attention to the cutting clearance

**Same external diameters as punch guide
bushes SZ 6225**

Order example: Cutting bush to press in,
with shoulder, round **SZ 6285**
 $d_1 = 8,5$ mm, $l_1 = 32$ mm
Add **085 x 32**
Order number **SZ 6285.085 x 32**

Add size to order number

Add size to order number

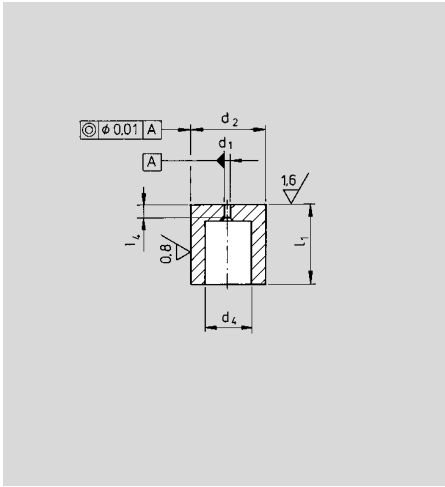
Order number **SZ 6285.** x

x

d_1^{H8}	Step-up distance	d_{2m5}	d_3	d_4	Pieces/standard packing	$l_1^{+0,5}$	l_4	l_5	▲	$l_1^{+0,5}$	l_4	l_5	▲
1,0 – 2,0	0,1	5	8	2,5	5	25	2	5	010 – 020 x 25	–	–	–	–
2,1 – 3,0	0,1	6	9	3,5	5	25	3	5	021 – 030 x 25	–	–	–	–
3,1 – 3,5	0,1	8	11	4,0	5	25	4	5	031 – 035 x 25	32	4	5	031 – 035 x 32
3,6 – 5,0	0,1	10	13	5,8	5	25	4	5	036 – 050 x 25	32	4	5	036 – 050 x 32
5,1 – 7,0	0,1	13	16	8,0	5	25	5	5	051 – 070 x 25	32	5	5	051 – 070 x 32
7,1 – 8,8	0,1	16	19	9,5	5	25	5	5	071 – 088 x 25	32	5	5	071 – 088 x 32
8,9 – 11,0	0,1	20	24	12,0	5	25	8	5	089 – 110 x 25	32	8	5	089 – 110 x 32
11,1 – 15,0	0,1	25	29	17,3	5	25	8	5	111 – 150 x 25	32	8	5	111 – 150 x 32
15,5 – 20,0	0,5	32	36	20,7	5	25	8	5	155 – 200 x 25	32	8	5	155 – 200 x 32
20,5 – 25,0	0,5	40	44	27,7	5	25	8	5	205 – 250 x 25	32	8	5	205 – 250 x 32

Length 20 upon request

Cutting bushes with start bore



**Cutting bushes for press fitting,
without shoulder, round, with start bore**

Material: HWS high performance tool steel
12% CR, hardness HRC 60-62

Indication: Suitable for wire-eroding for
different forms.

**Same outside diameters as punch guide SZ
6225 and punch bushing SZ 6265 (ISO 8978
and ISO 8977).**

Order example: Cutting bush for press
fitting, without shoulder, round, with start bore
SZ 6266

$d_2 = 8 \text{ mm}$, $l_1 = 20 \text{ mm}$

Add **08 x 20**

Order number **SZ 6266.08 x 20**

Add size to order number

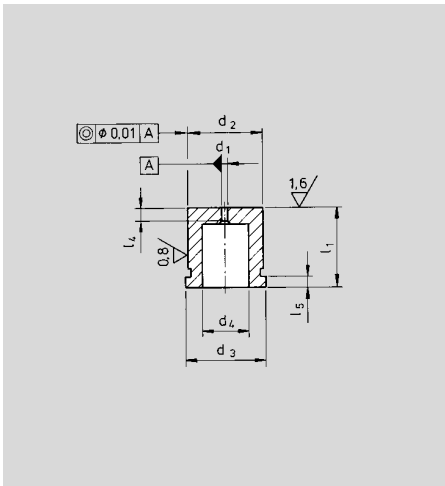
Add size to order number

Order number **SZ 6266.** x

x

d_1	d_{2n5}	d_4	Pieces/standard packing	$l_1^{+0,5}$	l_4	▲	$l_1^{+0,5}$	l_4	▲
1,0	5	2,8	5	20	2	05 x 20	25	2	05 x 25
1,0	6	3,5	5	20	3	06 x 20	25	3	06 x 25
1,0	8	4,0	5	20	4	08 x 20	25	4	08 x 25
1,0	10	5,8	5	20	4	10 x 20	25	4	10 x 25
1,2	13	8,0	5	20	5	13 x 20	25	5	13 x 25
1,2	16	9,5	5	20	5	16 x 20	25	5	16 x 25
1,5	20	12,0	5	20	8	20 x 20	25	8	20 x 25
1,5	25	17,3	5	20	8	25 x 20	25	8	25 x 25
1,5	32	20,7	5	20	8	32 x 20	25	8	32 x 25
1,5	40	27,7	5	20	8	40 x 20	25	8	40 x 25

Length 32 upon request



**Cutting bushes for press fitting,
with shoulder, round, with start bore**

Material: HWS high performance tool steel
12% CR, hardness HRC 60-62

Indication: Suitable for wire-eroding for
different forms.

**Same outside diameters as punch guide
SZ 6225 and punch bushing SZ 6285
(ISO 8978 and ISO 8977).**

Order example: Cutting bush for press fitting,
with shoulder, round, with start bore

SZ 6286

$d_2 = 16 \text{ mm}$, $l_1 = 32 \text{ mm}$

Add **16 x 32**

Order number **SZ 6286.16 x 32**

Add size to order number

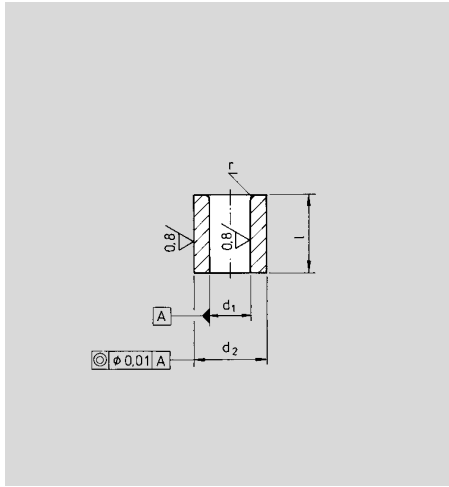
Add size to order number

Order number **SZ 6286.** x

x

d_1	d_{2m5}	d_3	d_4	Pieces/standard packing	$l_1^{+0,5}$	l_4	l_5	▲	$l_1^{+0,5}$	l_4	l_5	▲
1,0	5	8	2,8	5	25	2	5	05 x 25	–	–	–	–
1,0	6	9	3,5	5	25	3	5	06 x 25	–	–	–	–
1,0	8	11	4,0	5	25	4	5	08 x 25	32	4	5	08 x 32
1,0	10	13	5,8	5	25	4	5	10 x 25	32	4	5	10 x 32
1,2	13	16	8,0	5	25	5	5	13 x 25	32	5	5	13 x 32
1,2	16	19	9,5	5	25	5	5	16 x 25	32	5	5	16 x 32
1,5	20	24	12,0	5	25	8	5	20 x 25	32	8	5	20 x 32
1,5	25	29	17,3	5	25	8	5	25 x 25	32	8	5	25 x 32
1,5	32	36	20,7	5	25	8	5	32 x 25	32	8	5	32 x 32
1,5	40	44	27,7	5	25	8	5	40 x 25	32	8	5	40 x 32

Length 20 upon request



Punch guide bushes for press-fitting

ISO 8978

Material: Case hardening steel
hardness HRC 60-64

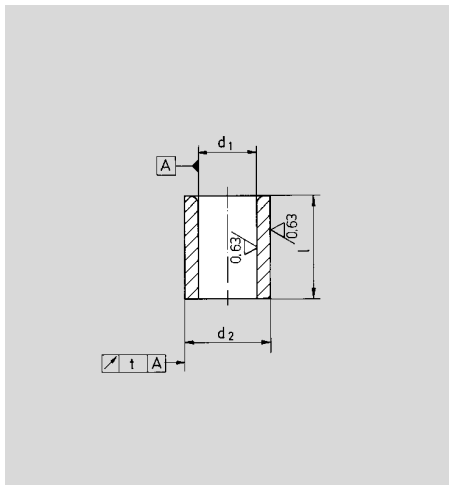
**Same outside diameters as cutting bushes
SZ 6265 and SZ 6285 as well as
SZ 6266 and SZ 6286**

Order example: Punch guide bush for press-fitting **SZ 6225**
 $d_1 = 6,5$ mm, $l = 16$ mm
Add **065 x 16**
Order number **SZ 6225.065 x 16**

Add
size to
order number

Order number **SZ 6225.** x

d_1^{H6}	Step-up distance	d_{2n6}	l	r	Pieces/standard packing	▲
1,0 – 2,0	0,1	5	8,0	1,0	5	010 – 020 x 08
2,1 – 3,0	0,1	6	12,5	1,0	5	021 – 030 x 12
3,1 – 3,5	0,1	8	12,5	1,5	5	031 – 035 x 12
3,6 – 5,0	0,1	10	16,0	2,0	5	036 – 050 x 16
5,1 – 7,0	0,1	13	16,0	2,0	5	051 – 070 x 16
7,1 – 8,8	0,1	16	20,0	2,0	5	071 – 088 x 20
8,9 – 11,0	0,1	20	20,0	2,5	5	089 – 110 x 20
11,1 – 15,0	0,1	25	25,0	2,5	5	111 – 150 x 25
15,5 – 20,0	0,5	32	25,0	4,0	5	155 – 200 x 25
20,5 – 25,0	0,5	40	32,0	4,0	5	205 – 250 x 32



Punch guide bushes for press-fitting of cutting punch meeting ISO 8020

Material: Case-hardening steel
hardness HRC 60-64

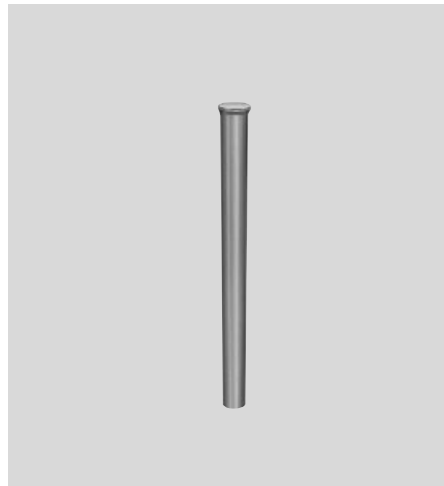
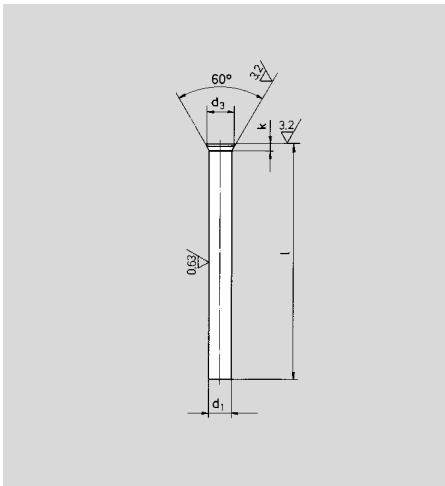
Order example: Punch guide bush for press-fitting **SZ 6229**
 $d_1 = 6,5$ mm, $l = 16$ mm
Add **065 x 16**
Order number **SZ 6229.065 x 16**

Add
size to
order number

Order number **SZ 6229.** x

d_1^{F7}	Step-up distance	d_{2n6}	t	Pieces/standard packing	l	▲
1,1 – 1,8	0,1	4	0,01	10	9	011 – 018 x 09
1,9 – 2,6	0,1	5	0,01	10	9	019 – 026 x 09
2,7 – 3,3	0,1	6	0,01	10	12	027 – 033 x 12
3,4 – 4,0	0,1	7	0,01	10	12	034 – 040 x 12
4,1 – 5,0	0,1	8	0,01	10	12	041 – 050 x 12
5,1 – 6,0	0,1	10	0,02	10	16	051 – 060 x 16
6,1 – 8,0	0,1	12	0,02	10	16	061 – 080 x 16
8,1 – 10,0	0,1	15	0,02	10	20	081 – 100 x 20
10,1 – 12,0	0,1	18	0,02	10	20	101 – 120 x 20
12,5 – 15,0	0,5	22	0,02	5	28	125 – 150 x 28
15,5 – 18,0	0,5	26	0,02	5	28	155 – 180 x 28
18,5 – 20,0	0,5	30	0,02	5	36	185 – 200 x 36
21,0 – 22,0	1,0	30	0,02	5	36	210 – 220 x 36
23,0 – 26,0	1,0	35	0,02	5	36	230 – 260 x 36

Ejector pins



Ejector pins with conical head and straight shank hardened version

DIN 1530, Form D

Material: Tool steel
shank hardness HRC 60 ± 2
head hardness HRC 45 ± 5

Order example: Ejector pin with conical head and straight shank, hardened version

SZ 6750

d₁ = 4 mm, l = 125 mm

Add **040 x 125**

Order number **SZ 6750.040 x 125**

Add size to order number

Order number **SZ 6750.** x

d _{1g6}	d _{3-0,2}	k	l ⁺²	Pieces/standard packing	▲
1	1,8	1,19	100	10	010 x 100
			160	10	010 x 160
1,5	2,2	1,11	100	10	015 x 100
			160	10	015 x 160
2	3	1,37	100	10	020 x 100
			125	10	020 x 125
			160	10	020 x 160
			200	10	020 x 200
2,5	3,5	1,37	100	10	025 x 100
			125	10	025 x 125
			160	10	025 x 160
			200	10	025 x 200
3	4,5	1,80	100	10	030 x 100
			125	10	030 x 125
			160	10	030 x 160
			200	10	030 x 200
3,5	5	1,80	100	10	035 x 100
			125	10	035 x 125
			160	10	035 x 160
			200	10	035 x 200
4	5,5	1,80	100	10	040 x 100
			125	10	040 x 125
			160	10	040 x 160
			200	10	040 x 200
4,5	6	1,80	100	10	045 x 100
			125	10	045 x 125
			160	10	045 x 160
			200	10	045 x 200
5	6,5	1,80	100	10	050 x 100
			125	10	050 x 125
			160	10	050 x 160
			200	10	050 x 200

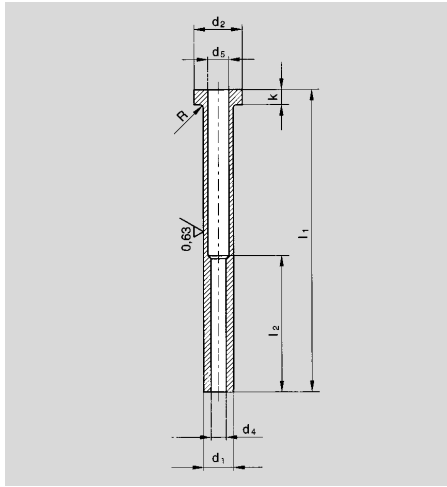
Add size to order number

Order number **SZ 6750.** x

d _{1g6}	d _{3-0,2}	k	l ⁺²	Pieces/standard packing	▲
5,5	7	1,80	100	10	055 x 100
			125	10	055 x 125
			160	10	055 x 160
			200	10	055 x 200
6	8	2,23	100	10	060 x 100
			125	10	060 x 125
			160	10	060 x 160
			200	10	060 x 200
6,5	9	3,16	100	10	065 x 100
			125	10	065 x 125
			160	10	065 x 160
			200	10	065 x 200
8	10	2,73	100	10	080 x 100
			125	10	080 x 125
			160	10	080 x 160
			200	10	080 x 200
10	12	2,73	100	5	100 x 100
			125	5	100 x 125
			160	5	100 x 160
			200	5	100 x 200
12	14	2,73	100	5	120 x 100
			125	5	120 x 125
			160	5	120 x 160
			200	5	120 x 200
14	16	3,23	160	5	140 x 160
			200	5	140 x 200
16	18	3,23	160	5	160 x 160
			200	5	160 x 200

For lengths below 100 we recommend our cutting punches SZ 6134, SZ 6137 and SZ 6139.

Ejector tubes



**Ejector tubes with cylindrical head
hardened version**

DIN/ISO 8405

Material: Tool steel
shank hardness HRC 61 ± 2
head hardness HRC 45 ± 5

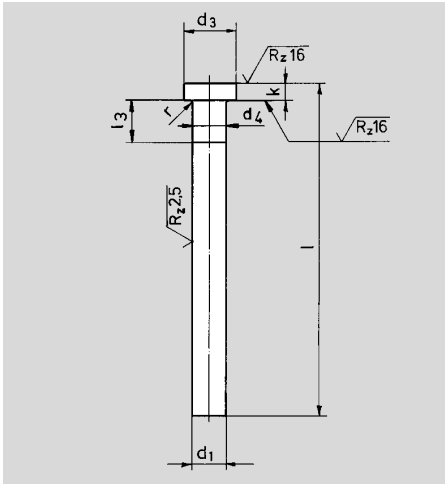
Order example: Ejector tube with cylindrical head, hardened version **SZ 6751**
d₄ = 4 mm, d₁ = 6 mm, l₁ = 100 mm
Add **040 x 060 x 100**
Order number **SZ 6751.040 x 060 x 100**

Add size to order number

Order number **SZ 6751.** x x

d _{1g6}	d _{2-0,2}	d ₄ ^{H5}	d ₅	k _{0,05}	r	l ₁ ⁺¹	l ₂	▲
4	8	2	2,4	3	0,3	100	35	020 x 040 x 100
						125	35	020 x 040 x 125
5	10	3	3,4	3	0,3	100	45	030 x 050 x 100
						125	45	030 x 050 x 125
						150	45	030 x 050 x 150
5	10	3,2	3,6	3	0,3	100	45	032 x 050 x 100
						125	45	032 x 050 x 125
						150	45	032 x 050 x 150
6	12	4	4,4	5	0,5	100	45	040 x 060 x 100
						125	45	040 x 060 x 125
						150	45	040 x 060 x 150
						175	45	040 x 060 x 175
8	14	4,2	4,6	5	0,5	100	45	042 x 080 x 100
						125	45	042 x 080 x 125
						150	45	042 x 080 x 150
						175	45	042 x 080 x 175
8	14	5	5,4	5	0,5	100	45	050 x 080 x 100
						125	45	050 x 080 x 125
						150	45	050 x 080 x 150
						175	45	050 x 080 x 175
						200	45	050 x 080 x 200
8	14	5,2	5,6	5	0,5	100	45	052 x 080 x 100
						125	45	052 x 080 x 125
						150	45	052 x 080 x 150
						175	45	052 x 080 x 175
						200	45	052 x 080 x 200
10	16	6	6,4	5	0,5	100	45	060 x 100 x 100
						125	45	060 x 100 x 125
						150	45	060 x 100 x 150
						175	45	060 x 100 x 175
						200	45	060 x 100 x 200
10	16	6,2	6,6	5	0,5	100	45	062 x 100 x 100
						125	45	062 x 100 x 125
						150	45	062 x 100 x 150
						175	45	062 x 100 x 175
						200	45	062 x 100 x 200
12	20	8	8,4	7	0,8	100	45	080 x 120 x 100
						125	45	080 x 120 x 125
						150	45	080 x 120 x 150
						175	45	080 x 120 x 175
						200	45	080 x 120 x 200
12	20	8,2	8,6	7	0,8	100	45	082 x 120 x 100
						125	45	082 x 120 x 125
						150	45	082 x 120 x 150
						175	45	082 x 120 x 175
						200	45	082 x 120 x 200

Ejector pins



Ejector pins with cylindrical head and straight shank hardened version

DIN/ISO 6751
DIN/ISO 8405

Material: Tool steel
shank hardness HRC 61 ± 2
head hardness HRC 45 ± 5

Order example: Ejector pin with cylindrical head and straight shank, hardened version

SZ 6650

d₁ = 5 mm, l = 125 mm

Add **050 x 125**

Order number **SZ 6650.050 x 125**

Note: The thickness of d₄ below the head is:
Until diameter 8 mm = 0,03 mm
above diameter 8 mm = 0,04 mm

Add size to order number

Order number **SZ 6650.** x

d _{1g6}	d _{3-0,2}	k _{0,05}	r	l ⁺²	l ₃	▲
1,5	3	1,5	0,2	100	5	015 x 100
				125		015 x 125
				160		015 x 160
				200		015 x 200
1,6	3	1,5	0,2	100	5	016 x 100
				125		016 x 125
				160		016 x 160
				200		016 x 200
2	4	2	0,2	100	5	020 x 100
				125		020 x 125
				160		020 x 160
				200		020 x 200
2,2	4	2	0,2	100	5	022 x 100
				125		022 x 125
				160		022 x 160
				200		022 x 200
3	6	3	0,3	100	5	030 x 100
				125		030 x 125
				160		030 x 160
				200		030 x 200
3,2	6	3	0,3	100	5	032 x 100
				125		032 x 125
				160		032 x 160
				200		032 x 200
4	8	3	0,3	100	5	040 x 100
				125		040 x 125
				160		040 x 160
				200		040 x 200
				250		040 x 250
4,2	8	3	0,3	100	5	042 x 100
				125		042 x 125
				160		042 x 160
				200		042 x 200
				250		042 x 250
5	10	3	0,3	100	5	050 x 100
				125		050 x 125
				160		050 x 160
				200		050 x 200
				250		050 x 250
5,2	10	3	0,3	100	5	052 x 100
				125		052 x 125
				160		052 x 160
				200		052 x 200
				250		052 x 250

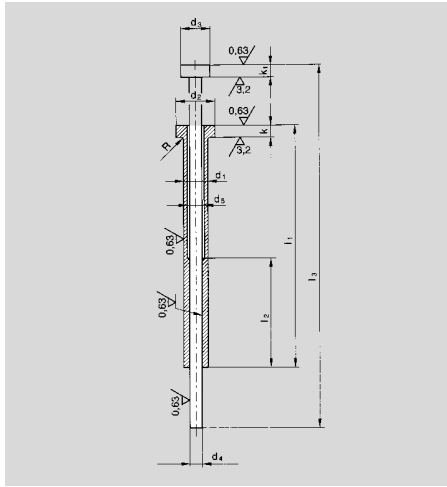
Add size to order number

Order number **SZ 6650.** x

d _{1g6}	d _{3-0,2}	k _{0,05}	r	l ⁺²	l ₃	▲
6	12	5	0,5	100	6	060 x 100
				125		060 x 125
				160		060 x 160
				200		060 x 200
				250		060 x 250
6,2	12	5	0,5	100	6	062 x 100
				125		062 x 125
				160		062 x 160
				200		062 x 200
				250		062 x 250
8	14	5	0,5	100	8	080 x 100
				125		080 x 125
				160		080 x 160
				200		080 x 200
				250		080 x 250
8,2	14	5	0,5	100	8	082 x 100
				125		082 x 125
				160		082 x 160
				200		082 x 200
				250		082 x 250
10	16	5	0,5	100	10	100 x 100
				125		100 x 125
				160		100 x 160
				200		100 x 200
				250		100 x 200
10,2	16	5	0,5	100	10	102 x 100
				125		102 x 125
				160		102 x 160
				200		102 x 200
				250		102 x 200
12	18	7	0,8	125	12	120 x 125
				160		120 x 160
				200		120 x 200
				250		120 x 200
				250		120 x 200
14	22	7	0,8	160	14	140 x 160
				200		140 x 200
				250		140 x 200
				250		140 x 200
				250		140 x 200
16	22	7	0,8	160	16	160 x 160
				200		160 x 200
				250		160 x 200
				250		160 x 200
				250		160 x 200

For lengths 250 and longer price and delivery time upon request

Ejector tubes with ejector pin



Ejector tubes with cylindrical head and ejector pin, hardened version

DIN 16756/ISO 8405

Material: Tool steel
shank hardness HRC 61 ± 2
head hardness HRC 45 ± 5

1 set = 1 tube and 1 pin

Order example: Ejector tube with cylindrical head and ejector pin, hardened version

SZ 6753

$d_4 = 4 \text{ mm}$, $d_1 = 6 \text{ mm}$, $l_1 = 100 \text{ mm}$

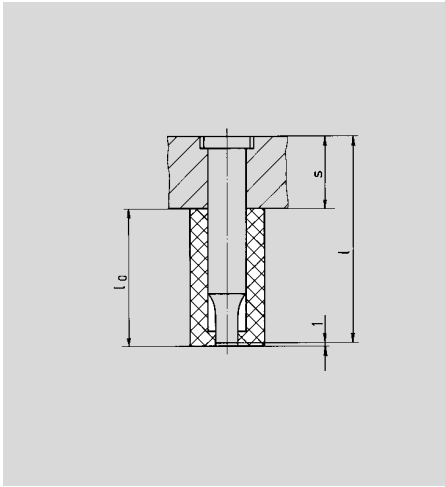
Add **040 x 060 x 100**

Order number **SZ 6753.040 x 060 x 100**

Add size to order number

Order number **SZ 6753.** x x

d_{1g6}	$d_{2-0,2}$	$d_{3-0,2}$	d_{4g6}^{H5}	d_5	$k_{-0,05}$	$k_{1-0,05}$	r	l_1^{+1}	l_2	l_3^{+2}	▲
4	8	4	2	2,4	3	2	0,3	100 125	35 35	160 200	020 x 040 x 100 020 x 040 x 125
5	10	6	3	3,4	3	3	0,3	100 125 150	45 45 45	160 200 200	030 x 050 x 100 030 x 050 x 125 030 x 050 x 150
5	10	6	3,2	3,6	3	3	0,3	100 125 150	45 45 45	160 200 200	032 x 050 x 100 032 x 050 x 125 032 x 050 x 150
6	12	8	4	4,4	5	3	0,5	100 125 150 175	45 45 45 45	160 200 200 250	040 x 060 x 100 040 x 060 x 125 040 x 060 x 150 040 x 060 x 175
8	14	8	4,2	4,6	5	3	0,5	100 125 150 175	45 45 45 45	160 200 200 250	042 x 080 x 100 042 x 080 x 125 042 x 080 x 150 042 x 080 x 175
8	14	10	5	5,4	5	3	0,5	100 125 150 175 200	45 45 45 45 45	160 200 200 250 250	050 x 080 x 100 050 x 080 x 125 050 x 080 x 150 050 x 080 x 175 050 x 080 x 200
8	14	10	5,2	5,6	5	3	0,5	100 125 150 175 200	45 45 45 45 45	160 200 200 250 250	052 x 080 x 100 052 x 080 x 125 052 x 080 x 150 052 x 080 x 175 052 x 080 x 200
10	16	12	6	6,4	5	5	0,5	100 125 150 175 200	45 45 45 45 45	160 200 200 250 250	060 x 100 x 100 060 x 100 x 125 060 x 100 x 150 060 x 100 x 175 060 x 100 x 200
10	16	12	6,2	6,6	5	5	0,5	100 125 150 175 200	45 45 45 45 45	160 200 200 250 250	062 x 100 x 100 062 x 100 x 125 062 x 100 x 150 062 x 100 x 175 062 x 100 x 200
12	20	14	8	8,4	7	5	0,8	100 125 150 175 200	45 45 45 45 45	160 200 200 250 250	080 x 120 x 100 080 x 120 x 125 080 x 120 x 150 080 x 120 x 175 080 x 120 x 200
12	20	14	8,2	8,6	7	5	0,8	100 125 150 175 200	45 45 45 45 45	160 200 200 250 250	082 x 120 x 100 082 x 120 x 125 082 x 120 x 150 082 x 120 x 175 082 x 120 x 200



Strippers for cutting punches, self-retaining

Material: Vulkollan
Polyurethan-Elastomer (PUR)
on the base of Desmodur 15
hardness: 90 ± 5 Shore A

Stripper length l_0
The stripper length l_0 in the table are a proposal range harmonized onto the standard sizes of cutting punches and receiving plates. Beyond we supply every immediate length without any additional costs.

For other sizes of cutting punches and receiving plates the stripper length will be determined as follows:

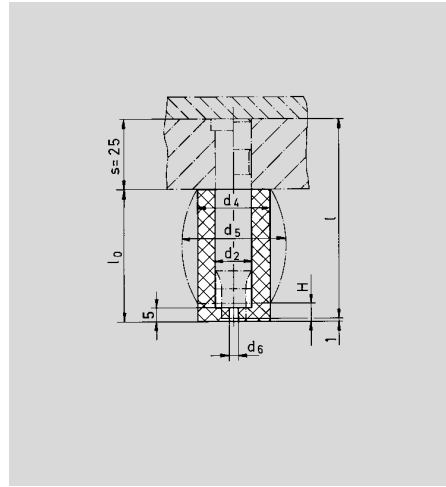
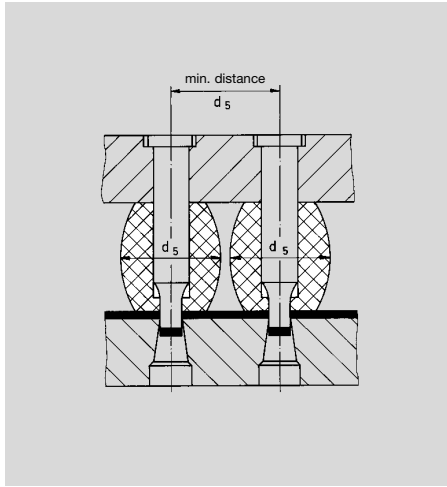
$$l_0 = l - s + 1$$

Order example: Punch length $l = 71$ mm
Thickness of the receiving plate $s = 25$ mm
 $l_0 = 71 - 25 + 1 = 47$ mm

Add size to order number

Order number **SZ 8455**. x

d_2	d_4	d_6	l_0^{+1}	l	H = 3 mm F (N)	d_5	H = 6,5 mm F (N)	d_5	H = 9,5 mm F (N)	d_5	▲
4	17	1,6	36	60	1250	19,3	1750	20,3			04 x 36
			46	70	1150	18,7					04 x 46
6	19	1,6	36	70	1400	21,3	2300	22,9	2400	22,9	06 x 36
			39	63	1380	21,0					06 x 39
			46	70	1350	20,7					06 x 46
			47	71	1300	20,6					06 x 47
			56	80	1100	20,4					06 x 56
8	21	3	36	60	1600	23,3	2400	24,9	3000	24,9	08 x 36
			39	63	1580	23,0					08 x 39
			46	70	1500	22,7					08 x 46
			47	71	1450	22,6					08 x 47
			56	80	1350	22,4					08 x 56
10	23	3	36	60	2100	25,3	3100	26,9	3250	26,9	10 x 36
			39	63	1900	25,0					10 x 39
			46	70	1750	24,7					10 x 46
			47	71	1600	24,6					10 x 47
			56	80	1450	24,4					10 x 56
13	26	3	36	60	2600	28,3	3600	29,9	3000	29,9	13 x 36
			39	63	2250	28,0					13 x 39
			46	70	2150	27,7					13 x 46
			47	71	1650	27,6					13 x 47
			56	80	1500	27,4					13 x 56
16	30	3	36	60	3000	32,5	4200	34,1	4600	34,1	16 x 36
			39	63	2600	32,2					16 x 39
			46	70	2400	31,9					16 x 46
			47	71	2350	31,8					16 x 47
			56	80	2200	31,5					16 x 56
20	38	3	39	63	2800	40,8	4200	43,2	5500	43,2	20 x 39
			47	71	2400	40,2					20 x 47
			56	80	2000	39,9					20 x 56
25	50	3	39	63	11000	54,2	16000	55,9	16000	56,0	25 x 39
			47	71	9000	53,1					25 x 47
			56	80	7000	51,5					25 x 56



Mounting indications

Due to the axial compression of the stripper during the cutting process, there results a bulging out of the external diameter, d_4 onto the size d_5 (see table).

Therefore enough volume for the bulging out must be provided for.

Fitting: Place upside down by hand over fitted cutting punch. Stripper adheres, due to its elasticity tight to the punch. Operate the press empty for one stroke, so that the punch perforates the bottom of the stripper in the correct size.

Ready for use!

As the stripper sits tight to the cutting shank, because it was perforated by the punch itself, the indentation of the sheet between cutting punch and stripper, also of small sheets, will be prevented.

The stripper moreover raises the kink rigidity of the cutting punch, because punch shank and cutting shank will be encircled by the stripper free from play.

Order example: Stripper for cutting punch, self retaining **SZ 8455**

$d_2 = 13 \text{ mm}$, $l_0 = 47 \text{ mm}$

Add **13 x 47**

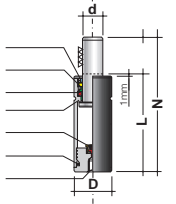
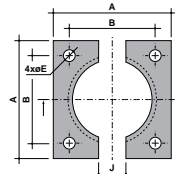
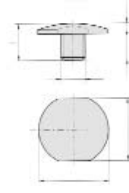



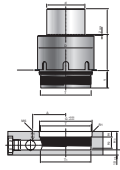
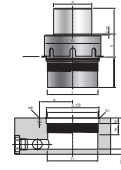





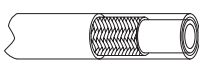
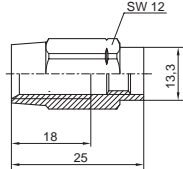
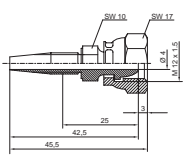
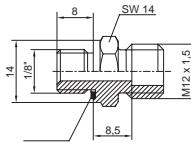
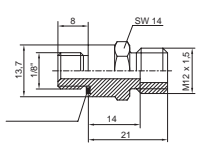
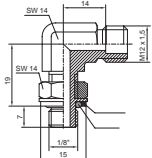
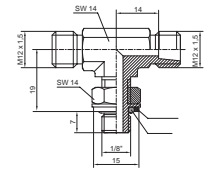
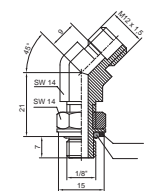
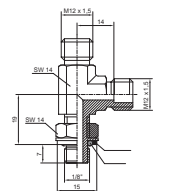
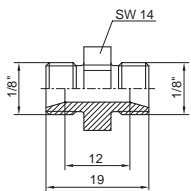
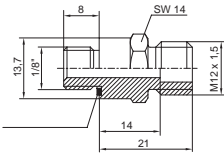
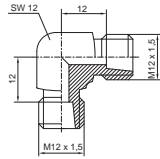
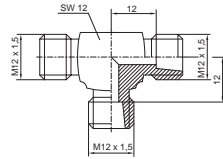
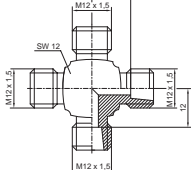
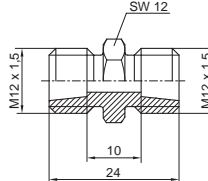
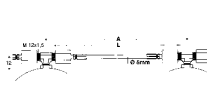
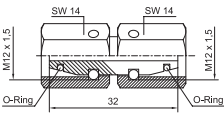
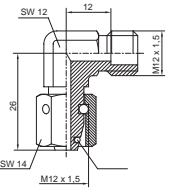
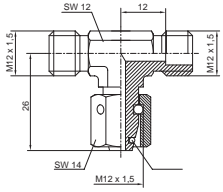
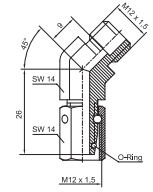
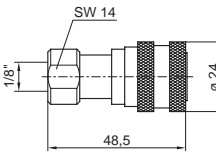
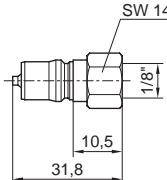


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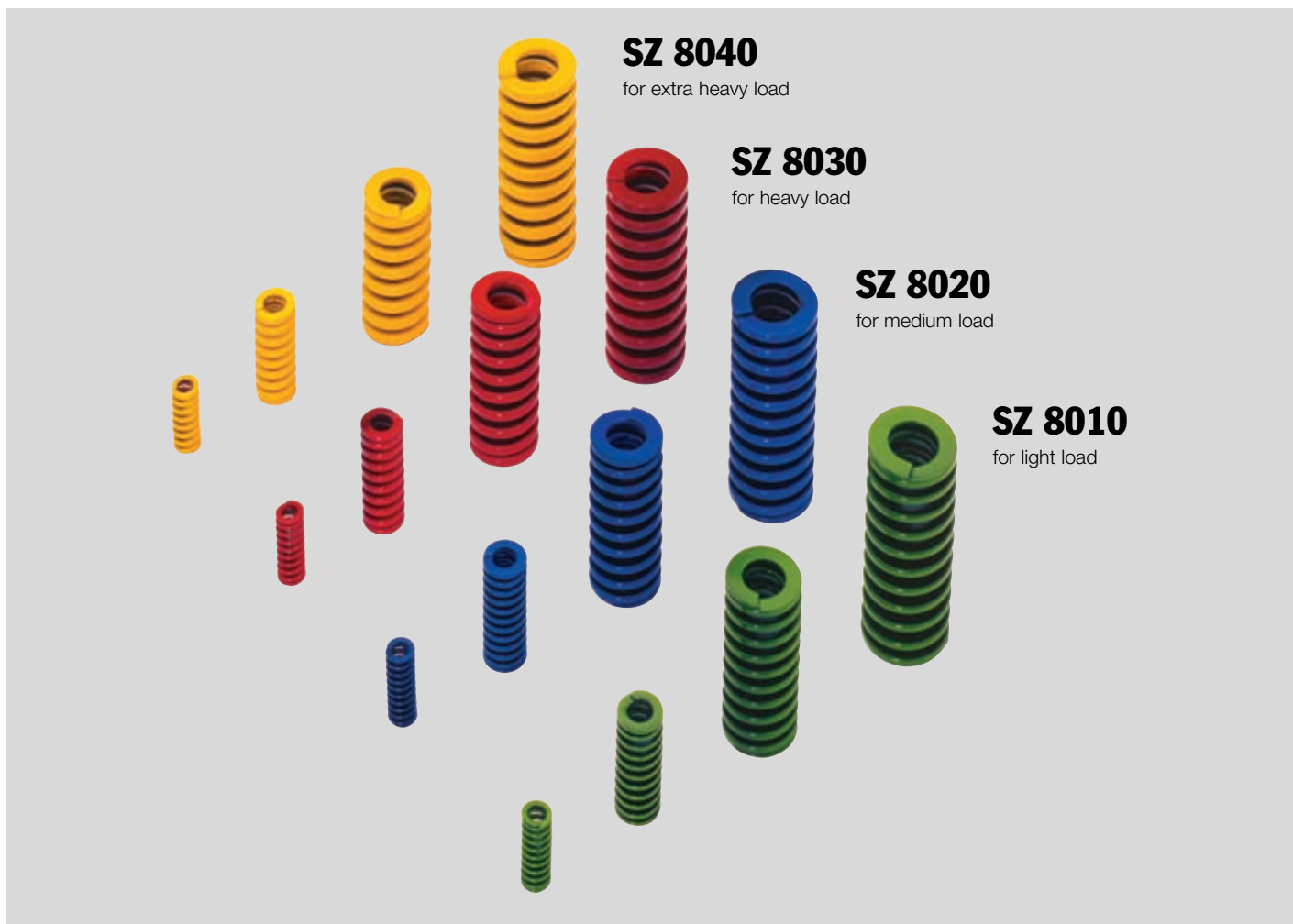
Springs

- Helical springs with round, square and flat bottom cross section
- Disc springs
- Rubber springs
- Plastic springs
- Springy thrust pieces
- Polyurethane plates and rods for example for metal deformation
- System springs
- System spring units
- Gas pressure springs



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SZ 8131 page 5.44 	SZ 8140 page 5.45 	SZ 8080 page 5.52 	SZ 7080 page 5.54 	SZ 8066 page 5.56 	SZ 7066 page 5.58 
SZ 8065 page 5.60 	SZ 8060 page 5.62 	SZ 7082 page 5.64 	SZ 8063 page 5.66 	SZ 8061 page 5.68 	SZ 8150 page 5.69 

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<p>SZ 8051 page 5.78</p> 	<p>SZ 8052 page 5.78</p> 	<p>SZ 8085.2 page 5.80</p> 	<p>SZ 8090 page 5.81</p> 	<p>SZ 8086 page 5.81</p> 	<p>SZ 8089 page 5.81</p> 
<p>SZ 8091 page 5.82</p> 	<p>SZ 7010 page 5.83</p> 	<p>SZ 7011 page 5.83</p> 	<p>SZ 7012 page 5.83</p> 	<p>SZ 7013 page 5.83</p> 	<p>SZ 7020 page 5.83</p> 
<p>SZ 7014 page 5.83</p> 	<p>SZ 7015 page 5.83</p> 	<p>SZ 7016 page 5.83</p> 	<p>SZ 7017 page 5.84</p> 	<p>SZ 7019 page 5.84.1</p> 	<p>SZ 7020 page 5.83</p> 
<p>SZ 7021 page 5.84</p> 	<p>SZ 7022 page 5.84</p> 	<p>SZ 7023 page 5.84</p> 	<p>SZ 7024 page 5.84.1</p> 	<p>SZ 8074 page 5.84</p> 	<p>SZ 7033 page 5.84.1</p> 
<p>SZ 7034 page 5.84.1</p> 	<p>SZ 7035 page 5.84.1</p> 	<p>SZ 7036 page 5.84.1</p> 	<p>SZ 7041 page 5.84.1</p> 	<p>SZ 7042 page 5.84.1</p> 	<p>SZ 8079 page 5.85</p> 
<p>SZ 8078 page 5.85</p> 					



SZ 8040

for extra heavy load

SZ 8030

for heavy load

SZ 8020

for medium load

SZ 8010

for light load

Helical compression springs in four types of load

The system springs made of profiled valve-spring steel wire are available in four load types. Each of these four helical compression springs have got the same assembling dimensions, so that an increase respectively a reduction of compressive forces can ensue without an problems, also subsequently.

For immediatel distinction the system springs are charcterized by different colours and therefore can quickly be allocated to the respective type of load.

Ascending part numbers also mean ascendant loads of the system springs, so it is only neccessary to add the tube diameter (D_h) x of the unloaded spring length (L_0).

Order number	Types of load	Ident. colour
SZ8010. $D_h \times L_0$	light load	green
SZ8020. $D_h \times L_0$	medium load	blue
SZ8030. $D_h \times L_0$	heavy load	red
SZ8040. $D_h \times L_0$	extra heavy load	yellow

ISO 10243

Assembling dimensions – basic sizes

The STEINEL system springs are available in nine basic sizes with the following tube diameters (D_h) and rod diameters (D_d):

D_h/D_d	D_h/D_d	D_h/D_d
10/5	20/10	40/20
12,5/6,3	25/12,5	50/25
16/8	32/16	63/38

The assembling lengths of the unloaded springs (L_0) base on inch sizes according to 25 – 254 mm.

For all basic sizes there are 305 mm long springs available, too, which can be shortened as occasion demands.

Material

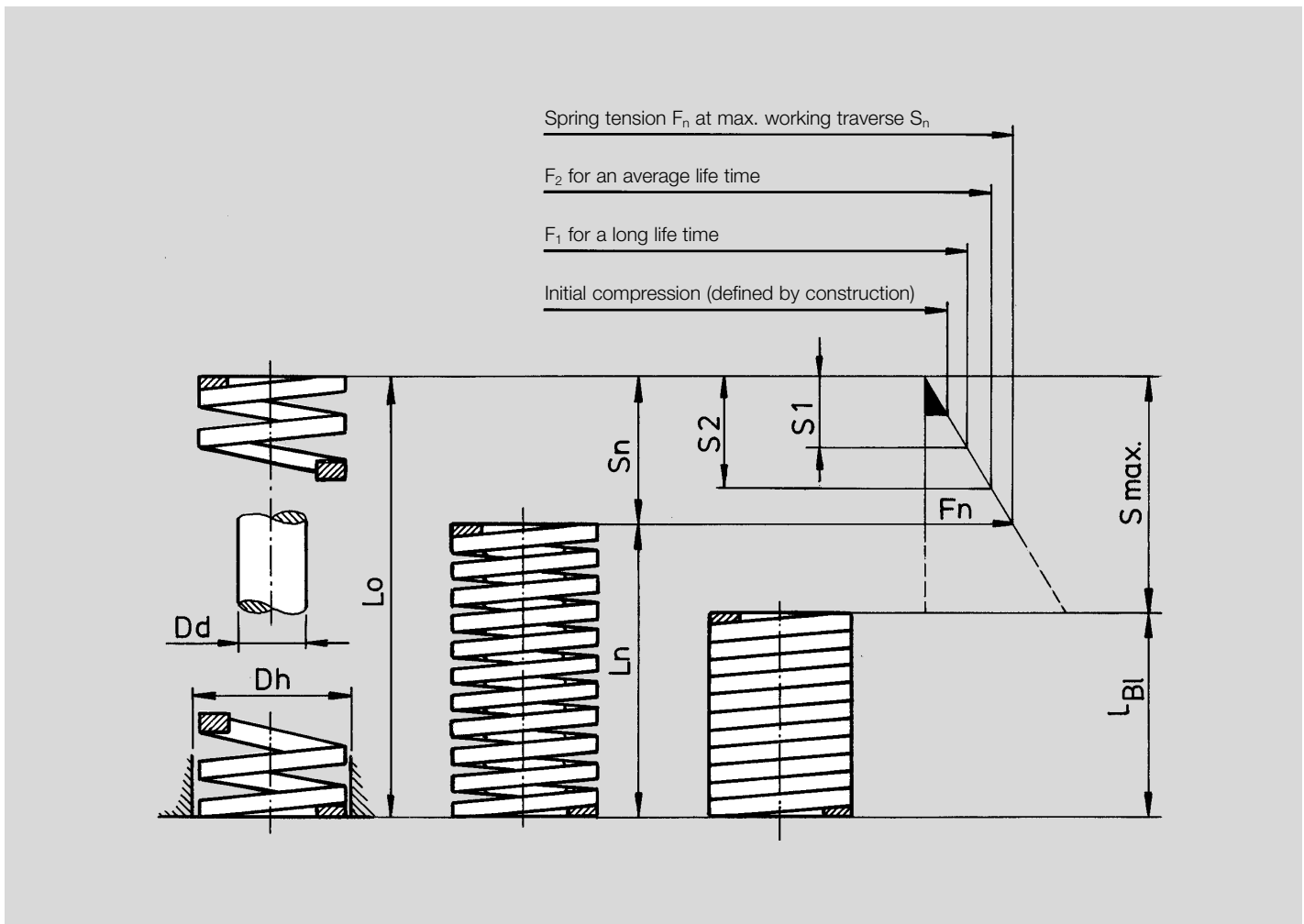
All springs are made of alloyed valve-spring steel wire (Cr-V/CR-Si). This wire is especially resistant against beat and vibration strains. Moreover this quality can also be used for higher temperature ranges up to 230 °C.

Manufacturing process and testing method

All springs are subject to special heat treatments, shot peened and initial-loaded. Thereby tensions are eliminated, to get a high fatigue limit.

The ends of the springs are closed and ground square with parallel faces.

The springs are subjected to strict quality checks, with vibration trials additional tests ensue concerning the working life.



Legend of the dimension symbols

- D_h = tube diameters (outward guiding) in mm
- D_d = rod diameter (internal guiding) in mm
- L_0 = length of the unloaded spring
- c = spring coefficient in N/mm
(spring tension causing spring strokes in mm)
- $s_1 - s_n$ = travel strokes in mm
caused to the spring tensions $F_1 - F_n$
- $F_1 - F_n$ = spring tensions in N
caused to the travel strokes $s_1 - s_n$
- L_n = minimal allowable length of the loaded spring ($L_0 - s_n$)
caused to the spring tension F_n
- S_{max} = maximal travel stroke in mm
- L_{BI} = block length of compacted spring ($L_0 - s_{max}$)

Constructional directives for selection

- priority the stroke
- priority the spring tension
- priority the working life

Note:

It is not allowed to exceed the travel stroke s_n (max. working traverse) and the resulting spring tension F_n , listed in the table.

Every spring should by principle be pre-loaded, because natural vibrations and push shock stresses of an unloaded spring reduce the working life.

Every spring has to be guided by an outward guiding (D_h) and/or an internal guiding (D_d). A rule of thumbs is: The crevasse depth of counterboring respectively the rod length should amount at minimum to 2 – 3 windings of the spring. The longer the spring, the longer the guiding.

Constructively it should always be aimed at a long working life of the springs. Therefore, the spring should preferable be chosen acc. to the travel stroke s_1 and the resulting spring tension F_1 .

Tolerances for the length of the unloaded spring, L_0

L_0 mm $\pm 3\%$	L_0 mm $\pm 2,5\%$	L_0 mm $\pm 2\%$
25	76	127
32	89	139
38	102	152
44	115	178
51		203
64		254
		305

Travel stroke symbols

- S_1 = long working life
- S_2 = average working life
- S_n = max. working traverse
- S_{max} = max. travel stroke

System springs

Quick review



Helical compression springs in four groups

Material: profiled valve-spring steel wire (Cr-V / Cr-Si)

The springs are initial-loaded, the ends are closed and ground square parallel.

Important characteristics data:

D_h = tube diameter in mm

L_0 = length of the unloaded spring in mm

c = spring coefficient in N/mm (spring tension causing spring strokes in mm)

ISO 10243

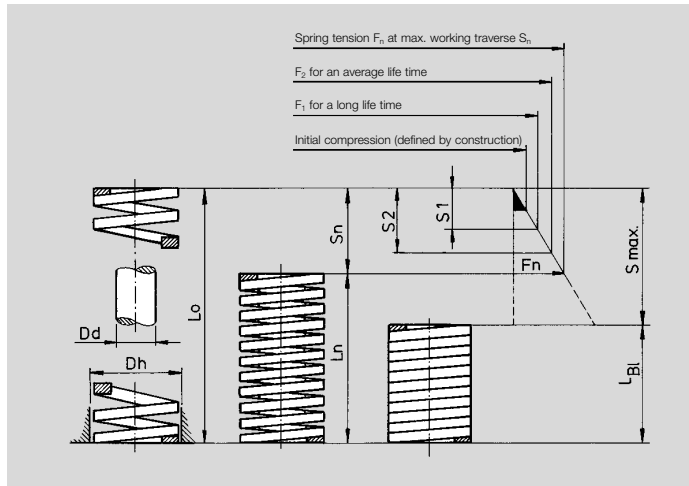
Tube Ø D_h^{H15}	Rod Ø D_{dh15}	Unloaded length L_0	Green light load		Blue medium load		Red heavy load		Yellow extra heavy load	
			c	Order number	c	Order number	c	Order number	c	Order number
10	5	25	10	SZ 8010.10 x 025	16,0	SZ 8020.10 x 025	22,1	SZ 8030.10 x 025	36,8	SZ 8040.10 x 025
10	5	32	8,5	SZ 8010.10 x 032	13,0	SZ 8020.10 x 032	17,5	SZ 8030.10 x 032	27,9	SZ 8040.10 x 032
10	5	38	6,8	SZ 8010.10 x 038	11,9	SZ 8020.10 x 038	17,1	SZ 8030.10 x 038	23,7	SZ 8040.10 x 038
10	5	44	6,0	SZ 8010.10 x 044	10,3	SZ 8020.10 x 044	15,0	SZ 8030.10 x 044	19,2	SZ 8040.10 x 044
10	5	51	5,0	SZ 8010.10 x 051	8,9	SZ 8020.10 x 051	12,8	SZ 8030.10 x 051	16,5	SZ 8040.10 x 051
10	5	64	4,3	SZ 8010.10 x 064	7,5	SZ 8020.10 x 064	10,7	SZ 8030.10 x 064	13,2	SZ 8040.10 x 064
10	5	76	3,2	SZ 8010.10 x 076	5,3	SZ 8020.10 x 076	7,5	SZ 8030.10 x 076	10,9	SZ 8040.10 x 076
10	5	305	1,1	SZ 8010.10 x 305	1,6	SZ 8020.10 x 305	2,1	SZ 8030.10 x 305	2,6	SZ 8040.10 x 305
12,5	6,3	25	17,9	SZ 8010.13 x 025	30,0	SZ 8020.13 x 025	42,1	SZ 8030.13 x 025	58,5	SZ 8040.13 x 025
12,5	6,3	32	16,4	SZ 8010.13 x 032	24,8	SZ 8020.13 x 032	33,2	SZ 8030.13 x 032	43,9	SZ 8040.13 x 032
12,5	6,3	38	13,6	SZ 8010.13 x 038	21,4	SZ 8020.13 x 038	29,3	SZ 8030.13 x 038	36,0	SZ 8040.13 x 038
12,5	6,3	44	12,1	SZ 8010.13 x 044	18,5	SZ 8020.13 x 044	24,6	SZ 8030.13 x 044	30,3	SZ 8040.13 x 044
12,5	6,3	51	11,4	SZ 8010.13 x 051	15,5	SZ 8020.13 x 051	19,6	SZ 8030.13 x 051	26,2	SZ 8040.13 x 051
12,5	6,3	64	9,3	SZ 8010.13 x 064	12,1	SZ 8020.13 x 064	15,0	SZ 8030.13 x 064	21,2	SZ 8040.13 x 064
12,5	6,3	76	7,1	SZ 8010.13 x 076	10,2	SZ 8020.13 x 076	13,2	SZ 8030.13 x 076	17,1	SZ 8040.13 x 076
12,5	6,3	89	5,4	SZ 8010.13 x 089	8,4	SZ 8020.13 x 089	11,4	SZ 8030.13 x 089	14,5	SZ 8040.13 x 089
12,5	6,3	102	4,6	SZ 8010.13 x 102	7,1	SZ 8020.13 x 102	9,4	SZ 8030.13 x 102	12,5	SZ 8040.13 x 102
12,5	6,3	305	1,4	SZ 8010.13 x 305	2,1	SZ 8020.13 x 305	2,8	SZ 8030.13 x 305	4,3	SZ 8040.13 x 305
16	8	25	23,4	SZ 8010.16 x 025	49,4	SZ 8020.16 x 025	75,7	SZ 8030.16 x 025	118,0	SZ 8040.16 x 025
16	8	32	22,9	SZ 8010.16 x 032	37,1	SZ 8020.16 x 032	52,8	SZ 8030.16 x 032	89,0	SZ 8040.16 x 032
16	8	38	19,3	SZ 8010.16 x 038	33,9	SZ 8020.16 x 038	48,5	SZ 8030.16 x 038	72,1	SZ 8040.16 x 038
16	8	44	17,1	SZ 8010.16 x 044	30,0	SZ 8020.16 x 044	42,8	SZ 8030.16 x 044	60,9	SZ 8040.16 x 044
16	8	51	15,7	SZ 8010.16 x 051	26,4	SZ 8020.16 x 051	37,1	SZ 8030.16 x 051	52,3	SZ 8040.16 x 051
16	8	64	10,7	SZ 8010.16 x 064	20,5	SZ 8020.16 x 064	30,3	SZ 8030.16 x 064	41,2	SZ 8040.16 x 064
16	8	76	10,0	SZ 8010.16 x 076	17,8	SZ 8020.16 x 076	25,7	SZ 8030.16 x 076	34,1	SZ 8040.16 x 076
16	8	89	8,6	SZ 8010.16 x 089	15,2	SZ 8020.16 x 089	21,7	SZ 8030.16 x 089	29,5	SZ 8040.16 x 089
16	8	102	7,8	SZ 8010.16 x 102	13,5	SZ 8020.16 x 102	19,3	SZ 8030.16 x 102	25,6	SZ 8040.16 x 102
16	8	305	2,5	SZ 8010.16 x 305	4,8	SZ 8020.16 x 305	7,1	SZ 8030.16 x 305	8,4	SZ 8040.16 x 305
20	10	25	55,8	SZ 8010.20 x 025	98,0	SZ 8020.20 x 025	216,0	SZ 8030.20 x 025	293,0	SZ 8040.20 x 025
20	10	32	45,0	SZ 8010.20 x 032	72,6	SZ 8020.20 x 032	168,0	SZ 8030.20 x 032	224,0	SZ 8040.20 x 032
20	10	38	33,3	SZ 8010.20 x 038	56,0	SZ 8020.20 x 038	129,0	SZ 8030.20 x 038	177,0	SZ 8040.20 x 038
20	10	44	30,0	SZ 8010.20 x 044	47,5	SZ 8020.20 x 044	112,0	SZ 8030.20 x 044	149,0	SZ 8040.20 x 044
20	10	51	24,5	SZ 8010.20 x 051	41,7	SZ 8020.20 x 051	94,0	SZ 8030.20 x 051	128,0	SZ 8040.20 x 051
20	10	64	20,0	SZ 8010.20 x 064	32,3	SZ 8020.20 x 064	72,1	SZ 8030.20 x 064	99,0	SZ 8040.20 x 064
20	10	76	16,0	SZ 8010.20 x 076	25,1	SZ 8020.20 x 076	59,7	SZ 8030.20 x 076	81,7	SZ 8040.20 x 076
20	10	89	14,0	SZ 8010.20 x 089	22,0	SZ 8020.20 x 089	50,5	SZ 8030.20 x 089	69,5	SZ 8040.20 x 089
20	10	102	12,0	SZ 8010.20 x 102	19,8	SZ 8020.20 x 102	44,2	SZ 8030.20 x 102	60,6	SZ 8040.20 x 102
20	10	115	10,9	SZ 8010.20 x 115	18,1	SZ 8020.20 x 115	38,4	SZ 8030.20 x 115	53,0	SZ 8040.20 x 115
20	10	127	9,5	SZ 8010.20 x 127	16,6	SZ 8020.20 x 127	34,1	SZ 8030.20 x 127	47,5	SZ 8040.20 x 127
20	10	139	8,4	SZ 8010.20 x 139	15,1	SZ 8020.20 x 139	31,0	SZ 8030.20 x 139	43,0	SZ 8040.20 x 139
20	10	152	7,5	SZ 8010.20 x 152	13,2	SZ 8020.20 x 152	28,2	SZ 8030.20 x 152	39,0	SZ 8040.20 x 152
20	10	305	4,0	SZ 8010.20 x 305	6,1	SZ 8020.20 x 305	15,0	SZ 8030.20 x 305	21,2	SZ 8040.20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{dh15}	Unloaded length L ₀	Green light load c	Blue medium load		Red heavy load		Yellow extra heavy load	
				Order number	c	Order number	c	Order number	c
25	12,5	25	100,0	SZ 8010.25 x 025	147,0	SZ 8020.25 x 025	375,0	SZ 8030.25 x 025	—
25	12,5	32	80,3	SZ 8010.25 x 032	118,0	SZ 8020.25 x 032	297,0	SZ 8030.25 x 032	374,4
25	12,5	38	62,0	SZ 8010.25 x 038	93,0	SZ 8020.25 x 038	219,0	SZ 8030.25 x 038	346,0
25	12,5	44	52,9	SZ 8010.25 x 044	80,0	SZ 8020.25 x 044	187,0	SZ 8030.25 x 044	244,0
25	12,5	51	44,0	SZ 8010.25 x 051	68,6	SZ 8020.25 x 051	156,0	SZ 8030.25 x 051	207,5
25	12,5	64	35,2	SZ 8010.25 x 064	53,0	SZ 8020.25 x 064	123,0	SZ 8030.25 x 064	161,0
25	12,5	76	28,0	SZ 8010.25 x 076	43,2	SZ 8020.25 x 076	99,0	SZ 8030.25 x 076	130,8
25	12,5	89	24,0	SZ 8010.25 x 089	38,2	SZ 8020.25 x 089	84,0	SZ 8030.25 x 089	110,5
25	12,5	102	21,1	SZ 8010.25 x 102	33,0	SZ 8020.25 x 102	73,0	SZ 8030.25 x 102	96,3
25	12,5	115	18,7	SZ 8010.25 x 115	28,0	SZ 8020.25 x 115	65,0	SZ 8030.25 x 115	85,7
25	12,5	127	16,7	SZ 8010.25 x 127	25,9	SZ 8020.25 x 127	57,7	SZ 8030.25 x 127	76,3
25	12,5	139	15,3	SZ 8010.25 x 139	23,2	SZ 8020.25 x 139	52,7	SZ 8030.25 x 139	—
25	12,5	152	14,0	SZ 8010.25 x 152	20,8	SZ 8020.25 x 152	47,8	SZ 8030.25 x 152	63,5
25	12,5	178	12,5	SZ 8010.25 x 178	17,8	SZ 8020.25 x 178	41,0	SZ 8030.25 x 178	53,9
25	12,5	203	10,4	SZ 8010.25 x 203	15,8	SZ 8020.25 x 203	35,8	SZ 8030.25 x 203	47,0
25	12,5	305	7,0	SZ 8010.25 x 305	10,2	SZ 8020.25 x 305	22,9	SZ 8030.25 x 305	30,9
32	16	38	94,0	SZ 8010.32 x 038	185,0	SZ 8020.32 x 038	388,0	SZ 8030.32 x 038	528,2
32	16	44	79,5	SZ 8010.32 x 044	158,0	SZ 8020.32 x 044	324,0	SZ 8030.32 x 044	424,4
32	16	51	67,0	SZ 8010.32 x 051	134,0	SZ 8020.32 x 051	272,0	SZ 8030.32 x 051	353,0
32	16	64	53,0	SZ 8010.32 x 064	99,0	SZ 8020.32 x 064	212,0	SZ 8030.32 x 064	269,2
32	16	76	44,0	SZ 8010.32 x 076	80,5	SZ 8020.32 x 076	172,0	SZ 8030.32 x 076	218,5
32	16	89	37,2	SZ 8010.32 x 089	69,1	SZ 8020.32 x 089	141,0	SZ 8030.32 x 089	180,3
32	16	102	32,0	SZ 8010.32 x 102	58,8	SZ 8020.32 x 102	122,0	SZ 8030.32 x 102	155,0
32	16	115	29,0	SZ 8010.32 x 115	51,5	SZ 8020.32 x 115	107,0	SZ 8030.32 x 115	140,0
32	16	127	25,0	SZ 8010.32 x 127	44,8	SZ 8020.32 x 127	93,0	SZ 8030.32 x 127	124,0
32	16	139	23,0	SZ 8010.32 x 139	42,3	SZ 8020.32 x 139	86,0	SZ 8030.32 x 139	—
32	16	152	21,5	SZ 8010.32 x 152	37,8	SZ 8020.32 x 152	78,0	SZ 8030.32 x 152	102,0
32	16	178	18,2	SZ 8010.32 x 178	32,5	SZ 8020.32 x 178	67,2	SZ 8030.32 x 178	88,2
32	16	203	15,8	SZ 8010.32 x 203	28,9	SZ 8020.32 x 203	59,1	SZ 8030.32 x 203	76,0
32	16	254	12,5	SZ 8010.32 x 254	21,4	SZ 8020.32 x 254	46,4	SZ 8030.32 x 254	60,8
32	16	305	10,3	SZ 8010.32 x 305	18,3	SZ 8020.32 x 305	38,0	SZ 8030.32 x 305	49,0
40	20	51	92,0	SZ 8010.40 x 051	181,6	SZ 8020.40 x 051	350,0	SZ 8030.40 x 051	628,0
40	20	64	73,0	SZ 8010.40 x 064	140,0	SZ 8020.40 x 064	269,0	SZ 8030.40 x 064	487,0
40	20	76	63,0	SZ 8010.40 x 076	108,0	SZ 8020.40 x 076	219,0	SZ 8030.40 x 076	379,0
40	20	89	51,0	SZ 8010.40 x 089	90,7	SZ 8020.40 x 089	190,0	SZ 8030.40 x 089	321,0
40	20	102	43,0	SZ 8010.40 x 102	81,0	SZ 8020.40 x 102	163,0	SZ 8030.40 x 102	281,0
40	20	115	39,6	SZ 8010.40 x 115	71,8	SZ 8020.40 x 115	142,0	SZ 8030.40 x 115	245,0
40	20	127	37,0	SZ 8010.40 x 127	62,7	SZ 8020.40 x 127	128,0	SZ 8030.40 x 127	221,0
40	20	139	32,0	SZ 8010.40 x 139	57,5	SZ 8020.40 x 139	115,0	SZ 8030.40 x 139	202,0
40	20	152	28,0	SZ 8010.40 x 152	51,6	SZ 8020.40 x 152	105,0	SZ 8030.40 x 152	168,0
40	20	178	25,2	SZ 8010.40 x 178	44,1	SZ 8020.40 x 178	89,0	SZ 8030.40 x 178	140,0
40	20	203	22,7	SZ 8010.40 x 203	36,7	SZ 8020.40 x 203	77,0	SZ 8030.40 x 203	132,0
40	20	254	17,0	SZ 8010.40 x 254	30,1	SZ 8020.40 x 254	61,0	SZ 8030.40 x 254	107,0
40	20	305	14,8	SZ 8010.40 x 305	24,6	SZ 8020.40 x 305	51,0	SZ 8030.40 x 305	87,8
50	25	64	156,0	SZ 8010.50 x 064	209,0	SZ 8020.50 x 064	413,0	SZ 8030.50 x 064	709,0
50	25	76	125,0	SZ 8010.50 x 076	168,0	SZ 8020.50 x 076	339,0	SZ 8030.50 x 076	572,0
50	25	89	109,0	SZ 8010.50 x 089	140,0	SZ 8020.50 x 089	288,0	SZ 8030.50 x 089	475,0
50	25	102	94,0	SZ 8010.50 x 102	119,0	SZ 8020.50 x 102	245,0	SZ 8030.50 x 102	405,0
50	25	115	81,0	SZ 8010.50 x 115	106,0	SZ 8020.50 x 115	215,0	SZ 8030.50 x 115	352,0
50	25	127	71,0	SZ 8010.50 x 127	97,0	SZ 8020.50 x 127	192,0	SZ 8030.50 x 127	316,0
50	25	139	66,5	SZ 8010.50 x 139	87,0	SZ 8020.50 x 139	168,0	SZ 8030.50 x 139	289,0
50	25	152	60,0	SZ 8010.50 x 152	80,0	SZ 8020.50 x 152	154,0	SZ 8030.50 x 152	239,0
50	25	178	52,0	SZ 8010.50 x 178	69,5	SZ 8020.50 x 178	134,0	SZ 8030.50 x 178	226,0
50	25	203	44,0	SZ 8010.50 x 203	59,8	SZ 8020.50 x 203	117,0	SZ 8030.50 x 203	187,0
50	25	254	35,0	SZ 8010.50 x 254	43,9	SZ 8020.50 x 254	89,0	SZ 8030.50 x 254	153,0
50	25	305	28,5	SZ 8010.50 x 305	38,6	SZ 8020.50 x 305	73,0	SZ 8030.50 x 305	127,0
63	38	76	189,0	SZ 8010.63 x 076	312,0	SZ 8020.63 x 076	630,0	SZ 8030.63 x 076	842,0
63	38	89	158,0	SZ 8010.63 x 089	260,0	SZ 8020.63 x 089	485,0	SZ 8030.63 x 089	726,0
63	38	102	131,0	SZ 8010.63 x 102	221,0	SZ 8020.63 x 102	434,0	SZ 8030.63 x 102	656,0
63	38	115	116,0	SZ 8010.63 x 115	187,0	SZ 8020.63 x 115	384,0	SZ 8030.63 x 115	534,0
63	38	127	103,0	SZ 8010.63 x 127	168,0	SZ 8020.63 x 127	349,0	SZ 8030.63 x 127	480,0
63	38	152	84,3	SZ 8010.63 x 152	136,0	SZ 8020.63 x 152	276,0	SZ 8030.63 x 152	396,0
63	38	178	71,5	SZ 8010.63 x 178	114,0	SZ 8020.63 x 178	237,0	SZ 8030.63 x 178	335,0
63	38	203	61,7	SZ 8010.63 x 203	100,0	SZ 8020.63 x 203	210,0	SZ 8030.63 x 203	297,0
63	38	254	47,0	SZ 8010.63 x 254	78,4	SZ 8020.63 x 254	165,0	SZ 8030.63 x 254	235,0
63	38	305	38,2	SZ 8010.63 x 305	64,7	SZ 8020.63 x 305	134,0	SZ 8030.63 x 305	194,0

System springs SZ 8005

for extra light load, colour purple

STEINEL[®]
NORMALIEN



Helical compression springs for extra light load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for extra light load **SZ 8005**



$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**

Order number **SZ 8005.25 x 076**


Add size to order number

Order number **SZ 8005.** x

Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire 	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 25\%$ in mm	F_1 in N	medium life $s_2 = 35\%$ in mm	F_2 in N	max. working traverse $s_n = 50\%$ in mm	F_n in N	max. travel stroke S_{max}	
20	10	4,0 x 1,7	25	32,1	6,3	202	8,8	281	12,5	401	14	20 x 025
20	10		32	24,7	8,0	198	11,2	277	16,0	395	18	20 x 032
20	10		38	20,7	9,5	197	13,3	275	19,0	393	22	20 x 038
20	10		44	17,8	11,0	196	15,4	275	22,0	392	26	20 x 044
20	10		51	15,3	12,8	196	17,9	273	25,5	390	30	20 x 051
20	10		64	12,1	16,0	194	22,4	270	32,0	386	38	20 x 064
20	10		76	10,2	19,0	194	26,6	270	38,0	386	45	20 x 076
20	10		89	8,6	22,3	192	31,1	269	44,5	384	53	20 x 089
20	10		102	7,5	25,5	191	35,7	269	51,0	384	62	20 x 102
20	10		115	6,7	28,8	193	40,3	269	57,5	384	70	20 x 115
20	10		127	6,1	31,8	194	44,5	270	63,5	386	77	20 x 127
20	10		139	5,5	34,8	191	48,7	269	69,5	385	85	20 x 139
20	10		152	5,1	38,0	194	53,2	269	76,0	384	93	20 x 152
20	10		305	2,5	76,3	191	106,8	266	151,0	380	188	20 x 305
25	12,5	5,3 x 2,2	25	52,7	6,3	332	8,8	461	12,5	658	14	25 x 025
25	12,5		32	40,0	8,0	320	11,2	448	16,0	640	18	25 x 032
25	12,5		38	33,3	9,5	316	13,3	444	19,0	634	22	25 x 038
25	12,5		44	28,6	11,0	315	15,4	440	22,0	629	25	25 x 044
25	12,5		51	24,7	12,8	316	17,9	441	25,5	630	30	25 x 051
25	12,5		64	19,4	16,0	310	22,4	435	32,0	622	38	25 x 064
25	12,5		76	16,3	19,0	310	26,6	433	38,0	618	45	25 x 076
25	12,5		89	13,9	22,3	310	31,1	433	44,5	618	53	25 x 089
25	12,5		102	12,1	25,5	309	35,7	433	51,0	618	61	25 x 102
25	12,5		115	10,8	28,8	311	40,3	433	57,5	619	70	25 x 115
25	12,5		127	9,8	31,8	312	44,5	434	63,5	620	77	25 x 127
25	12,5		139	8,9	34,8	310	48,7	433	69,5	618	85	25 x 139
25	12,5		152	8,1	38,0	308	53,2	431	76,0	616	93	25 x 152
25	12,5		178	6,9	44,5	307	62,3	431	89,0	616	109	25 x 178
25	12,5		203	6,1	50,8	309	71,0	431	101,5	615	124	25 x 203
25	12,5		305	4,0	76,3	305	106,8	429	152,5	613	188	25 x 305
32	16	6,4 x 2,6	38	43,8	9,5	416	13,3	582	19,0	831	22	32 x 038
32	16		44	37,5	11,0	412	15,4	578	22,0	825	26	32 x 044
32	16		51	32,3	12,8	413	17,9	576	25,5	823	31	32 x 051
32	16		64	25,4	16,0	406	22,4	569	32,0	813	39	32 x 064
32	16		76	21,3	19,0	405	26,6	566	38,0	809	47	32 x 076
32	16		89	18,1	22,3	404	31,1	563	44,5	804	56	32 x 089
32	16		102	15,8	25,5	403	35,7	562	51,0	803	64	32 x 102
32	16		115	13,9	28,8	400	40,3	560	57,5	800	73	32 x 115
32	16		127	12,6	31,8	401	44,5	559	63,5	799	81	32 x 127
32	16		139	11,4	34,8	397	48,7	557	69,5	796	89	32 x 139
32	16		152	10,5	38,0	399	53,2	560	76,0	800	97	32 x 152
32	16		178	8,9	44,5	396	62,3	558	89,0	796	114	32 x 178
32	16		203	7,8	50,8	396	71,0	555	101,5	793	131	32 x 203
32	16		254	6,2	63,5	394	88,9	549	127,0	784	163	32 x 254
32	16		305	5,2	76,3	397	106,8	552	152,5	788	197	32 x 305

Add
size to
order number

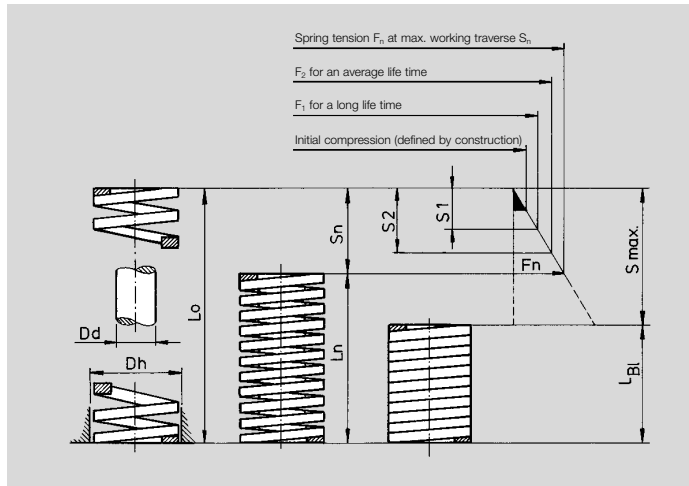
Order number **SZ 8005**. x

Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire 	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 25\%$ in mm	F_1 in N	medium life $s_2 = 35\%$ in mm	F_2 in N	max. working traverse $s_n = 50\%$ in mm	F_n in N	max. travel stroke s_{max}	\blacktriangle
40	20	7,8 x 3,4	51	50,8	12,8	650	17,9	908	25,5	1297	26	40 x 051
40	20		64	39,7	16,0	635	22,4	888	32,0	1269	34	40 x 064
40	20		76	33,1	19,0	629	26,6	879	38,0	1256	40	40 x 076
40	20		89	28,1	22,3	627	31,1	874	44,5	1249	48	40 x 089
40	20		102	24,5	25,5	625	35,7	874	51,0	1249	55	40 x 102
40	20		115	21,6	28,8	622	40,3	871	57,5	1244	63	40 x 115
40	20		127	19,5	31,8	620	44,5	867	63,5	1239	70	40 x 127
40	20		139	17,8	34,8	619	48,7	867	69,5	1238	76	40 x 139
40	20		152	16,3	38,0	619	53,2	865	76,0	1235	84	40 x 152
40	20		178	13,8	44,5	614	62,3	862	89,0	1231	99	40 x 178
40	20		203	12,1	50,8	615	71,0	863	101,5	1232	113	40 x 203
40	20		254	9,7	63,5	616	88,9	859	127,0	1227	142	40 x 254
40	20		305	8,0	76,3	610	106,8	858	152,5	1226	171	40 x 305
50	25	10,7 x 4,4	64	80,2	16,0	1283	22,4	1796	32,0	2566	37	50 x 064
50	25		76	66,9	19,0	1271	26,6	1781	38,0	2544	45	50 x 076
50	25		89	56,6	22,3	1262	31,1	1763	44,5	2519	53	50 x 089
50	25		102	49,3	25,5	1257	35,7	1762	51,0	2517	62	50 x 102
50	25		115	43,5	28,8	1253	40,3	1751	57,5	2501	70	50 x 115
50	25		127	39,3	31,8	1250	44,5	1746	63,5	2494	78	50 x 127
50	25		139	35,8	34,8	1246	48,7	1742	69,5	2489	85	50 x 139
50	25		152	32,8	38,0	1246	53,2	1743	76,0	2490	94	50 x 152
50	25		178	27,8	44,5	1237	62,3	1731	89,0	2474	110	50 x 178
50	25		203	24,2	50,8	1230	71,0	1720	101,5	2457	126	50 x 203
50	25		254	19,2	63,5	1219	88,9	1711	127,0	2444	159	50 x 254
50	25		305	16,0	76,3	1221	106,8	1712	152,5	2446	192	50 x 305

System springs SZ 8010

for light load, colour green

STEINEL[®]
NORMALIEN



Helical compression springs for light load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for light load **SZ 8010**

$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**

Order number **SZ 8010.25 x 076**

ISO 10243


Add size to order number

Order number **SZ 8010.** x

Tube \varnothing D_{hH15}	Rod \varnothing D_{dh15}	Wire \varnothing	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 25\%$ in mm	F_1 in N	medium life $s_2 = 35\%$ in mm	F_2 in N	max. working traverse $s_n = 40\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
10	5	1,7x1,1	25	10,0	6,3	63	8,8	88	10,0	100	13	10 x 025
10	5		32	8,5	8,0	68	11,2	95	12,8	108	16	10 x 032
10	5		38	6,8	9,5	64	13,3	90	15,2	103	20	10 x 038
10	5		44	6,0	11,0	66	15,4	92	17,6	105	24	10 x 044
10	5		51	5,0	12,8	64	17,9	89	20,4	102	27	10 x 051
10	5		64	4,3	16,0	68	22,4	96	25,6	110	35	10 x 064
10	5		76	3,2	19,0	61	26,6	85	30,4	97	39	10 x 076
10	5		305	1,1	76,3	83	106,8	117	122,0	134	154	10 x 305
12,5	6,3	2,3x1,5	25	17,9	6,3	112	8,8	157	10,0	179	13	13 x 025
12,5	6,3		32	16,4	8,0	131	11,2	183	12,8	209	17	13 x 032
12,5	6,3		38	13,6	9,5	129	13,3	180	15,2	206	21	13 x 038
12,5	6,3		44	12,1	11,0	133	15,4	186	17,6	212	26	13 x 044
12,5	6,3		51	11,4	12,8	145	17,9	204	20,4	232	29	13 x 051
12,5	6,3		64	9,3	16,0	148	22,4	208	25,6	238	37	13 x 064
12,5	6,3		76	7,1	19,0	134	26,6	188	30,4	215	42	13 x 076
12,5	6,3		89	5,4	22,3	120	31,1	167	35,6	192	50	13 x 089
12,5	6,3		102	4,6	25,5	117	35,7	164	40,8	188	58	13 x 102
12,5	6,3		305	1,4	76,3	106	106,8	149	122,0	170	162	13 x 305
16	8	3,2x1,7	25	23,4	6,3	147	8,8	205	10,0	234	13	16 x 025
16	8		32	22,9	8,0	183	11,2	256	12,8	293	17	16 x 032
16	8		38	19,3	9,5	183	13,3	256	15,2	293	20	16 x 038
16	8		44	17,1	11,0	188	15,4	263	17,6	300	25	16 x 044
16	8		51	15,7	12,8	200	17,9	281	20,4	320	27	16 x 051
16	8		64	10,7	16,0	171	22,4	239	25,6	273	36	16 x 064
16	8		76	10,0	19,0	190	26,6	266	30,4	304	43	16 x 076
16	8		89	8,6	22,3	191	31,1	267	35,6	306	52	16 x 089
16	8		102	7,8	25,5	198	35,7	278	40,8	318	58	16 x 102
16	8		305	2,5	76,3	190	106,8	267	122,0	305	166	16 x 305
20	10	4,0x2,1	25	55,8	6,3	351	8,8	491	10,0	558	13	20 x 025
20	10		32	45,0	8,0	360	11,2	504	12,8	576	17	20 x 032
20	10		38	33,3	9,5	316	13,3	442	15,2	506	20	20 x 038
20	10		44	30,0	11,0	330	15,4	462	17,6	528	24	20 x 044
20	10		51	24,5	12,8	313	17,9	438	20,4	499	27	20 x 051
20	10		64	20,0	16,0	320	22,4	448	25,6	512	35	20 x 064
20	10		76	16,0	19,0	304	26,6	425	30,4	486	40	20 x 076
20	10		89	14,0	22,3	312	31,1	435	35,6	498	49	20 x 089
20	10		102	12,0	25,5	306	35,7	428	40,8	489	55	20 x 102
20	10		115	10,9	28,8	313	40,3	439	46,0	501	62	20 x 115
20	10		127	9,5	31,8	302	44,5	422	50,8	482	71	20 x 127
20	10		139	8,4	34,8	292	48,7	409	55,6	467	76	20 x 139
20	10		152	7,5	38,0	285	53,2	399	60,8	456	81	20 x 152
20	10		305	4,0	76,3	305	106,8	427	122,0	488	168	20 x 305

Add
size to
order number

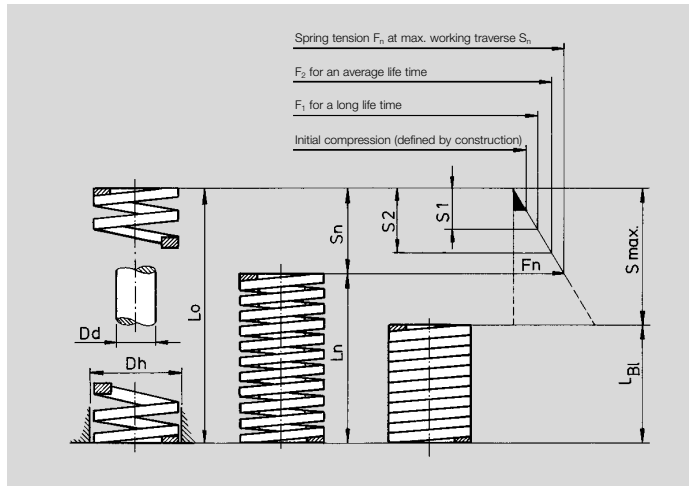
Order number **SZ 8010**. x

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c±10%	long life s ₁ = 25% in mm	F ₁ in N	medium life s ₂ = 35% in mm	F ₂ in N	max. working traverse s _n = 40% in mm	F _n in N	max. travel stroke S _{max}	▲
25	12,5	5,3x2,7	25	100,0	6,3	630	8,8	880	10,0	1000	12	25 x 025
25	12,5		32	80,3	8,0	642	11,2	899	12,8	1027	16	25 x 032
25	12,5		38	62,0	9,5	589	13,3	824	15,2	942	19	25 x 038
25	12,5		44	52,9	11,0	581	15,4	814	17,6	931	22	25 x 044
25	12,5		51	44,0	12,8	563	17,9	787	20,4	897	25	25 x 051
25	12,5		64	35,2	16,0	563	22,4	788	25,6	901	34	25 x 064
25	12,5		76	28,0	19,0	532	26,6	744	30,4	851	38	25 x 076
25	12,5		89	24,0	22,3	535	31,1	746	35,6	854	48	25 x 089
25	12,5		102	21,1	25,5	538	35,7	753	40,8	860	54	25 x 102
25	12,5		115	18,7	28,8	538	40,3	753	46,0	860	61	25 x 115
25	12,5		127	16,7	31,8	531	44,5	743	50,8	848	69	25 x 127
25	12,5		139	15,3	34,8	532	48,7	745	55,6	851	75	25 x 139
25	12,5		152	14,0	38,0	532	53,2	744	60,8	851	81	25 x 152
25	12,5		178	12,5	44,5	556	62,3	778	71,2	890	96	25 x 178
25	12,5		203	10,4	50,8	528	71,0	738	81,2	844	110	25 x 203
25	12,5		305	7,0	76,3	534	106,8	747	122,0	854	168	25 x 305
32	16	6,7x3,3	38	94,0	9,5	893	13,3	1250	15,2	1428	18	32 x 038
32	16		44	79,5	11,0	874	15,4	1224	17,6	1399	22	32 x 044
32	16		51	67,0	12,8	857	17,9	1199	20,4	1366	25	32 x 051
32	16		64	53,0	16,0	848	22,4	1187	25,6	1356	34	32 x 064
32	16		76	44,0	19,0	836	26,6	1170	30,4	1337	40	32 x 076
32	16		89	37,2	22,3	829	31,1	1156	35,6	1324	48	32 x 089
32	16		102	32,0	25,5	816	35,7	1142	40,8	1305	55	32 x 102
32	16		115	29,0	28,8	835	40,3	1168	46,0	1334	63	32 x 115
32	16		127	25,0	31,8	795	44,5	1112	50,8	1270	69	32 x 127
32	16		139	23,0	34,8	800	48,7	1120	55,6	1279	77	32 x 139
32	16		152	21,5	38,0	817	53,2	1143	60,8	1307	81	32 x 152
32	16		178	18,2	44,5	809	62,3	1133	71,2	1295	95	32 x 178
32	16		203	15,8	50,8	802	71,0	1121	81,2	1282	112	32 x 203
32	16		254	12,5	63,5	793	88,9	1111	101,6	1270	143	32 x 254
32	16		305	10,3	76,3	785	106,8	1100	122,0	1256	175	32 x 305
40	20	8,0x4,0	51	92,0	12,8	1177	17,9	1646	20,4	1876	25	40 x 051
40	20		64	73,0	16,0	1168	22,4	1635	25,6	1868	33	40 x 064
40	20		76	63,0	19,0	1197	26,6	1675	30,4	1915	39	40 x 076
40	20		89	51,0	22,3	1137	31,1	1586	35,6	1815	47	40 x 089
40	20		102	43,0	25,5	1096	35,7	1535	40,8	1754	54	40 x 102
40	20		115	39,6	28,8	1140	40,3	1595	46,0	1821	61	40 x 115
40	20		127	37,0	31,8	1176	44,5	1646	50,8	1879	66	40 x 127
40	20		139	32,0	34,8	1114	48,7	1558	55,6	1779	76	40 x 139
40	20		152	28,0	38,0	1064	53,2	1489	60,8	1702	81	40 x 152
40	20		178	25,2	44,5	1121	62,3	1569	71,2	1794	93	40 x 178
40	20		203	22,7	50,8	1153	71,0	1611	81,2	1843	110	40 x 203
40	20		254	17,0	63,5	1079	88,9	1511	101,6	1727	136	40 x 254
40	20		305	14,8	76,3	1129	106,8	1580	122,0	1805	163	40 x 305
50	25	11,5x5,5	64	156,0	16,0	2496	22,4	3494	25,6	3993	31	50 x 064
50	25		76	125,0	19,0	2375	26,6	3325	30,4	3800	36	50 x 076
50	25		89	109,0	22,3	2430	31,1	3389	35,6	3880	44	50 x 089
50	25		102	94,0	25,5	2397	35,7	3355	40,8	3835	49	50 x 102
50	25		115	81,0	28,8	2332	40,3	3264	46,0	3726	60	50 x 115
50	25		127	71,0	31,8	2257	44,5	3159	50,8	3606	64	50 x 127
50	25		139	66,5	34,8	2314	48,7	3239	55,6	3697	70	50 x 139
50	25		152	60,0	38,0	2280	53,2	3192	60,8	3648	77	50 x 152
50	25		178	52,0	44,5	2314	62,3	3239	71,2	3702	94	50 x 178
50	25		203	44,0	50,8	2235	71,0	3124	81,2	3572	105	50 x 203
50	25		254	35,0	63,5	2222	88,9	3111	101,6	3556	126	50 x 254
50	25		305	28,5	76,3	2174	106,8	3044	122,0	3477	168	50 x 305
63	38	11,6x7,7	76	189,0	19,0	3591	26,6	5027	30,4	5744	38	63 x 076
63	38		89	158,0	22,3	3523	31,1	4913	35,6	5624	45	63 x 089
63	38		102	131,0	25,5	3340	35,7	4676	40,8	5344	52	63 x 102
63	38		115	116,0	28,8	3340	40,3	4674	46,0	5336	60	63 x 115
63	38		127	103,0	31,8	3275	44,5	4583	50,8	5232	63	63 x 127
63	38		152	84,3	38,0	3203	53,2	4484	60,8	5125	78	63 x 152
63	38		178	71,5	44,5	3181	62,3	4454	71,2	5090	89	63 x 178
63	38		203	61,7	50,8	3134	71,0	4380	81,2	5010	108	63 x 203
63	38		254	47,0	63,5	2984	88,9	4178	101,6	4775	137	63 x 254
63	38		305	38,2	76,3	2914	106,8	4079	122,0	4660	163	63 x 305

System springs SZ 8020

for medium load, colour blue

STEINEL[®]
NORMALIEN



Helical compression springs for medium load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for medium load **SZ 8020**

$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**


Order number **SZ 8020.25 x 076**

ISO 10243

Add size to order number

Order number **SZ 8020.** x

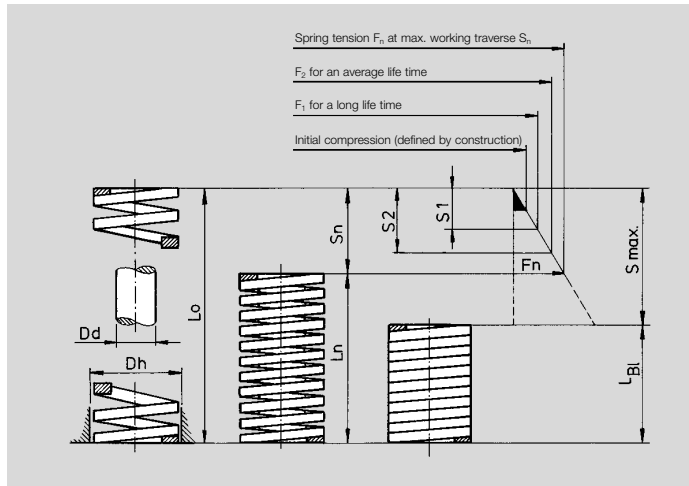
Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 20\%$ in mm	F_1 in N	medium life $s_2 = 25\%$ in mm	F_2 in N	max. working traverse $s_n = 35\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
10	5	1,8x1,2	25	16,0	5,0	80	6,3	100	8,8	140	12	10 x 025
10	5		32	13,0	6,4	83	8,0	104	11,2	145	14	10 x 032
10	5		38	11,9	7,6	90	9,5	113	13,3	158	19	10 x 038
10	5		44	10,3	8,8	90	11,4	117	15,4	158	23	10 x 044
10	5		51	8,9	10,2	90	12,8	113	17,9	159	27	10 x 051
10	5		64	7,5	12,8	96	16,0	120	22,4	168	31	10 x 064
10	5		76	5,3	15,2	80	19,0	100	26,6	140	37	10 x 076
10	5		305	1,6	61,0	97	76,3	122	106,8	170	137	10 x 305
12,5	6,3	2,5x1,7	25	30,0	5,0	150	6,3	189	8,8	264	10	13 x 025
12,5	6,3		32	24,8	6,4	158	8,0	198	11,2	277	13	13 x 032
12,5	6,3		38	21,4	7,6	162	9,5	203	13,3	284	16	13 x 038
12,5	6,3		44	18,5	8,8	162	11,0	203	15,4	284	20	13 x 044
12,5	6,3		51	15,5	10,2	158	12,8	198	17,9	277	25	13 x 051
12,5	6,3		64	12,1	12,8	154	16,0	193	22,4	271	28	13 x 064
12,5	6,3		76	10,2	15,2	155	19,0	193	26,6	271	34	13 x 076
12,5	6,3		89	8,4	17,8	149	22,3	187	31,1	261	41	13 x 089
12,5	6,3		102	7,1	20,4	145	25,5	181	35,7	253	46	13 x 102
12,5	6,3		305	2,1	61,0	128	76,3	160	106,8	224	128	13 x 305
16	8	3,2x2,0	25	49,4	5,0	247	6,3	311	8,8	434	11	16 x 025
16	8		32	37,1	6,4	237	8,0	296	11,2	415	15	16 x 032
16	8		38	33,9	7,6	257	9,5	322	13,3	450	18	16 x 038
16	8		44	30,0	8,8	264	11,0	330	15,4	462	22	16 x 044
16	8		51	26,4	10,2	269	12,8	337	17,9	472	24	16 x 051
16	8		64	20,5	12,8	262	16,0	328	22,4	459	32	16 x 064
16	8		76	17,8	15,2	270	19,0	338	26,6	473	36	16 x 076
16	8		89	15,2	17,8	270	22,3	338	31,1	472	43	16 x 089
16	8		102	13,5	20,4	275	25,5	344	35,7	481	47	16 x 102
16	8		305	4,8	61,0	292	76,3	366	106,8	512	139	16 x 305
20	10	4,0x2,4	25	98,0	5,0	490	6,3	617	8,8	862	10	20 x 025
20	10		32	72,6	6,4	464	8,0	580	11,2	813	13	20 x 032
20	10		38	56,0	7,6	425	9,5	532	13,3	744	16	20 x 038
20	10		44	47,5	8,8	418	11,0	522	15,4	731	19	20 x 044
20	10		51	41,7	10,2	425	12,8	533	17,9	746	21	20 x 051
20	10		64	32,3	12,8	413	16,0	516	22,4	723	28	20 x 064
20	10		76	25,1	15,2	381	19,0	476	26,6	667	33	20 x 076
20	10		89	22,0	17,8	391	22,3	490	31,1	684	41	20 x 089
20	10		102	19,8	20,4	403	25,5	504	35,7	706	48	20 x 102
20	10		115	18,1	23,0	416	28,8	521	40,3	729	55	20 x 115
20	10		127	16,6	25,4	421	31,8	527	44,5	738	61	20 x 127
20	10		139	15,1	27,8	420	34,8	525	48,7	735	67	20 x 139
20	10		152	13,2	30,4	401	38,0	501	53,2	702	74	20 x 152
20	10		305	6,1	61,0	372	76,3	465	106,8	651	146	20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c ± 10%	long life s ₁ = 20% in mm	F ₁ in N	medium life s ₂ = 25% in mm	F ₂ in N	max. working traverse s _n = 35% in mm	F _n in N	max. travel stroke S _{max}	▲
25	12,5	5,3x3,1	25	147,0	5,0	735	6,3	926	8,8	1293	11	25 x 025
25	12,5		32	118,0	6,4	755	8,0	944	11,2	1321	13	25 x 032
25	12,5		38	93,0	7,6	706	9,5	883	13,3	1236	18	25 x 038
25	12,5		44	80,8	8,8	711	11,0	888	15,4	1244	21	25 x 044
25	12,5		51	68,6	10,2	699	12,8	878	17,9	1227	23	25 x 051
25	12,5		64	53,0	12,8	678	16,0	848	22,4	1187	30	25 x 064
25	12,5		76	43,2	15,2	656	19,0	820	26,6	1149	35	25 x 076
25	12,5		89	38,2	17,8	679	22,3	851	31,1	1188	43	25 x 089
25	12,5		102	33,0	20,4	673	25,5	841	35,7	1178	49	25 x 102
25	12,5		115	28,0	23,0	644	28,8	806	40,3	1128	56	25 x 115
25	12,5		127	25,9	25,4	657	31,8	823	44,5	1152	60	25 x 127
25	12,5		139	23,2	27,8	645	34,8	807	48,7	1130	65	25 x 139
25	12,5		152	20,8	30,4	632	38,0	790	53,2	1106	71	25 x 152
25	12,5		178	17,8	35,6	633	44,5	792	62,3	1108	85	25 x 178
25	12,5		203	15,8	40,6	641	50,8	802	71,0	1121	96	25 x 203
25	12,5		305	10,2	61,0	622	76,3	778	106,8	1089	150	25 x 305
32	16	6,8x4,0	38	185,0	7,6	1406	9,5	1757	13,3	2460	17	32 x 038
32	16		44	158,0	8,8	1390	11,0	1738	15,4	2433	19	32 x 044
32	16		51	134,0	10,2	1366	12,8	1715	17,9	2398	23	32 x 051
32	16		64	99,0	12,8	1267	16,0	1584	22,4	2217	30	32 x 064
32	16		76	80,5	15,2	1223	19,0	1529	26,6	2141	34	32 x 076
32	16		89	69,1	17,8	1229	22,3	1540	31,1	2149	42	32 x 089
32	16		102	58,8	20,4	1199	25,5	1499	35,7	2099	47	32 x 102
32	16		115	51,5	23,0	1184	28,8	1483	40,3	2059	55	32 x 115
32	16		127	44,8	25,4	1137	31,8	1424	44,5	1993	61	32 x 127
32	16		139	42,3	27,8	1176	34,8	1472	48,7	2060	68	32 x 139
32	16		152	37,8	30,4	1149	38,0	1436	53,2	2010	75	32 x 152
32	16		178	32,5	35,6	1157	44,5	1446	62,3	2024	89	32 x 178
32	16		203	28,9	40,6	1173	50,8	1468	71,0	2051	101	32 x 203
32	16		254	21,4	50,8	1097	63,5	1358	88,9	1902	124	32 x 254
32	16		305	18,3	61,0	1116	76,3	1396	106,8	1954	150	32 x 305
40	20	8,1x4,8	51	181,6	10,2	1852	12,8	2324	17,9	3250	21	40 x 051
40	20		64	140,0	12,8	1792	16,0	2240	22,4	3136	28	40 x 064
40	20		76	108,0	15,2	1641	19,0	2052	26,6	2872	33	40 x 076
40	20		89	90,7	17,8	1614	22,3	2022	31,1	2820	41	40 x 089
40	20		102	81,0	20,4	1652	25,5	2065	35,7	2891	45	40 x 102
40	20		115	71,8	23,0	1651	28,8	2067	40,3	2893	52	40 x 115
40	20		127	62,7	25,4	1592	31,8	1993	44,5	2790	59	40 x 127
40	20		139	57,5	27,8	1599	34,8	2001	48,7	2800	66	40 x 139
40	20		152	51,6	30,4	1568	38,0	1960	53,2	2745	71	40 x 152
40	20		178	44,1	35,6	1569	44,5	1962	62,3	2747	83	40 x 178
40	20		203	36,7	40,6	1490	50,8	1864	71,0	2605	94	40 x 203
40	20		254	30,1	50,8	1529	63,5	1911	88,9	2675	114	40 x 254
40	20		305	24,6	61,0	1500	76,3	1876	106,8	2627	148	40 x 305
50	25	10,9x6,0	64	209,0	12,8	2775	16,0	3344	22,4	4681	30	50 x 064
50	25		76	168,0	15,2	2553	19,0	3192	26,6	4468	36	50 x 076
50	25		89	140,0	17,8	2492	22,3	3122	31,1	4354	43	50 x 089
50	25		102	119,0	20,4	2427	25,5	3034	35,7	4248	48	50 x 102
50	25		115	106,0	23,0	2438	28,8	3052	40,3	4271	55	50 x 115
50	25		127	97,0	25,4	2463	31,8	3084	44,5	4316	63	50 x 127
50	25		139	87,0	27,8	2419	34,8	3028	48,7	4237	66	50 x 139
50	25		152	80,0	30,4	2432	38,0	3040	53,2	4256	72	50 x 152
50	25		178	69,5	35,6	2474	44,5	3092	62,3	4329	85	50 x 178
50	25		203	59,8	40,6	2427	50,8	3037	71,0	4245	95	50 x 203
50	25		254	43,9	50,8	2230	63,5	2787	88,9	3902	125	50 x 254
50	25		305	38,6	61,0	2354	76,3	2945	106,8	4122	150	50 x 305
63	38	11,5x9,3	76	312,0	15,2	4742	19,0	5928	26,6	8299	30	63 x 076
63	38		89	260,0	17,8	4628	22,3	5798	31,1	8086	38	63 x 089
63	38		102	221,0	20,4	4508	25,5	5635	35,7	7889	43	63 x 102
63	38		115	178,0	23,0	4301	28,8	5385	40,3	7536	50	63 x 115
63	38		127	168,0	25,4	4267	31,8	5342	44,5	7476	52	63 x 127
63	38		152	136,0	30,4	4134	38,0	5168	53,2	7235	67	63 x 152
63	38		178	114,0	35,6	4058	44,5	5073	62,3	7102	78	63 x 178
63	38		203	100,0	40,6	4060	50,8	5080	71,0	7100	88	63 x 203
63	38		254	78,4	50,8	3982	63,5	4978	88,9	6969	115	63 x 254
63	38		305	64,7	61,0	3946	76,3	4936	106,8	6909	134	63 x 305

System springs SZ 8030

for heavy load, colour red

STEINEL[®]
NORMALIEN



Helical compression springs for heavy load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for heavy load **SZ 8030**

$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**


Order number **SZ 8030.25 x 076**

ISO 10243

Add size to order number

Order number **SZ 8030.** x

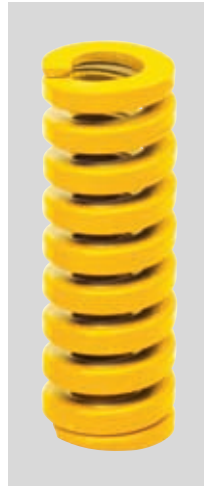
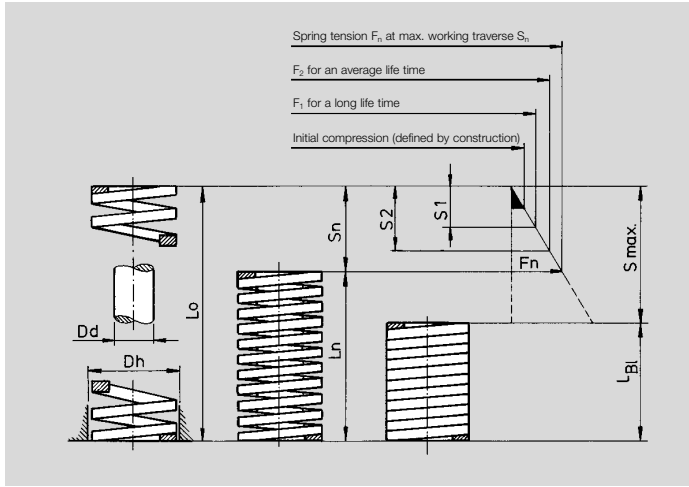
Tube \varnothing D_{hH15}	Rod \varnothing D_{dh15}	Wire \varnothing	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 15\%$ in mm	F_1 in N	medium life $s_2 = 20\%$ in mm	F_2 in N	max. working traverse $s_n = 30\%$ in mm	F_n in N	max. travel stroke S_{max}	\blacktriangle
10	5	1,9x1,5	25	22,1	3,7	81	5,0	110	7,5	165	9	10 x 025
10	5		32	17,5	4,8	84	6,4	112	9,6	168	12	10 x 032
10	5		38	17,1	5,7	97	7,6	129	11,4	194	15	10 x 038
10	5		44	15,0	6,6	99	8,8	132	13,2	198	17	10 x 044
10	5		51	12,8	7,6	97	10,2	130	15,3	195	21	10 x 051
10	5		64	10,7	9,6	102	12,8	136	19,2	205	26	10 x 064
10	5		76	7,5	11,4	85	15,2	114	22,8	171	31	10 x 076
10	5		305	2,1	45,7	95	61,0	128	91,5	192	122	10 x 305
12,5	6,3	2,4x2,0	25	42,1	3,7	155	5,0	210	7,5	315	9	13 x 025
12,5	6,3		32	33,2	4,8	159	6,4	212	9,6	318	13	13 x 032
12,5	6,3		38	29,3	5,7	167	7,6	222	11,4	334	15	13 x 038
12,5	6,3		44	24,6	6,6	162	8,8	216	13,2	324	18	13 x 044
12,5	6,3		51	19,6	7,6	148	10,2	199	15,3	299	20	13 x 051
12,5	6,3		64	15,0	9,6	144	12,8	192	19,2	288	26	13 x 064
12,5	6,3		76	13,2	11,4	150	15,2	200	22,8	300	30	13 x 076
12,5	6,3		89	11,4	13,3	151	17,8	202	26,7	304	35	13 x 089
12,5	6,3		102	9,4	15,3	144	20,4	192	30,6	287	41	13 x 102
12,5	6,3		305	2,8	45,7	127	61,0	170	91,5	247	123	13 x 305
16	8	3,0x2,4	25	75,7	3,7	280	5,0	378	7,5	567	9	16 x 025
16	8		32	52,8	4,8	253	6,4	337	9,6	506	14	16 x 032
16	8		38	48,5	5,7	276	7,6	368	11,4	552	17	16 x 038
16	8		44	42,8	6,6	282	8,8	376	13,2	564	20	16 x 044
16	8		51	37,1	7,6	281	10,2	378	15,3	567	21	16 x 051
16	8		64	30,3	9,6	290	12,8	387	19,2	581	28	16 x 064
16	8		76	25,7	11,4	292	15,2	390	22,8	585	33	16 x 076
16	8		89	21,7	13,3	288	17,8	386	26,7	579	39	16 x 089
16	8		102	19,3	15,3	295	20,4	393	30,6	590	44	16 x 102
16	8		305	7,1	45,7	324	61,0	433	91,5	649	127	16 x 305
20	10	4,0x3,2	25	216,0	3,7	799	5,0	1080	7,6	1641	9	20 x 025
20	10		32	168,0	4,8	806	6,4	1075	9,6	1612	11	20 x 032
20	10		38	129,0	5,7	735	7,6	980	11,4	1470	13	20 x 038
20	10		44	112,0	6,6	739	8,8	985	13,2	1478	16	20 x 044
20	10		51	94,0	7,6	714	10,2	958	15,3	1438	20	20 x 051
20	10		64	72,1	9,6	692	12,8	922	19,2	1384	25	20 x 064
20	10		76	59,7	11,4	680	15,2	907	22,8	1361	29	20 x 076
20	10		89	50,5	13,3	671	17,8	898	26,7	1348	35	20 x 089
20	10		102	44,2	15,3	676	20,4	901	30,6	1352	40	20 x 102
20	10		115	38,4	17,2	660	23,0	883	34,5	1324	47	20 x 115
20	10		127	34,1	19,0	647	25,4	866	38,1	1299	52	20 x 127
20	10		139	31,0	20,9	648	27,8	862	41,7	1293	57	20 x 139
20	10		152	28,2	22,8	642	30,4	857	45,6	1285	62	20 x 152
20	10		305	15,0	45,7	685	61,0	915	91,5	1372	121	20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c ± 10%	long life s ₁ = 15% in mm	F ₁ in N	medium life s ₂ = 20% in mm	F ₂ in N	max. working traverse s _n = 30% in mm	F _n in N	max. travel stroke S _{max}	▲	
25	12,5	5,6x4,1	25	375,0	3,7	1387	5,0	1875	7,5	2812	9	25 x 025	
25	12,5		32	297,0	4,8	1425	6,4	1900	9,6	2851	11	25 x 032	
25	12,5		38	219,0	5,7	1248	7,6	1664	11,4	2496	14	25 x 038	
25	12,5		44	187,0	6,6	1234	8,8	1645	13,2	2468	16	25 x 044	
25	12,5		51	156,0	7,6	1185	10,2	1591	15,3	2386	19	25 x 051	
25	12,5		64	123,0	9,6	1180	12,8	1574	19,2	2361	26	25 x 064	
25	12,5		76	99,0	11,4	1128	15,2	1504	22,8	2257	29	25 x 076	
25	12,5		89	84,0	13,3	1117	17,8	1495	26,7	2242	35	25 x 089	
25	12,5		102	73,0	15,3	1116	20,4	1489	30,6	2233	39	25 x 102	
25	12,5		115	65,0	17,2	1118	23,0	1495	34,5	2242	45	25 x 115	
25	12,5		127	57,7	19,0	1096	25,4	1465	38,1	2198	48	25 x 127	
25	12,5		139	52,7	20,9	1101	27,8	1465	41,7	2198	54	25 x 139	
25	12,5		152	47,8	22,8	1089	30,4	1453	45,6	2179	60	25 x 152	
25	12,5		178	41,0	26,7	1094	35,6	1459	53,4	2189	67	25 x 178	
25	12,5		203	35,8	30,4	1088	40,6	1453	60,9	2180	80	25 x 203	
25	12,5	305	22,9	45,7	1046	61,0	1396	91,5	2095	119	25 x 305		
32	16	6,9x5,3	38	388,0	5,7	2111	7,6	2948	11,4	4423	13	32 x 038	
32	16		44	324,0	6,6	2138	8,8	2851	13,2	4276	16	32 x 044	
32	16		51	272,0	7,6	2067	10,2	2774	15,3	4161	18	32 x 051	
32	16		64	212,0	9,6	2035	12,8	2713	19,2	4070	23	32 x 064	
32	16		76	172,0	11,4	1960	15,2	2614	22,8	3921	27	32 x 076	
32	16		89	141,0	13,3	1875	17,8	2509	26,7	3764	33	32 x 089	
32	16		102	122,0	15,3	1866	20,4	2488	30,6	3733	39	32 x 102	
32	16		115	107,0	17,2	1840	23,0	2461	34,5	3691	43	32 x 115	
32	16		127	93,0	19,0	1767	25,4	2362	38,1	3543	47	32 x 127	
32	16		139	86,0	20,9	1797	27,8	2391	41,7	3586	51	32 x 139	
32	16		152	78,0	22,8	1778	30,4	2371	45,6	3556	55	32 x 152	
32	16		178	67,2	26,7	1794	35,6	2392	53,4	3588	69	32 x 178	
32	16		203	59,1	30,4	1796	40,6	2399	60,9	3599	81	32 x 203	
32	16		254	46,4	38,1	1767	50,8	2357	76,2	3535	99	32 x 254	
32	16		305	38,0	45,7	1736	61,0	2318	91,5	3477	119	32 x 305	
40	20	8,4x6,2	51	350,0	7,6	2660	10,2	3570	15,3	5355	18	40 x 051	
40	20		64	269,0	9,6	2582	12,8	3443	19,2	5164	25	40 x 064	
40	20		76	219,0	11,4	2496	15,2	3328	22,8	4993	30	40 x 076	
40	20		89	190,0	13,3	2527	17,8	3382	26,7	5073	36	40 x 089	
40	20		102	163,0	15,3	2493	20,4	3325	30,6	4987	41	40 x 102	
40	20		115	142,0	17,2	2442	23,0	3266	34,5	4899	47	40 x 115	
40	20		127	128,0	19,0	2432	25,4	3251	38,1	4876	53	40 x 127	
40	20		139	115,0	20,9	2404	27,8	3197	41,7	4796	56	40 x 139	
40	20		152	105,0	22,8	2394	30,4	3192	45,6	4788	62	40 x 152	
40	20		178	89,0	26,7	2376	35,6	3168	53,4	4752	70	40 x 178	
40	20		203	77,0	30,4	2340	40,6	3126	60,9	4689	83	40 x 203	
40	20		254	61,0	38,1	2324	50,8	3098	76,2	4648	101	40 x 254	
40	20		305	51,0	45,7	2330	61,0	3111	91,5	4666	127	40 x 305	
50	25		11,3x7,4	64	413,0	9,6	3964	12,8	5286	19,2	7929	26	50 x 064
50	25			76	339,0	11,4	3864	15,2	5152	22,8	7729	29	50 x 076
50	25	89		288,0	13,3	3830	17,8	5126	26,7	7689	35	50 x 089	
50	25	102		245,0	15,3	3748	20,4	4998	30,6	7497	41	50 x 102	
50	25	115		215,0	17,2	3698	23,0	4945	34,5	7417	47	50 x 115	
50	25	127		192,0	19,0	3648	25,4	4876	38,1	7315	55	50 x 127	
50	25	139		168,0	20,9	3511	27,8	4670	41,7	7006	61	50 x 139	
50	25	152		154,0	22,8	3511	30,4	4681	45,6	7022	66	50 x 152	
50	25	178		134,0	26,7	3577	35,6	4770	53,4	7155	75	50 x 178	
50	25	203		117,0	30,4	3556	40,6	4750	60,9	7125	87	50 x 203	
50	25	254		89,0	38,1	3390	50,8	4521	76,2	6781	108	50 x 254	
50	25	305		73,0	45,7	3336	61,0	4453	91,5	6679	133	50 x 305	
63	38	12,5x11,0		76	630,0	11,4	7182	15,2	9576	22,8	14364	24	63 x 076
63	38			89	485,0	13,3	6450	17,8	8633	26,7	12950	32	63 x 089
63	38			102	434,0	15,3	5772	20,4	8854	30,6	13280	36	63 x 102
63	38		115	384,0	17,2	5875	23,0	8832	34,5	13248	40	63 x 115	
63	38		127	349,0	19,0	6631	25,4	8865	38,1	13297	44	63 x 127	
63	38		152	276,0	22,8	6293	30,4	8390	45,6	12586	56	63 x 152	
63	38		178	237,0	26,7	6328	35,6	8437	53,4	12656	65	63 x 178	
63	38		203	210,0	30,4	6384	40,6	8526	60,9	12789	74	63 x 203	
63	38		254	165,0	38,1	6286	50,8	8382	76,2	12573	94	63 x 254	
63	38		305	134,0	45,7	6124	61,0	8174	91,5	12261	115	63 x 305	

System springs SZ 8040

for extra heavy load, colour yellow

STEINEL®
NORMALIEN



Helical compression springs for extra heavy load

Material: profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for extra heavy load **SZ 8040**

$D_h = 25$ mm, $L_0 = 76$ mm

Add **25 x 076**


Order number **SZ 8040.25 x 076**

ISO 10243

Add size to order number

Order number **SZ 8040.** x

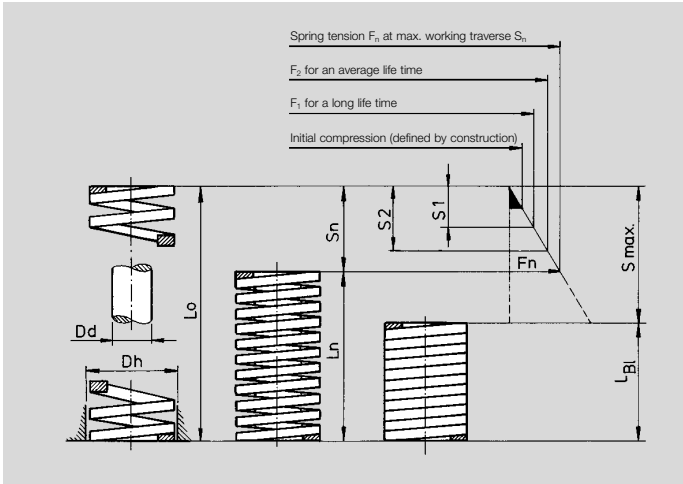
Tube \varnothing D_{hH15}	Rod \varnothing D_{dh15}	Wire \varnothing	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 15\%$ in mm	F_1 in N	medium life $s_2 = 20\%$ in mm	F_2 in N	max. working traverse $s_n = 25\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
10	5	1,9x1,5	25	36,8	3,7	136	5,0	184	6,3	231	9	10 x 025
10	5		32	27,9	4,8	133	6,4	178	8,0	223	12	10 x 032
10	5		38	23,7	5,7	135	7,6	180	9,5	225	14	10 x 038
10	5		44	19,2	6,6	126	8,8	168	11,0	211	17	10 x 044
10	5		51	16,5	7,6	125	10,2	168	12,8	211	19	10 x 051
10	5		64	13,2	9,6	126	12,8	168	16,0	211	23	10 x 064
10	5		76	10,9	11,4	124	15,2	165	19,0	207	30	10 x 076
10	5		305	2,6	45,7	118	61,0	158	76,3	198	117	10 x 305
12,5	6,3	2,3x2,2	25	58,5	3,7	216	5,0	292	6,3	368	9	13 x 025
12,5	6,3		32	43,9	4,8	210	6,4	280	8,0	351	12	13 x 032
12,5	6,3		38	36,0	5,7	205	7,6	273	9,5	342	14	13 x 038
12,5	6,3		44	30,3	6,6	199	8,8	266	11,0	333	18	13 x 044
12,5	6,3		51	26,2	7,6	199	10,2	267	12,8	335	20	13 x 051
12,5	6,3		64	21,2	9,6	203	12,8	271	16,0	339	27	13 x 064
12,5	6,3		76	17,1	11,4	194	15,2	259	19,0	324	32	13 x 076
12,5	6,3		89	14,5	13,3	192	17,8	258	22,3	323	38	13 x 089
12,5	6,3		102	12,5	15,3	191	20,4	255	25,5	319	41	13 x 102
12,5	6,3		305	4,3	45,7	196	61,0	262	76,3	328	115	13 x 305
16	8	3,2x2,7	25	118,0	3,7	436	5,0	590	6,3	743	10	16 x 025
16	8		32	89,0	4,8	427	6,4	569	8,0	712	12	16 x 032
16	8		38	72,1	5,7	410	7,6	547	9,5	684	14	16 x 038
16	8		44	60,9	6,6	401	8,8	535	11,0	669	17	16 x 044
16	8		51	52,3	7,6	397	10,2	533	12,8	669	19	16 x 051
16	8		64	41,2	9,6	395	12,8	527	16,0	659	25	16 x 064
16	8		76	34,1	11,4	388	15,2	518	19,0	647	29	16 x 076
16	8		89	29,5	13,3	392	17,8	525	22,3	657	36	16 x 089
16	8		102	25,6	15,3	391	20,4	522	25,5	652	38	16 x 102
16	8		305	8,4	45,7	383	61,0	512	76,3	640	120	16 x 305
20	10	4,1x3,7	25	293,0	3,7	1084	5,0	1465	6,3	1845	7	20 x 025
20	10		32	224,0	4,8	1075	6,4	1433	8,0	1792	10	20 x 032
20	10		38	177,0	5,7	1008	7,6	1345	9,5	1681	12	20 x 038
20	10		44	149,0	6,6	983	8,8	1311	11,0	1639	14	20 x 044
20	10		51	128,0	7,6	972	10,2	1305	12,8	1638	16	20 x 051
20	10		64	99,0	9,6	950	12,8	1267	16,0	1584	22	20 x 064
20	10		76	81,7	11,4	931	15,2	1241	19,0	1552	25	20 x 076
20	10		89	69,5	13,3	924	17,8	1237	22,3	1549	31	20 x 089
20	10		102	60,6	15,3	927	20,4	1236	25,5	1545	36	20 x 102
20	10		115	53,0	17,2	911	23,0	1219	28,8	1526	42	20 x 115
20	10		127	47,5	19,0	902	25,4	1206	31,8	1510	43	20 x 127
20	10		139	43,0	20,9	899	27,8	1195	34,8	1496	48	20 x 139
20	10		152	39,0	22,8	889	30,4	1185	38,4	1497	52	20 x 152
20	10		305	21,2	45,7	968	61,0	1293	76,3	1617	105	20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c ± 10%	long life s ₁ = 15% in mm	F ₁ in N	medium life s ₂ = 20% in mm	F ₂ in N	max. working traverse s _n = 25% in mm	F _n in N	max. travel stroke S _{max}	▲
25	12,5	5,6x4,6	32	374,4	4,8	1797	6,4	2396	8,0	2995	11	25 x 032
25	12,5		38	346,0	5,7	1972	7,6	2629	9,5	3287	13	25 x 038
25	12,5		44	244,0	6,6	1610	8,8	2147	11,0	2684	16	25 x 044
25	12,5		51	207,5	7,6	1577	10,2	2116	12,8	2656	18	25 x 051
25	12,5		64	161,0	9,6	1545	12,8	2060	16,0	2576	23	25 x 064
25	12,5		76	130,8	11,4	1491	15,2	1988	19,0	2485	26	25 x 076
25	12,5		89	110,5	13,3	1469	17,8	1966	22,3	2464	31	25 x 089
25	12,5		102	96,3	15,3	1473	20,4	1964	25,5	2455	36	25 x 102
25	12,5		115	85,7	17,2	1474	23,0	1971	28,8	2468	41	25 x 115
25	12,5		127	76,3	19,0	1449	25,4	1938	31,8	2426	47	25 x 127
25	12,5		152	63,5	22,8	1447	30,4	1930	38,0	2413	54	25 x 152
25	12,5		178	53,9	26,7	1439	35,6	1918	44,5	2398	63	25 x 178
25	12,5		203	47,0	30,4	1428	40,6	1908	50,8	2387	72	25 x 203
25	12,5		305	30,9	45,7	1412	61,0	1884	76,3	2357	113	25 x 305
32	16	7,2x5,6	38	528,2	5,7	3010	7,6	4014	9,5	5017	12	32 x 038
32	16		44	424,4	6,6	2810	8,8	3734	11,0	4668	15	32 x 044
32	16		51	353,0	7,6	2682	10,2	3600	12,8	4518	17	32 x 051
32	16		64	269,2	9,6	2584	12,8	3445	16,0	4307	22	32 x 064
32	16		76	218,5	11,4	2490	15,2	3321	19,0	4151	25	32 x 076
32	16		89	180,3	13,3	2397	17,8	3209	22,3	4020	33	32 x 089
32	16		102	155,0	15,3	2371	20,4	3162	25,5	3952	36	32 x 102
32	16		115	140,0	17,2	2408	23,0	3220	28,8	4032	42	32 x 115
32	16		127	124,0	19,0	2356	25,4	3149	31,8	3943	46	32 x 127
32	16		152	102,0	22,8	2325	30,4	3100	38,0	3876	56	32 x 152
32	16		178	88,2	26,7	2354	35,6	3139	44,5	3924	64	32 x 178
32	16		203	76,0	30,4	2310	40,6	3085	50,8	3860	71	32 x 203
32	16		254	60,8	38,1	2316	50,8	3088	63,5	3860	90	32 x 254
32	16		305	49,0	45,7	2239	61,0	2989	76,3	3738	103	32 x 305
40	20	8,7x7,3	51	628,0	7,6	4772	10,2	6405	12,8	8038	17	40 x 051
40	20		64	487,0	9,6	4675	12,8	6233	16,0	7792	23	40 x 064
40	20		76	379,0	11,4	4320	15,2	5760	19,0	7201	27	40 x 076
40	20		89	321,0	13,3	4269	17,8	5713	22,3	7158	31	40 x 089
40	20		102	281,0	15,3	4299	20,4	5732	25,5	7165	36	40 x 102
40	20		115	245,0	17,2	4214	23,0	5635	28,8	7056	40	40 x 115
40	20		127	221,0	19,0	4199	25,4	5613	31,8	7027	44	40 x 127
40	20		139	202,0	20,9	4222	27,8	5616	34,8	7030	52	40 x 139
40	20		152	168,0	22,8	3830	30,4	5107	38,0	6384	56	40 x 152
40	20		178	140,0	26,7	3738	35,6	4984	44,5	6230	61	40 x 178
40	20		203	132,0	30,4	4012	40,6	5359	50,8	6705	73	40 x 203
40	20		254	107,0	38,1	4076	50,8	5435	63,5	6794	93	40 x 254
40	20		305	87,8	45,7	4012	61,0	5355	76,3	6699	106	40 x 305
50	25	11,4x9,1	64	709,0	9,6	6806	12,8	9075	16,0	11344	21	50 x 064
50	25		76	572,0	11,4	6520	15,2	8694	19,0	10868	25	50 x 076
50	25		89	475,0	13,3	6317	17,8	8455	22,3	10592	28	50 x 089
50	25		102	405,0	15,3	6196	20,4	8262	25,5	10327	33	50 x 102
50	25		115	352,0	17,2	6054	23,0	8096	28,8	10137	38	50 x 115
50	25		127	316,0	19,0	6004	25,4	8026	31,8	10048	43	50 x 127
50	25		139	289,0	20,9	6040	27,8	8034	34,8	10057	47	50 x 139
50	25		152	239,0	22,8	5449	30,4	7265	38,0	9082	53	50 x 152
50	25		178	226,0	26,7	6034	35,6	8045	44,5	10057	60	50 x 178
50	25		203	187,0	30,4	5684	40,6	7592	50,8	9499	71	50 x 203
50	25		254	153,0	38,1	5829	50,8	7772	63,5	9715	91	50 x 254
50	25		305	127,0	45,7	5803	61,0	7747	76,3	9690	106	50 x 305
63	38	13,3x11,8	76	842,0	11,4	9599	15,2	12798	19,0	15998	24	63 x 076
63	38		89	726,0	13,3	9656	17,8	12923	22,3	16190	28	63 x 089
63	38		102	656,0	15,3	10037	20,4	13382	25,5	16728	31	63 x 102
63	38		115	534,0	17,2	9185	23,0	12282	28,8	15379	38	63 x 115
63	38		127	480,0	19,0	9120	25,4	12192	31,8	15264	42	63 x 127
63	38		152	396,0	22,8	9029	30,4	12038	38,0	15048	51	63 x 152
63	38		178	335,0	26,7	8945	35,6	11926	44,5	14908	60	63 x 178
63	38		203	297,0	30,4	9029	40,6	12058	50,8	15088	68	63 x 203
63	38		254	235,0	38,1	8954	50,8	11938	63,5	14923	85	63 x 254
63	38		305	194,0	45,7	8866	61,0	11834	76,3	14802	103	63 x 305

System springs SZ 8045

for extra heavy loads

STEINEL®
NORMALIEN



Screw pressure springs for extra heavy loads

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for extra heavy load **SZ 8045**

$D_h = 25$ mm, $L_0 = 89$ mm

Add **25 x 089**

Order number **SZ 8045.25 x 089**


Add size to order number

Order number **SZ 8045.** x

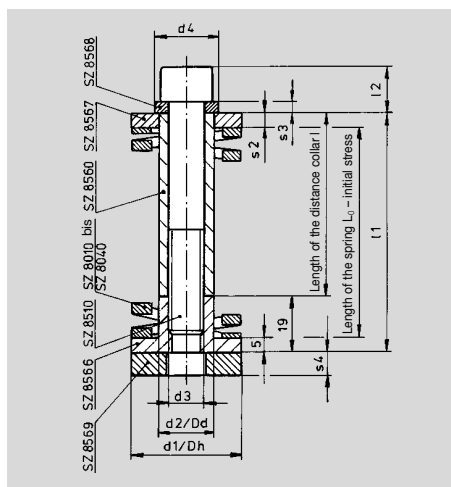
Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 7\%$ in mm	F_1 in N	medium life $s_2 = 10\%$ in mm	F_2 in N	max. working traverse $s_n = 15\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
16	8	3,45x4,6	32	449	2,2	988	3,2	1437	4,8	2155	6	16 x 032
16	8		38	363	2,6	944	3,8	1379	5,7	2069	7	16 x 038
16	8		44	309	3,1	958	4,4	1360	6,6	2039	8	16 x 044
16	8		51	256	3,6	922	5,1	1306	7,7	1958	9	16 x 051
16	8		64	203	4,5	914	6,4	1299	9,6	1949	11	16 x 064
16	8		76	166	5,3	880	7,6	1262	11,4	1892	14	16 x 076
16	8		89	139	6,2	862	8,9	1237	13,4	1856	16	16 x 089
16	8		102	114	7,1	809	10,2	1163	15,3	1744	19	16 x 102
16	8		115	105	8,1	851	11,5	1208	17,3	1811	22	16 x 115
16	8		127	94	8,9	837	12,7	1194	19,1	1791	25	16 x 127
16	8		152	69	10,6	731	15,2	1049	22,8	1573	34	16 x 152
16	8		305	37	21,4	792	30,5	1129	45,8	1693	70	16 x 305
20	10	4,05x5,9	44	452	3,1	1401	4,4	1989	6,6	2983	8	20 x 044
20	10		51	378	3,6	1361	5,1	1928	7,7	2892	10	20 x 051
20	10		64	301	4,5	1355	6,4	1926	9,6	2890	13	20 x 064
20	10		76	247	5,3	1309	7,6	1877	11,4	2816	16	20 x 076
20	10		89	208	6,2	1290	8,9	1851	13,4	2777	19	20 x 089
20	10		102	188	7,1	1335	10,2	1918	15,3	2876	21	20 x 102
20	10		115	159	8,1	1288	11,5	1829	17,3	2743	24	20 x 115
20	10		127	146	8,9	1299	12,7	1854	19,1	2781	26	20 x 127
20	10		152	91	10,6	965	15,2	1383	22,8	2075	45	20 x 152
20	10		305	60	21,4	1284	30,5	1830	45,8	2745	70	20 x 305
25	12,5	5,7x7,4	44	1158	3,1	3590	4,4	5095	6,6	7643	8	25 x 044
25	12,5		51	933	3,6	3359	5,1	4758	7,6	7091	10	25 x 051
25	12,5		64	644	4,5	2898	6,4	4122	9,6	6182	13	25 x 064
25	12,5		76	556	5,3	2947	7,6	4226	11,4	6338	16	25 x 076
25	12,5		89	462	6,2	2864	8,9	4112	13,4	6191	20	25 x 089
25	12,5		102	390	7,1	2769	10,2	3978	15,3	5967	23	25 x 102
25	12,5		115	360	8,1	2916	11,5	4140	17,3	6228	26	25 x 115
25	12,5		127	336	8,9	2990	12,7	4267	19,1	6418	28	25 x 127
25	12,5		152	248	10,6	2629	15,2	3770	22,8	5654	34	25 x 152
25	12,5		178	220	12,5	2750	17,8	3916	26,7	5874	39	25 x 178
25	12,5		203	199	14,2	2826	20,3	4040	30,5	5313	45	25 x 203
25	12,5		305	134	21,4	2868	30,5	4087	45,8	6137	63	25 x 305
32	16	7,4x8,8	44	1300	3,1	4030	4,4	5720	6,6	8580	8	32 x 044
32	16		51	1150	3,6	4140	5,1	5864	7,6	8740	11	32 x 051
32	16		64	887	4,5	3992	6,4	5677	9,6	8515	14	32 x 064
32	16		76	705	5,3	3737	7,6	5358	11,4	8037	17	32 x 076
32	16		89	594	6,2	3683	8,9	5287	13,4	7960	21	32 x 089
32	16		102	520	7,1	3692	10,2	5304	15,3	7956	23	32 x 102
32	16		115	465	8,1	3767	11,5	5348	17,3	8045	25	32 x 115
32	16		127	413	8,9	3676	12,7	5245	19,1	7888	30	32 x 127
32	16		152	348	10,6	3689	15,2	5290	22,8	7934	35	32 x 152
32	16		178	294	12,5	3675	17,8	5233	26,7	7850	41	32 x 178
32	16		203	256	14,2	3635	20,3	5197	30,5	7808	47	32 x 203
32	16		254	201	17,8	3578	25,4	5105	38,1	7658	58	32 x 254
32	16		305	168	21,4	3595	30,5	5124	45,8	7694	70	32 x 305

Add
size to
order number

Order number **SZ 8045.** x

Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire 	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 7\%$ in mm	F_1 in N	medium life $s_2 = 10\%$ in mm	F_2 in N	max. working $s_n = 15\%$ in mm	traverse F_n in N	max. travel stroke S_{max}	▲
40	20	8,7x10,6	64	1228	4,5	5526	6,4	7859	9,6	11789	13	40 x 064
40	20		76	1017	5,3	5390	7,6	7729	11,4	11594	16	40 x 076
40	20		89	880	6,2	5456	8,9	7832	13,4	11792	20	40 x 089
40	20		102	762	7,1	5410	10,2	7772	15,3	11659	23	40 x 102
40	20		115	679	8,1	5500	11,5	7809	17,3	11747	26	40 x 115
40	20		127	622	8,9	5536	12,7	7899	19,1	11880	28	40 x 127
40	20		152	509	10,6	5395	15,2	7737	22,8	11605	36	40 x 152
40	20		178	429	12,5	5363	17,8	7636	26,7	11454	43	40 x 178
40	20		203	374	14,2	5311	20,3	7592	30,5	11407	49	40 x 203
40	20		254	296	17,6	5269	25,4	7518	38,1	11278	62	40 x 254
40	20		305	246	21,4	5264	30,5	7503	45,8	11267	75	40 x 305
50	25	11,8x13,4	64	1980	4,5	8910	6,4	12672	9,6	19008	11	50 x 064
50	25		76	1811	5,3	9598	7,6	13764	11,4	20645	14	50 x 076
50	25		89	1410	6,2	8742	8,9	12549	13,4	18894	19	50 x 089
50	25		102	1215	7,1	8626	10,2	12393	15,3	18590	22	50 x 102
50	25		115	1076	8,1	8716	11,5	12374	17,3	18615	25	50 x 115
50	25		127	968	8,9	8615	12,7	12294	19,1	18489	28	50 x 127
50	25		152	806	10,6	8444	15,2	12251	22,8	18377	34	50 x 152
50	25		178	698	12,5	8725	17,8	12424	26,7	18637	40	50 x 178
50	25		203	612	14,2	8690	20,3	12424	30,5	18666	45	50 x 203
50	25		254	472	17,8	8402	25,4	11989	38,1	17983	58	50 x 254
50	25		305	388	21,4	8303	30,5	11834	45,8	17770	70	50 x 305

System spring units SZ 8565



System spring unit SZ 8565.00 complete, however without spring:

- 1 cheese-head screw SZ 8510
- 1 distance collar SZ 8560
- 1 thread disc SZ 8566
- 1 mating disc SZ 8567
- 1 tightening disc SZ 8568
- 1 regrinding disc SZ 8569

System spring unit complete with spring:

- SZ 8010 **SZ 8565.10**
- SZ 8020 **SZ 8565.20**
- SZ 8030 **SZ 8565.30**
- SZ 8040 **SZ 8565.40**

Add to order number

Tube Ø d₁ / D_h x l₁

Add size to order number

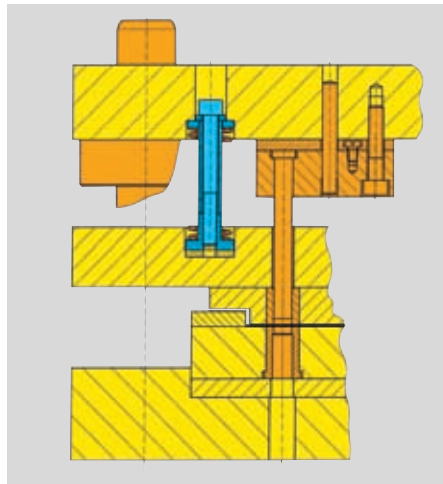
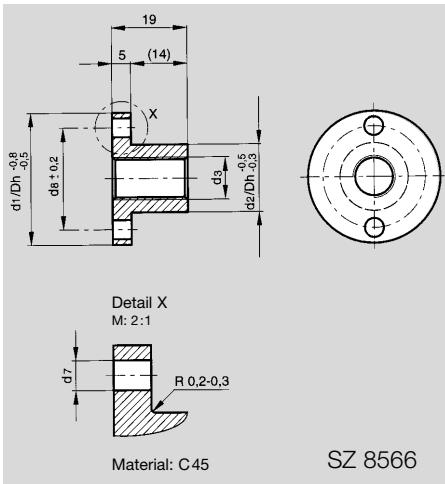
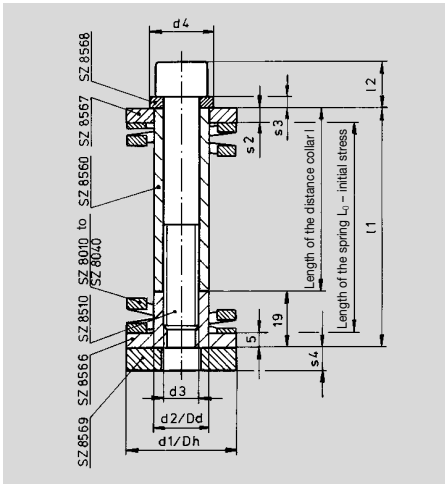
Order number **SZ 8565.** x x

Tube Ø d ₁ /D _h	Rod d ₂ /D _d	d ₃	d ₄	l	l ₁	l ₂	s ₂	s ₃	SZ 8510 included in SZ 8565	SZ 8560 included in SZ 8565	SZ 8566 included in SZ 8565	SZ 8567 included in SZ 8565	SZ 8568 included in SZ 8565	matchable to that SZ 8010-40 ▲ ▲
20	10	M6	13	20	39	9	4	3	06 x 035	10 x 020	20	20	20	20 x 032
				30	49				06 x 045	10 x 030				20 x 044
				50	69				06 x 070	10 x 050				20 x 064
				63	82				06 x 080	10 x 063				20 x 076
25	12,5	M8	16	20	39	11	4	3	08 x 035	12 x 020	25	25	25	25 x 032
				30	49				08 x 045	12 x 030				25 x 044
				50	69				08 x 070	12 x 050				25 x 064
				63	82				08 x 080	12 x 063				25 x 076
				100	119				08 x 120	12 x 100				25 x 115
32	16	M10	19	30	49	13	4	3	10 x 050	16 x 030	32	32	32	32 x 044
				50	69				10 x 070	16 x 050				32 x 064
				63	82				10 x 080	16 x 063				32 x 076
				100	119				10 x 120	16 x 100				32 x 115
40	20	M12	22	50	69	16	5	4	12 x 070	20 x 050	40	40	40	40 x 064
				63	82				12 x 080	20 x 063				40 x 076
				100	119				12 x 120	20 x 100				40 x 115
50	25	M16	28	50	69	20	5	4	16 x 070	25 x 050	50	50	50	50 x 064
				63	82				16 x 080	25 x 063				50 x 076
				100	119				16 x 120	25 x 100				50 x 115

Force stroke table

Spring units SZ 8565.	with system springs		SZ 8010 green (light load)			SZ 8020 blue (medium load)			SZ 8030 red (heavy load)			SZ 8040 yellow (extra heavy load)			
	SZ 8010 initial stress	SZ 8020 mm %	initial stress	max. working tension	max. spring traverse	initial stress	max. working tension	max. spring traverse	initial stress	max. working tension	max. spring traverse	initial stress	max. working tension	max. spring traverse	
20 x 039	20 x 032	2	6	90	10,8	576	145	9,2	813	336	7,6	1612	448	6	1792
20 x 049	20 x 044	4	9	120	13,6	528	190	11,4	731	448	9,2	1478	596	7	1639
20 x 069	20 x 064	4	6	80	21,6	512	129	18,4	723	288	15,2	1384	396	12	1584
20 x 082	20 x 076	3	4	48	27,4	486	75	23,6	667	179	19,8	1361	245	16	1552
25 x 039	25 x 032	2	6	160	10,8	1027	236	9,2	1321	594	7,6	2851	748	6	2995
25 x 049	25 x 044	4	9	211	13,6	931	323	11,4	1244	748	9,2	2468	976	7	2684
25 x 069	25 x 064	4	6	140	21,6	901	212	18,4	1187	492	15,2	2361	644	12	2576
25 x 082	25 x 076	3	4	84	27,4	851	129	23,6	1149	297	19,8	2257	392	16	2485
25 x 119	25 x 115	5	4	93	41,0	860	140	35,3	1128	325	29,5	2242	428	23,8	2468
32 x 049	32 x 044	4	9	318	13,6	1399	632	11,4	2433	1296	9,2	4276	1976	7	4668
32 x 069	32 x 064	4	6	212	21,6	1356	396	18,4	2217	848	15,2	4070	1076	12	4307
32 x 082	32 x 076	3	4	132	27,4	1337	241	23,6	2141	516	19,8	3921	655	16	4151
32 x 119	32 x 115	5	4	145	41,0	1334	257	35,3	2058	535	29,5	3691	700	23,8	4032
40 x 069	40 x 064	5	8	365	20,6	1868	700	17,4	3136	1345	14,2	5164	2435	11	7792
40 x 082	40 x 076	4	5	252	26,4	1915	432	22,6	2872	876	18,8	4993	1516	15	7201
40 x 119	40 x 115	6	5	237	40,0	1821	430	34,3	2893	852	28,5	4899	1470	22,8	7056
50 x 069	50 x 064	5	8	780	20,6	3993	1045	17,4	4681	2065	14,2	7929	3545	11	11344
50 x 082	50 x 076	4	5	500	26,4	3800	672	22,6	4468	1356	18,8	7729	2288	15	10868
50 x 119	50 x 115	6	5	486	40,0	3726	636	34,3	4271	1290	28,5	7417	2112	22,8	10137

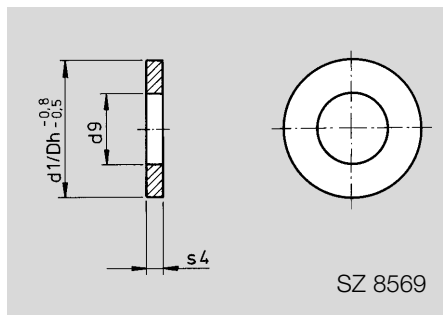
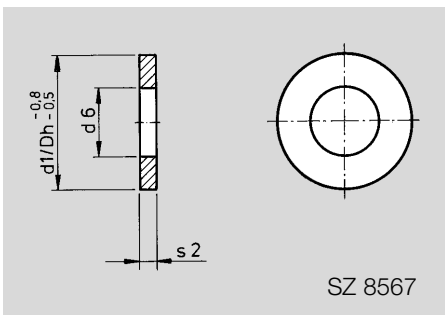
System spring units SZ 8565



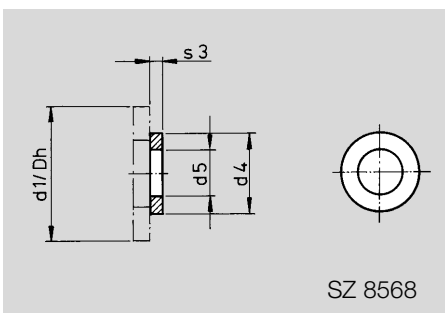
Order example: System spring unit complete, however without spring
SZ 8565.00
Tube $\varnothing d_1 / D_h = 32$ mm,
mounting length $l_1 = 82$ mm
Add **32 x 082**
Order number **SZ 8565.00.32 x 082**

Order example: System spring unit complete, with spring, for example SZ 8040
SZ 8565.40
Tube $\varnothing d_1 / D_h = 32$ mm,
mounting length $l_1 = 82$ mm
Add **32 x 082**
Order number **SZ 8565.40.32 x 082**

Order example for parts:
Thread disc **SZ 8566**
Tube $\varnothing d_1 / D_h = 32$ mm,
Add **32**
Order number **SZ 8566.32**



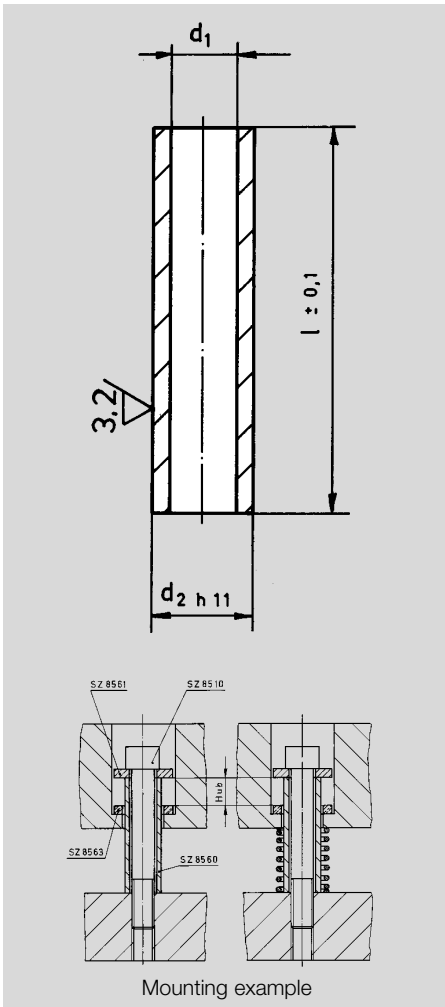
Matchable: Distance collars SZ 8560
Cheese head screws SZ 8510
System springs SZ 8010
SZ 8020
SZ 8030
SZ 8040
see concerning catalogue page



Parts for special lengths

	Order number	Add size to order number
Thread disc	Order number SZ 8566.	<input type="checkbox"/>
Mating disc	Order number SZ 8567.	<input type="checkbox"/>
Tightening disc	Order number SZ 8568.	<input type="checkbox"/>
Regrinding disc	Order number SZ 8569.	<input type="checkbox"/>
d_1/D_h $^{-0.8}_{-0.5}$	d_2/Dd $^{-0.5}_{-0.3}$	d_3
20	10,0	M 6
25	12,5	M 8
32	16,0	M10
40	20,0	M12
50	25,0	M16
d_4	d_5	d_6
13	6,5	10,5
16	8,5	13,0
19	10,5	16,5
23	12,5	20,5
28	16,5	25,5
d_7	d_8	d_9
3,2	14	6,5
4,2	18,5	8,5
4,2	25	10,5
4,2	30	12,5
4,2	40	16,5
s_2	s_3	s_4
4	3	8
4	3	8
4	3	10
5	4	10
5	4	10
20		25
25		32
32		40
40		50

Distance collars



Add size to order number

Order number **SZ 8560.** x

d_1	d_{2h11}	$l^{+0.1}$	matchable SZ 8561	matchable SZ 8563	Pieces/standard packing	▲					
7	10	20	6,4	11	4	10 x 020					
		30				10 x 030					
		40				10 x 040					
		50				10 x 050					
		63				10 x 063					
		80				10 x 080					
9	12,5	20	8,4	14	4	12 x 020					
		30				12 x 030					
		40				12 x 040					
		50				12 x 050					
		63				12 x 063					
		80				12 x 080					
9	13	20	8,4	14	4	13 x 020					
		30				13 x 030					
		40				13 x 040					
		50				13 x 050					
		63				13 x 063					
		80				13 x 080					
9	13	100	8,4	14	4	13 x 100					
		125				13 x 125					
		160				13 x 160					
		200				13 x 200					
		11				16	30	10,5	17	4	16 x 030
							40				16 x 040
50	16 x 050										
60	16 x 060										
63	16 x 063										
80	16 x 080										
11	16	100	10,5	17	4	16 x 100					
		125				16 x 125					
		160				16 x 160					
		200				16 x 200					
		13				19	30	13	21	4	19 x 030
							40				19 x 040
50	19 x 050										
60	19 x 060										
63	19 x 063										
80	19 x 080										
13	19	100	13	21	4	19 x 100					
		125				19 x 125					
		160				19 x 160					
		200				19 x 200					
		13				20	30	13	21	4	20 x 030
							40				20 x 040
50	20 x 050										
60	20 x 060										
63	20 x 063										
80	20 x 080										
13	20	100	13	21	4	20 x 100					
		125				20 x 125					
		160				20 x 160					
		200				20 x 200					
		17				25	50	17	26	4	25 x 050
							60				25 x 060
63	25 x 063										
70	25 x 070										
80	25 x 080										
90	25 x 090										
17	25	100	17	26	4	25 x 100					
		125				25 x 125					
		160				25 x 160					
		200				25 x 200					
		22				30	70	21	31	4	30 x 070
							80				30 x 080
90	30 x 090										
100	30 x 100										
120	30 x 120										
125	30 x 125										
22	30	150	21	31	4	30 x 150					
		200				30 x 200					
		26				36	80	25	37	4	36 x 080
							100				36 x 100
							125				36 x 125
							150				36 x 150
200	36 x 200										

Distance collars

Material: 1.0715 (9 S Mn 28 K)
casehardened, hardness 62 – 65 HRC

Order example: Distance collar **SZ 8560**

$d_2 = 16 \text{ mm}$, $l = 40 \text{ mm}$

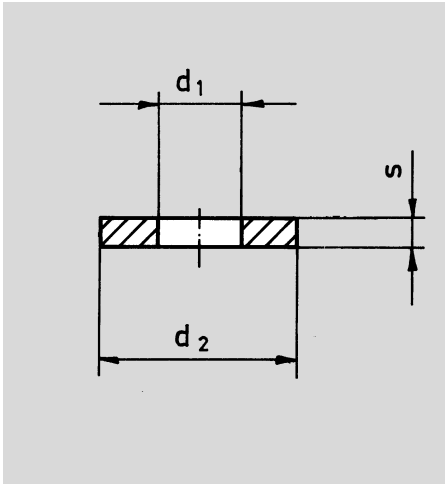
Add **16 x 040**

Order number **SZ 8560.16 x 040**

Special size lengths supplyable on request
minimum purchase quantity $\varnothing 10 - \varnothing 16$ 20 pcs
 $\varnothing 19 - \varnothing 36$ 10 pcs

Discs

Damping discs



Discs

Material: 1.0503 (C 45),
hardness 45 – 50 HRC

Order example: Disc **SZ 8561**

$d_1 = 10,5$ mm

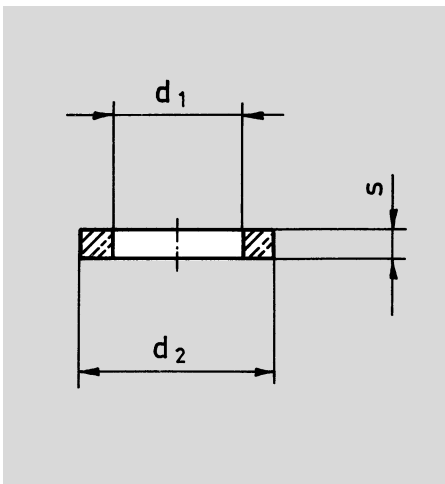
Add **10,5**

Order number **SZ 8561.10,5**

Add
size to
order number

Order number **SZ 8561.**

d_1	d_2	s	Pieces/standard packing	▲
6,4	17	3	4	06,4
8,4	23	4	4	08,4
10,5	26	4	4	10,5
13	30	5	4	13
17	35	6	4	17
21	42	8	4	21
25	46	10	4	25



Damping discs

Material: Polyurethane
on basis Desmodur 15
hardness 90 ± 5 Shore A

Order example: Damping disc **SZ 8563**

$d_1 = 17$ mm

Add **17**

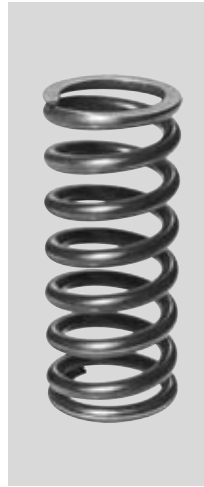
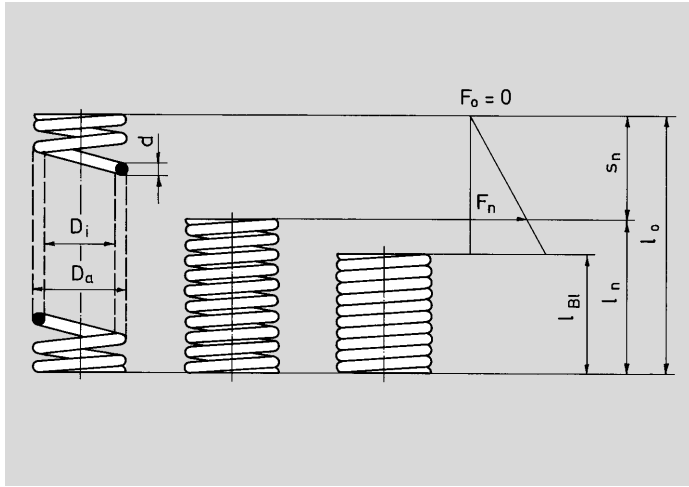
Order number **SZ 8563.17**

Add
size to
order number

Order number **SZ 8563.**

d_1	d_2	s	Pieces/standard packing	▲
11	17	3	4	11
14	23	4	4	14
17	26	4	4	17
21	30	5	4	21
26	35	6	4	26
31	42	6	4	31
37	46	6	4	37

Helical springs



Helical springs with round cross section

Material: Patented drawn spring wire grade C according to DIN 17223

Efficiency rating 2 according to DIN 2095. The springs are initial loaded, 1 winding closed at both ends and ground square.

Indication: For long working life at an oscillatory loading s_{max} = about 0,7 s_n .

Springs with round cross section should be used preferably, because they have the most positive attributes.

Order example: Helical spiral springs with round cross section **SZ 8100**

$D_a = 46$ mm, $l_o = 67$ mm

Add **46 x 67**

Order number **SZ 8100.46 x 67**

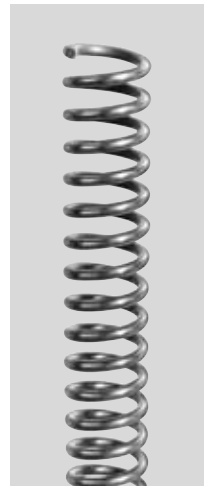
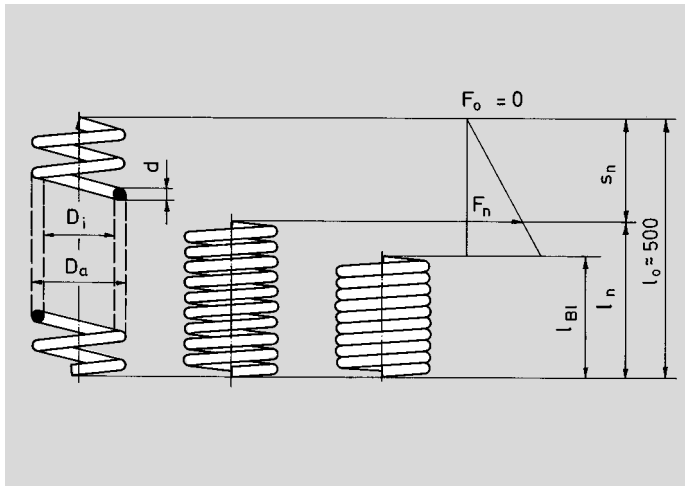
Add size to order number

Order number **SZ 8100.** x

D_a	D_i	d	l_o	l_n	s_n	Spring tension F_n^* (N) $\pm 10\%$	l_{max}	Pieces/standard packing	▲
10	7	1,5	40	23,9	16,1	130	18	50	10 x 40
12	9	1,5	55	25,3	29,7	110	23	50	12 x 55
14	10	2	40	22,4	17,6	210	20,5	50	14 x 40
14	10	2	50	25	25	250	24	50	14 x 50
15	11	2	40	20	20	220	17,5	50	15 x 40
17	12,5	2,25	85	41	44	260	35	30	17 x 85
17,5	11,5	3	45	31	14	490	29	30	17,5 x 45
17,5	11,5	3	50	34	16	480	33	30	17,5 x 50
18	10	4	83	65	18	1330	61,5	20	18 x 83
19	11	4	35	27	8	1340	26	30	19 x 35
19	10	4,5	90	72,4	17,6	1690	70,5	20	19 x 90
19,5	14,5	2,5	35	20	15	200	18,5	30	19,5 x 35
19,5	13,5	3	40	26	14	450	24,5	30	19,5 x 40
20,5	15,5	2,5	95	46,2	48,8	200	37	20	20,5 x 95
21	13	4	40	29	11	1140	28	20	21 x 40
21,5	15,5	3	45	23,6	21,4	540	22,5	20	21,5 x 45
21,5	13,5	4	50	34,4	15,6	1140	32	20	21,5 x 50
25	17	4	24	16,8	7,2	950	15,5	30	25 x 24
27,8	13,8	7	70	59	11	3680	57	10	27,8 x 70
30	22	4	70	36	34	810	34	20	30 x 70
30	17	6,5	150	122	28	2850	108	10	30 x 150
32	20	6	125	93	32	2110	84	10	32 x 125
42	26	8	130	94	36	3830	82	6	42 x 130
42	26	8	200	137,7	62,3	3830	125	6	42 x 200
46	26	10	67	58	9	5640	53	6	46 x 67
47	30	8,5	50	39	11	3630	36	10	47 x 50
53	31	11	200	157	43	6620	145	4	53 x 200
56	40	8	50	36	14	2080	34	10	56 x 50
61	39	11	180	137	43	5100	124	4	61 x 180
84	64	10	200	110	90	3750	75	2	84 x 200

*) Helical spiral springs arranged according to forces see concerning page

Helical springs



Helical springs with round cross section, 500 mm long

Material: Patented drawn spring wire grade C according to DIN 17223

Efficiency rating 2 according to DIN 2095. The springs are initial-loaded.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

Helical springs 500 mm long are suited for production of any spring lengths. After the cutoff of the desired length, close ends of the springs and grind rectangular to the spring axis. Avoid excessive heating during closing!

Order example: Helical springs with round cross section, 500 mm long **SZ 8101**

$D_a = 18$ mm, $d = 4$ mm

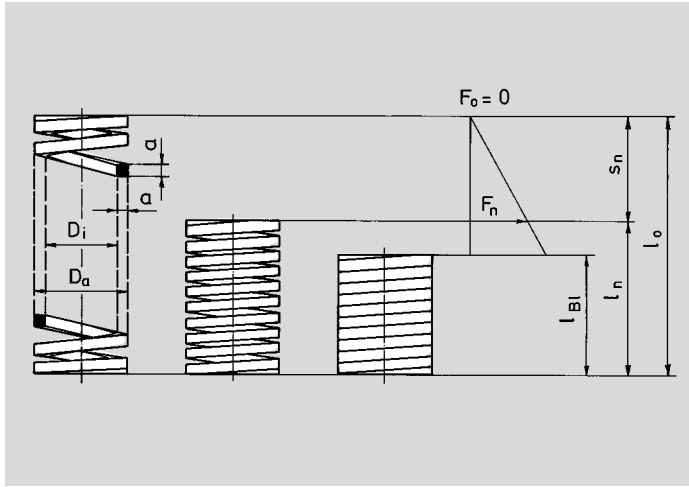
Add **18 x 4**

Order number **SZ 8101.18 x 4**

Add size to order number

Order number **SZ 8101.** x

D_a	D_i	d	l_n	s_n	Spring tension F_n (N)	Pieces/standard packing	▲
10	7	1,5	300	200	130	5	10 x 1,5
12	9	1,5	230	270	110	5	12 x 1,5
14	10	2	280	220	210	5	14 x 2
15	11	2	250	250	220	5	15 x 2
17	12,5	2,25	240	260	260	3	17 x 2,25
17,5	11,5	3	344	156	490	3	17,5 x 3
18	10	4	392	108	1330	3	18 x 4
19	10	4,5	400	100	1690	3	19 x 4,5
19,5	14,5	2,5	286	214	200	3	19,5 x 2,5
19,5	13,5	3	325	175	450	3	19,5 x 3
20,5	15,5	2,5	243	257	200	3	20,5 x 2,5
21	13	4	363	137	1140	3	21 x 4
21,5	15,5	3	262	238	540	3	21,5 x 3
21,5	13,5	4	344	156	1140	3	21,5 x 4
25	17	4	350	150	950	3	25 x 4
27,8	13,8	7	420	80	3680	3	27,8 x 7
30	22	4	257	243	810	3	30 x 4
30	17	6,5	407	93	2850	3	30 x 6,5
32	20	6	372	128	2110	3	32 x 6
42	26	8	362	138	3830	1	42 x 8
46	26	10	433	67	5640	1	46 x 10
47	30	8,5	390	110	3630	1	47 x 8,5
53	31	11	393	107	6620	1	53 x 11
56	40	8	360	140	2080	1	56 x 8
61	39	11	380	120	5100	1	61 x 11



Helical springs with square cross section

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095. The springs are initial-loaded, 1 each winding closed at both ends and ground square.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with square cross section is higher than that of comparable springs with round cross section.

The working life is nevertheless a little lower, because of the unfavourable stress distribution in the cross section.

Order example: Helical spring with square cross section **SZ 8200**

$D_a = 19,5 \text{ mm}$, $l_0 = 45 \text{ mm}$

Add **19,5 x 45**

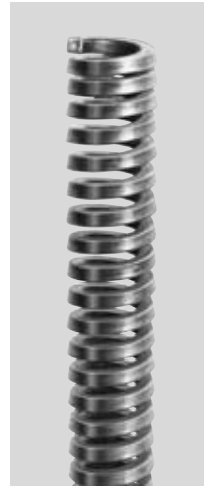
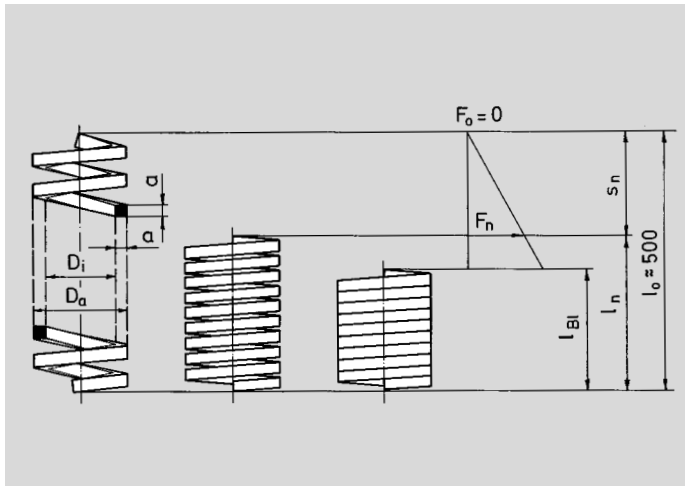
Order number **SZ 8200.19,5 x 45**

Add
size to
order number

Order number **SZ 8200.** x

D_a	D_i	$a \times a$	l_0	l_n	s_n	Spring tension $F_n^*)$ (N) $\pm 10\%$	l_{Bl}	Pieces/standard packing	▲
10	7	1,5	20	12,6	7,4	170	11,5	50	10 x 20
11,5	7,5	2	20	14,2	5,8	290	13,5	50	11,5 x 20
12	9	1,5	50	23,2	26,8	130	22	30	12 x 50
12,5	7,5	2,5	25	21	4	450	19	40	12,5 x 25
14	9	2,5	50	37,5	12,5	420	33	30	14 x 50
14,5	9,5	2,5	32	21,6	10,4	510	20	30	14,5 x 32
17,5	9,5	4	45	37,8	7,2	1570	35,5	30	17,5 x 45
19	11	4	50	39,4	10,6	1720	36,5	20	19 x 50
19,5	11,5	4	45	35,2	9,8	1570	32,5	20	19,5 x 45
21	13	4	45	34	11	1280	32	20	21 x 45
23	15	4	83	58,4	24,6	1100	55	10	23 x 83
26	14	6	45	40,2	4,8	2950	37	10	26 x 45
28	14	7	98	83,5	14,5	7200	82	6	28 x 98
30	21	4,5	50	32,5	17,5	1240	30,5	10	30 x 50
36	26	5	50	31	19	1340	29	10	36 x 50
42	26	8	72	55,5	16,5	4610	53	4	42 x 72
60	40	10	120	91	29	5010	84	2	60 x 120
70	54	8	60	39	21	1790	36	4	70 x 60

*) Helical springs arranged according to forces see concerning page



Helical springs with square cross section, 500 mm long

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095.
The springs are initial-loaded.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with square cross section is higher than that of comparable springs with round cross section.
The working life is nevertheless a little lower, because of the unfavourable stress distribution in the cross section.

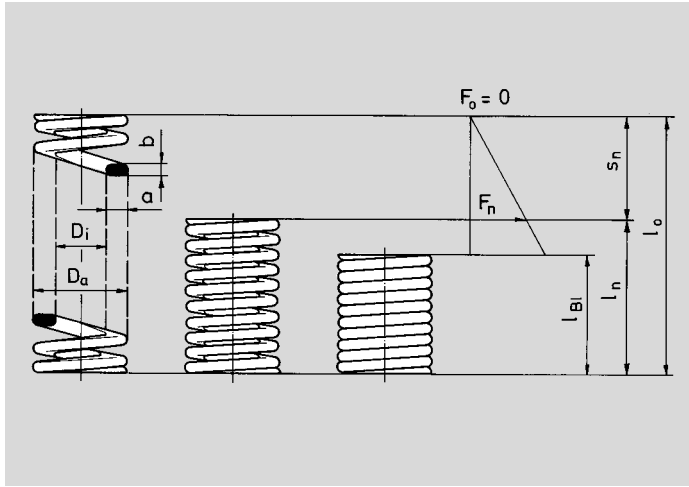
Helical springs 500 mm long are suited to be produced in any spring lengths. After the cutoff of the desired length, lay on ends of the springs and grind rectangular to the spring axis.
Avoid excessive heating during closing!

Order example: Helical springs with square cross section, 500 mm long **SZ 8201**
 $D_a = 19$ mm, $a = 4$ mm
Add **19 x 4**
Order number **SZ 8201.19 x 4**

Add size to order number

Order number **SZ 8201.** x

D_a	D_i	$a \times a$	l_n	s_n	Spring tension F_n (N)	Pieces/standard packing	▲
10	7	1,5	315	185	170	5	10 x 1,5
11,5	7,5	2	355	145	290	5	11,5 x 2
12	9	1,5	232	268	130	5	12 x 1,5
12,5	7,5	2,5	420	80	450	5	12,5 x 2,5
14,5	9,5	2,5	338	162	510	5	14,5 x 2,5
19	11	4	394	106	1720	3	19 x 4
21	13	4	378	122	1280	3	21 x 4
23	15	4	352	148	1100	3	23 x 4
28	14	7	426	74	6400	3	28 x 7
30	21	4,5	325	175	1240	3	30 x 4,5
36	26	5	310	190	1340	3	36 x 5
42	26	8	385	115	4610	1	42 x 8
60	40	10	380	120	5010	1	60 x 10
70	54	8	325	175	1790	1	70 x 8



Helical springs with oval cross section

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095. The springs are initial-loaded, 1 each winding closed at both ends and ground square.
Special treatment: blasted with steel balls.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with oval cross section is higher than that of comparable springs with round section.
The working life is nevertheless a little lower because of the unfavourable stress distribution in the cross section.

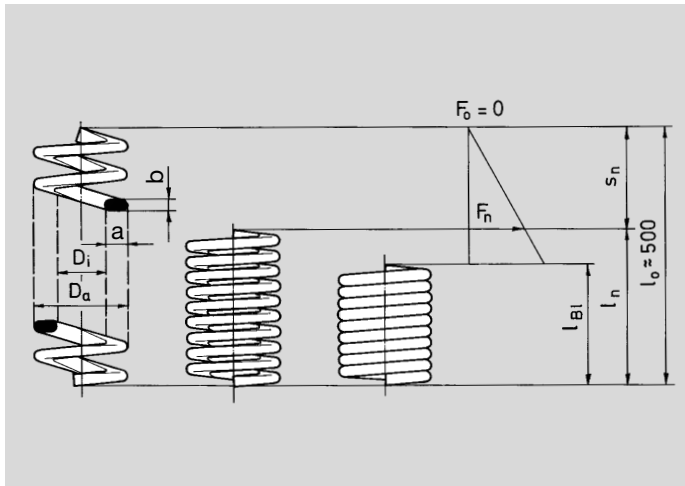
Order example: Helical spring with oval cross section **SZ 8400**
 $D_a = 32$ mm, $l_0 = 69$ mm
Add **32 x 69**
Order number **SZ 8400.32 x 69**

Add size to order number

Order number **SZ 8400.** x

D_a	D_i	a x b	l_0	l_n	s_n	Spring tension F_n^* (N) $\pm 10\%$	l_{Bl}	Pieces/standard packing	▲
11	7	2 x 1,25	20	10	10	200	9,5	50	11 x 20
12,5	7,5	2,5 x 1,5	20	13	7	270	12	50	12,5 x 20
13	9	2 x 1,25	50	20	30	150	18,5	50	13 x 50
14	8	3 x 1,6	25	15	10	400	13,5	50	14 x 25
15,5	8,5	3,5 x 2,2	25	17	8	740	15,5	40	15,5 x 25
17	9	4 x 2	50	32	18	690	30	30	17 x 50
17,6	9,6	4 x 2	30	18	12	690	17,5	40	17,6 x 30
25	13	6 x 3	54	35	19	1180	32	20	25 x 54
25	13	6 x 3	65	42	23	1180	36	10	25 x 65
25	13	6 x 3	77	50	27	1180	44	10	25 x 77
25	13	6 x 3	99	64	35	1180	52	10	25 x 99
25	13	6 x 3	123	79	44	1180	68	10	25 x123
32	17	7,5 x 4	69	45	24	2020	43	10	32 x 69
32	17	7,5 x 4	84	55	29	2020	50	10	32 x 84
32	17	7,5 x 4	98	64	34	2020	60	10	32 x 98
32	17	7,5 x 4	127	83	44	2020	74	10	32 x127
38	21	8,5 x 5	67	45	22	2950	44	10	38 x 67
38	21	8,5 x 5	85	57	28	2950	50	6	38 x 85
38	21	8,5 x 5	102	68	34	2950	64	6	38 x102
38	21	8,5 x 5	120	80	40	2950	70	6	38 x120
38	21	8,5 x 5	147	97	50	2950	88	4	38 x147
50	28	11 x 6	100	72	28	3440	60	4	50 x100
50	28	11 x 6	150	105	45	3440	87	4	50 x150
50	28	11 x 6	193	135	58	3440	118	2	50 x193
50	28	11 x 6	230	160	70	3440	130	2	50 x230

*) Helical springs arranged according to forces see concerning page



Helical springs with oval cross section, 500 mm long

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095.
The springs are initial-loaded.
Special treatment: blasted with steel balls.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with oval cross section is higher than that of comparable springs with round section.
The working life is nevertheless a little lower because of the unfavourable stress distribution in the cross section.

Helical springs 500 mm long are suited to be produced in any spring lengths. After the cutoff of the desired length, lay on ends of the springs and grind rectangular to the spring axis.
Avoid excessive heating during closing!

Order example: Helical spring with oval cross section, 500 mm long

SZ 8401

$D_a = 32$ mm, $a = 7,5$ mm, $b = 4$ mm

Add **32 x 7,5 x 4**

Order number **SZ 8401.32 x 7,5 x 4**

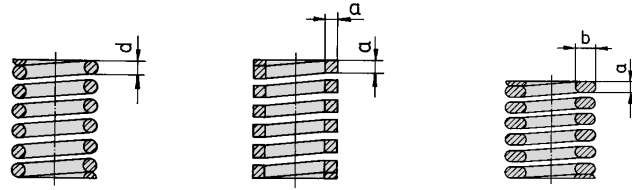
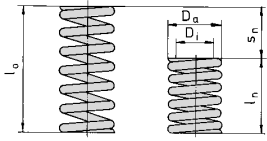
Add size to order number

Order number **SZ 8401.** x x

D_a	D_i	a x b	l_n	s_n	Spring tension F_n (N)	Pieces/standard packing	▲	▲
11	7	2 x 1,25	250	250	200	5	11	x 2 x 1,25
13	9	2 x 1,25	200	300	150	5	13	x 2 x 1,25
14	8	3 x 1,6	300	200	400	5	14	x 3 x 1,6
15,5	8,5	3,5 x 2,2	340	160	740	3	15,5	x 3,5 x 2,2
17	9	4 x 2	320	180	690	3	17	x 4 x 2
25	13	6 x 3	324	176	1180	3	25	x 6 x 3
32	17	7,5 x 4	326	174	2020	3	32	x 7,5 x 4
38	21	8,5 x 5	333	167	2950	3	38	x 8,5 x 5
50	28	11 x 6	350	150	3440	1	50	x 11 x 6

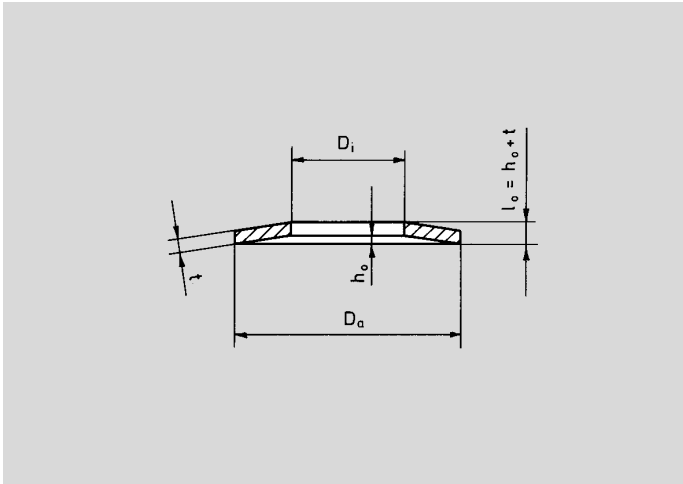
Helical springs

arranged according to forces



	SZ 8100. □ x □				SZ 8200. □ x □				SZ 8400. □ x □			
Spring tension F_n (N)	D_a	D_i	l_0	l_n	s_n	d	▲	$a \times a$	▲	$a \times b$	▲	
110	12	9	55	25,3	29,7	1,5	12 x 55	—	—	—	—	
130	10	7	40	23,9	16,1	1,5	10 x 40	—	—	—	—	
130	12	9	50	23,2	26,8	—	—	1,5 x 1,5	12 x 50	—	—	
150	13	9	50	20	30	—	—	—	—	2 x 1,25	13 x 50	
170	10	7	20	12,6	7,4	—	—	1,5 x 1,5	10 x 20	—	—	
200	11	7	20	10	10	—	—	—	—	2 x 1,25	11 x 20	
200	19,5	14,5	35	20	15	2,5	19,5 x 35	—	—	—	—	
200	20,5	15,5	95	46,2	48,8	2,5	20,5 x 95	—	—	—	—	
210	14	10	40	22,4	17,6	2	14 x 40	—	—	—	—	
220	15	11	40	20	20	2	15 x 40	—	—	—	—	
250	14	10	50	25	25	2	14 x 50	—	—	—	—	
260	17	12,5	85	41	44	2,25	17 x 85	—	—	—	—	
270	12,5	7,5	20	13	7	—	—	—	—	2,5 x 1,5	12,5 x 20	
290	11,5	7,5	20	14,2	5,8	—	—	2 x 2	11,5 x 20	—	—	
400	14	8	25	15	10	—	—	—	—	3 x 1,6	14 x 25	
420	14	9	50	37,5	12,5	—	—	2,5 x 2,5	14 x 50	—	—	
450	12,5	7,5	25	21	4	—	—	2,5 x 2,5	12,5 x 25	—	—	
450	19,5	13,5	40	26	14	3	19,5 x 40	—	—	—	—	
480	17,5	11,5	50	34	16	3	17,5 x 50	—	—	—	—	
490	17,5	11,5	45	31	14	3	17,5 x 45	—	—	—	—	
510	14,5	9,5	32	21,6	10,4	—	—	2,5 x 2,5	14,5 x 32	—	—	
540	21,5	15,5	45	23,6	21,4	3	21,5 x 45	—	—	—	—	
690	17	9	30	32	18	—	—	—	—	4 x 2	17 x 50	
690	17,6	9,6	50	18	12	—	—	—	—	4 x 2	17,6 x 30	
740	15,5	8,5	25	17	8	—	—	—	—	3,5 x 2,2	15,5 x 25	
810	30	22	70	36	34	4	30 x 70	—	—	—	—	
950	25	17	24	16,8	7,2	4	25 x 24	—	—	—	—	
1100	23	15	83	58,4	24,6	—	—	4 x 4	23 x 83	—	—	
1140	21	13	40	29	11	4	21 x 40	—	—	—	—	
1140	21,5	13,5	50	34,4	15,6	4	21,5 x 50	—	—	—	—	
1180	25	13	54	35	19	—	—	—	—	6 x 3	25 x 54	
1180	25	13	65	42	23	—	—	—	—	6 x 3	25 x 65	
1180	25	13	77	50	27	—	—	—	—	6 x 3	25 x 77	
1180	25	13	99	64	35	—	—	—	—	6 x 3	25 x 99	
1180	25	13	123	79	44	—	—	—	—	6 x 3	25 x 123	
1240	30	21	50	32,5	17,5	—	—	4,5 x 4,5	30 x 50	—	—	
1280	21	13	45	34	11	—	—	4 x 4	21 x 45	—	—	
1330	18	10	83	65	18	4	18 x 83	—	—	—	—	
1340	19	11	35	27	8	4	19 x 35	—	—	—	—	
1340	36	26	50	31	19	—	—	5 x 5	36 x 50	—	—	
1570	17,5	9,5	45	37,8	7,2	—	—	4 x 4	17,5 x 45	—	—	
1570	19,5	11,5	45	35,2	9,8	—	—	4 x 4	19,5 x 45	—	—	
1690	19	10	90	72,4	17,6	4,5	19 x 90	—	—	—	—	
1720	19	11	50	39,4	10,6	—	—	4 x 4	19 x 50	—	—	
1790	70	54	60	39	21	—	—	8 x 8	70 x 60	—	—	
2020	32	17	69	45	24	—	—	—	—	7,5 x 4	32 x 69	
2020	32	17	84	55	29	—	—	—	—	7,5 x 4	32 x 84	
2020	32	17	98	64	34	—	—	—	—	7,5 x 4	32 x 98	
2020	32	17	127	83	44	—	—	—	—	7,5 x 4	32 x 127	
2080	56	40	50	36	14	8	56 x 50	—	—	—	—	
2110	32	20	125	93	32	6	32 x 125	—	—	—	—	
2850	30	17	150	122	28	6,5	30 x 150	—	—	—	—	
2950	26	14	45	40,2	4,8	—	—	6 x 6	26 x 45	—	—	
2950	38	21	67	45	22	—	—	—	—	8,5 x 5	38 x 67	
2950	38	21	85	57	28	—	—	—	—	8,5 x 5	38 x 85	
2950	38	21	102	68	34	—	—	—	—	8,5 x 5	38 x 102	
2950	38	21	120	80	40	—	—	—	—	8,5 x 5	38 x 120	
2950	38	21	147	97	50	—	—	—	—	8,5 x 5	38 x 147	
3440	50	28	100	72	28	—	—	—	—	11 x 6	50 x 100	
3440	50	28	150	105	45	—	—	—	—	11 x 6	50 x 150	
3440	50	28	193	135	58	—	—	—	—	11 x 6	50 x 193	
3440	50	28	230	160	70	—	—	—	—	11 x 6	50 x 230	
3630	47	30	50	39	11	8,5	47 x 50	—	—	—	—	
3680	27,8	13,8	70	59	11	7	27,8 x 70	—	—	—	—	
3750	84	64	200	110	90	10	84 x 200	—	—	—	—	
3830	42	26	130	94	36	8	42 x 130	—	—	—	—	
3830	42	26	200	137,7	62,3	8	42 x 200	—	—	—	—	
4610	42	26	72	55,5	16,5	—	—	8 x 8	42 x 72	—	—	
5010	60	40	120	91	29	—	—	10 x 10	60 x 120	—	—	
5100	61	39	180	137	43	11	61 x 180	—	—	—	—	
5300	28	14	98	83,5	14,5	—	—	7 x 7	28 x 98	—	—	
5640	46	26	67	58	9	10	46 x 67	—	—	—	—	
6620	53	31	200	157	43	11	53 x 200	—	—	—	—	

Disc springs



DIN 2093, column A and B

sizes in parenthese are not according to DIN.

Note:

F = spring tension (N)
a = travel stroke (mm)

Order example: Disc spring **SZ 8300**
D_a = 25 mm, D_i = 12,2 mm, t = 1,5 mm
Add **25 x 12,2 x 1,5**
Order number **SZ 8300.25 x 12,2 x 1,5**

Add size to order number

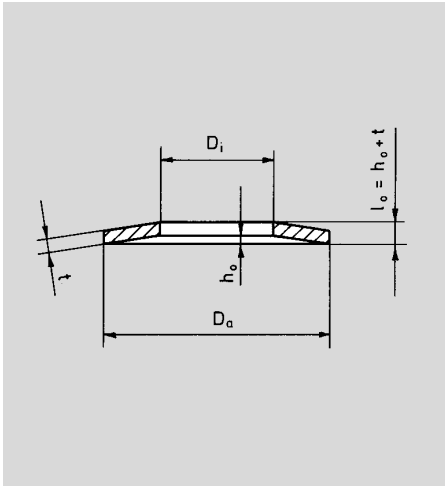
Order number **SZ 8300.** x x

D _a	D _i	t	h ₀	l ₀	s = 0,2 h ₀		s = 0,4 h ₀		s = 0,6 h ₀		s = 0,75 h ₀		Pieces/standard packing	▲	▲
					F *)	s	F *)	s	F *)	s	F *)	s			
8	4,2	0,3	0,25	0,55	42,5	0,05	75,6	0,10	102	0,15	119	0,19	100	08	x 4,2 x 0,3
8	4,2	0,4	0,2	0,6	63,5	0,04	120	0,08	173	0,12	210	0,15	100	08	x 4,2 x 0,4
10	5,2	0,4	0,3	0,7	72,1	0,06	130	0,12	178	0,18	213	0,23	100	10	x 5,2 x 0,4
10	5,2	0,5	0,25	0,75	98,5	0,05	187	0,10	268	0,15	329	0,19	100	10	x 5,2 x 0,5
12,5	6,2	0,5	0,35	0,85	98,3	0,07	180	0,14	248	0,21	291	0,26	100	12,5	x 6,2 x 0,5
12,5	6,2	0,7	0,3	1,0	194	0,06	372	0,12	539	0,18	673	0,23	100	12,5	x 6,2 x 0,7
14	7,2	0,5	0,4	0,9	98,9	0,08	177	0,16	239	0,24	279	0,30	100	14	x 7,2 x 0,5
14	7,2	0,8	0,3	1,1	229	0,06	444	0,12	648	0,18	813	0,23	100	14	x 7,2 x 0,8
15	5,2	0,7	0,4	1,1	174	0,08	326	0,16	461	0,24	555	0,30	100	(15)	x 5,2 x 0,7
16	8,2	0,6	0,45	1,05	141	0,09	255	0,18	349	0,27	412	0,34	100	16	x 8,2 x 0,6
16	8,2	0,9	0,35	1,25	293	0,07	566	0,14	825	0,21	1000	0,26	100	16	x 8,2 x 0,9
18	9,2	0,7	0,5	1,2	191	0,10	348	0,20	480	0,30	572	0,38	100	18	x 9,2 x 0,7
18	9,2	1,0	0,4	1,4	364	0,08	703	0,16	1020	0,24	1250	0,30	100	18	x 9,2 x 1,0
20	10,2	0,8	0,55	1,35	249	0,11	456	0,22	631	0,33	745	0,41	100	20	x 10,2 x 0,8
20	10,2	0,9	0,55	1,45	336	0,11	624	0,22	877	0,33	1040	0,41	100	(20)	x 10,2 x 0,9
20	10,2	1,1	0,45	1,55	443	0,09	854	0,18	1240	0,27	1530	0,34	100	20	x 10,2 x 1,1
22,5	11,2	0,8	0,65	1,45	252	0,13	450	0,26	608	0,39	710	0,49	100	22,5	x 11,2 x 0,8
22,5	11,2	1,25	0,5	1,75	560	0,10	1080	0,20	1570	0,30	1950	0,38	100	22,5	x 11,2 x 1,25
23	12,2	1,25	0,6	1,85	700	0,12	1330	0,24	1920	0,36	2330	0,45	100	(23)	x 12,2 x 1,25
25	12,2	0,9	0,7	1,6	302	0,14	542	0,28	737	0,42	868	0,53	100	25	x 12,2 x 0,9
25	12,2	1,5	0,55	2,05	838	0,11	1630	0,22	2380	0,33	2910	0,41	100	25	x 12,2 x 1,5
28	14,2	1,0	0,8	1,8	392	0,16	702	0,32	949	0,48	1110	0,60	100	28	x 14,2 x 1,0
28	14,2	1,5	0,65	2,15	836	0,13	1600	0,26	2320	0,39	2850	0,49	100	28	x 14,2 x 1,5
31,5	16,3	1,25	0,9	2,15	648	0,18	1180	0,36	1620	0,54	1920	0,68	100	31,5	x 16,3 x 1,25
31,5	16,3	1,75	0,7	2,45	1120	0,14	2170	0,28	3160	0,42	3900	0,53	100	31,5	x 16,3 x 1,75
35,5	18,3	1,25	1,0	2,25	602	0,20	1080	0,40	1460	0,60	1700	0,75	50	35,5	x 18,3 x 1,25
35,5	18,3	2,0	0,8	2,8	1500	0,16	2910	0,32	4230	0,48	5190	0,60	50	35,5	x 18,3 x 2,0
40	20,4	1,5	1,15	2,65	911	0,23	1640	0,46	2240	0,69	2620	0,86	50	40	x 20,4 x 1,5
40	20,4	2,25	0,9	3,15	1890	0,18	3640	0,36	5300	0,54	6540	0,68	50	40	x 20,4 x 2,25
45	22,4	1,75	1,3	3,05	1250	0,26	2260	0,52	3100	0,78	3660	0,98	50	45	x 22,4 x 1,75
45	22,4	2,5	1,0	3,5	2240	0,20	4320	0,40	6290	0,60	7720	0,75	50	45	x 22,4 x 2,5
50	25,4	2,0	1,4	3,4	1600	0,28	2910	0,56	4020	0,84	4760	1,05	50	50	x 25,4 x 2,0
50	25,4	2,5	1,4	3,9	2820	0,28	5300	0,56	7520	0,84	9060	1,05	50	(50)	x 25,4 x 2,5
50	25,4	3,0	1,1	4,1	3430	0,22	6660	0,44	9740	0,66	12000	0,83	50	50	x 25,4 x 3,0
56	28,5	2,0	1,6	3,6	1570	0,32	2810	0,64	3810	0,96	4440	1,20	50	56	x 28,5 x 2,0
56	28,5	3,0	1,3	4,3	3350	0,26	6430	0,52	9320	0,78	11400	0,98	50	56	x 28,5 x 3,0
63	31	2,5	1,75	4,25	2410	0,35	4400	0,70	6080	1,05	7180	1,31	50	63	x 31 x 2,5
63	31	3,5	1,4	4,9	4360	0,28	8420	0,56	12300	0,84	15000	1,05	50	63	x 31 x 3,5

*) Disc springs arranged according to forces see concerning page. Sizes in parentheses are not according to DIN.

Disc springs

arranged according to forces



Explication:

F = Spring tension (N) of a disc spring respectively a group with $s = 0,75 h_o$.
The named force at two or threefold layer arrangement is the theoretically calculated value. The real data differ because of occurring friction losses.

s = Travel stroke of one disc respectively of a group ($0,75 h_o$).

l_{o1} = Total height of single disc ($h_o + t$).

l_{o2} = Total height of a single group with two-fold layer arrangement ($h_o + 2 \cdot t$).

l_{o3} = Total height of a disc group threefold layer arrangement ($h_o + 3 \cdot t$).



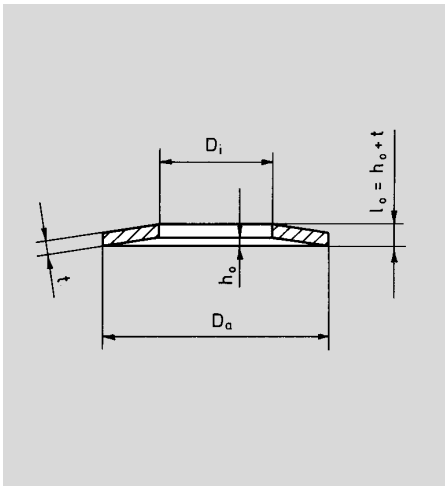
Add size to order number

Order number **SZ 8300.** x x

Spring tension F_n (N)	$s = 0,75 h_o$	D_a	D_i	t	l_{o1}	D_a	D_i	t	l_{o2}	D_a	D_i	t	l_{o3}	▲	▲
119	0,19	8	4,2	0,3	0,55									08	x 4,2 x 0,3
210	0,15	8	4,2	0,4	0,6									08	x 4,2 x 0,4
213	0,23	10	5,2	0,4	0,7									10	x 5,2 x 0,4
238	0,19					8	4,2	0,3	0,85					08	x 4,2 x 0,3
279	0,30	14	7,2	0,5	0,9									14	x 7,2 x 0,5
291	0,26	12,5	6,2	0,5	0,85									12,5	x 6,2 x 0,5
329	0,19	10	5,2	0,5	0,75									10	x 5,2 x 0,5
357	0,19									8	4,2	0,3	1,15	08	x 4,2 x 0,3
412	0,34	16	8,2	0,6	1,05									16	x 8,2 x 0,6
420	0,15					8	4,2	0,4	1,0					08	x 4,2 x 0,4
426	0,23					10	5,2	0,4	1,1					10	x 5,2 x 0,4
555	0,30	15	5,2	0,7	1,1									15	x 5,2 x 0,7
558	0,30					14	7,2	0,5	1,4					14	x 7,2 x 0,5
572	0,38	18	9,2	0,7	1,2									18	x 9,2 x 0,7
582	0,26					12,5	6,2	0,5	1,35					12,5	x 6,2 x 0,5
630	0,15									8	4,2	0,4	1,4	08	x 4,2 x 0,4
639	0,23									10	5,2	0,4	1,5	10	x 5,2 x 0,4
658	0,19					10	5,2	0,5	1,25					10	x 5,2 x 0,5
673	0,23	12,5	6,2	0,7	1,0									12,5	x 6,2 x 0,7
710	0,49	22,5	11,2	0,8	1,45									22,5	x 11,2 x 0,8
745	0,41	20	10,2	0,8	1,35									20	x 10,2 x 0,8
813	0,23	14	7,2	0,8	1,1									14	x 7,2 x 0,8
824	0,34					16	8,2	0,6	1,65					16	x 8,2 x 0,6
837	0,30									14	7,2	0,5	1,9	14	x 7,2 x 0,5
868	0,53	25	12,2	0,9	1,6									25	x 12,2 x 0,9
873	0,26									12,5	6,2	0,5	1,85	12,5	x 6,2 x 0,5
987	0,19									10	5,2	0,5	1,75	10	x 5,2 x 0,5
1000	0,26	16	8,2	0,9	1,25									16	x 8,2 x 0,9
1040	0,41	20	10,2	0,9	1,45									20	x 10,2 x 0,9
1110	0,30					15	5,2	0,7	1,8					15	x 5,2 x 0,7
1110	0,60	28	14,2	1,0	1,8									28	x 14,2 x 1,0
1144	0,38					18	9,2	0,7	1,9					18	x 9,2 x 0,7
1236	0,34									16	8,2	0,6	2,25	16	x 8,2 x 0,6
1250	0,30	18	9,2	1,0	1,4									18	x 9,2 x 1,0
1346	0,23					12,5	6,2	0,7	1,7					12,5	x 6,2 x 0,7
1420	0,49					22,5	11,2	0,8	2,25					22,5	x 11,2 x 0,8
1490	0,41					20	10,2	0,8	2,15					20	x 10,2 x 0,8
1530	0,34	20	10,2	1,1	1,55									20	x 10,2 x 1,1

Disc springs

arranged according to forces



Explication:

F = Spring tension (N) of a disc spring respectively a group with $s = 0,75 h_0$.
The named force at two or threefold layer arrangement is the theoretically calculated value. The real data differ because of occurring friction losses.

s = Travel stroke of one disc respectively of a group ($0,75 h_0$).

l_{01} = Total height of single disc ($h_0 + t$).

l_{02} = Total height of a single group with two-fold layer arrangement ($h_0 + 2 \cdot t$).

l_{03} = Total height of a disc group threefold layer arrangement ($h_0 + 3 \cdot t$).



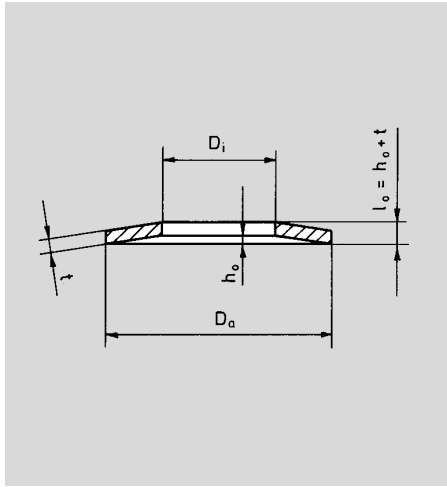
Add size to order number

Order number **SZ 8300.** x x

Spring tension F_n (N)	$s = 0,75 h_0$	D_a	D_i	t	l_{01}	D_a	D_i	t	l_{02}	D_a	D_i	t	l_{03}	▲	▲
1626	0,23					14	7,2	0,8	1,9					14	x 7,2 x 0,8
1665	0,30									15	5,2	0,7	2,5	15	x 5,2 x 0,7
1700	0,75	35,5	18,3	1,25	2,25									35,5	x 18,3 x 1,25
1716	0,38									18	9,2	0,7	2,6	18	x 9,2 x 0,7
1736	0,53					25	12,2	0,9	2,5					25	x 12,2 x 0,9
1920	0,68	31,5	16,3	1,25	2,15									31,5	x 16,3 x 1,25
1950	0,38	22,5	11,2	1,25	1,75									22,5	x 11,2 x 1,25
2000	0,26					16	8,2	0,9	2,15					16	x 8,2 x 0,9
2019	0,23									12,5	6,2	0,7	2,4	12,5	x 6,2 x 0,7
2080	0,41					20	10,2	0,9	2,35					20	x 10,2 x 0,9
2130	0,49									22,5	11,2	0,8	3,05	22,5	x 11,2 x 0,8
2220	0,60					28	14,2	1,0	2,8					28	x 14,2 x 1,0
2235	0,41									20	10,2	0,8	2,95	20	x 10,2 x 0,8
2330	0,45	23	12,2	1,25	1,85									23	x 12,2 x 1,25
2439	0,23									14	7,2	0,8	2,7	14	x 7,2 x 0,8
2500	0,30					18	9,2	1,0	2,4					18	x 9,2 x 1,0
2604	0,53									25	12,2	0,9	3,4	25	x 12,2 x 0,9
2620	0,86	40	20,4	1,5	2,65									40	x 20,4 x 1,5
2850	0,49	28	14,2	1,5	2,15									28	x 14,2 x 1,5
2910	0,41	25	12,2	1,5	2,05									25	x 12,2 x 1,5
3000	0,26									16	8,2	0,9	3,05	16	x 8,2 x 0,9
3060	0,34					20	10,2	1,1	2,65					20	x 10,2 x 1,1
3120	0,41									20	10,2	0,9	3,25	20	x 10,2 x 0,9
3330	0,60									28	14,2	1,0	3,8	28	x 14,2 x 1,0
3400	0,75													35,5	x 18,3 x 1,25
3660	0,98	45	22,4	1,75	3,05	35,5	18,3	1,25	3,5					45	x 22,4 x 1,75
3750	0,30									18	9,2	1,0	3,4	18	x 9,2 x 1,0
3840	0,68					31,5	16,3	1,25	3,4					31,5	x 16,3 x 1,25
3900	0,38					22,5	11,2	1,25	3,0					22,5	x 11,2 x 1,25
3900	0,53	31,5	16,3	1,75	2,45									31,5	x 16,3 x 1,75
4440	1,20	56	28,5	2,0	3,6									56	x 28,5 x 2,0
4590	0,34									20	10,2	1,1	3,75	20	x 10,2 x 1,1
4660	0,45					23	12,2	1,25	3,1					23	x 12,2 x 1,25
4760	1,05	50	25,4	2,0	3,4									50	x 25,4 x 2,0
5100	0,75									35,5	18,3	1,25	4,75	35,5	x 18,3 x 1,25
5190	0,60	35,5	18,3	2,0	2,8									35,5	x 18,3 x 2,0
5240	0,86					40	20,4	1,5	4,15					40	x 20,4 x 1,5
5700	0,49					28	14,2	1,5	3,65					28	x 14,2 x 1,5

Disc springs

arranged according to forces



Explication:

F = Spring tension (N) of a disc spring respectively a group with $s = 0,75 h_0$.
The named force at two or threefold layer arrangement is the theoretically calculated value. The real data differ because of occurring friction losses.

s = Travel stroke of one disc respectively of a group ($0,75 h_0$).

l_{01} = Total height of single disc ($h_0 + t$).

l_{02} = Total height of a single group with two-fold layer arrangement ($h_0 + 2 \cdot t$).

l_{03} = Total height of a disc group threefold layer arrangement ($h_0 + 3 \cdot t$).



Add size to order number

Order number **SZ 8300**. x x

Spring tension F_n (N)	$s = 0,75 h_0$	D_a	D_i	t	l_{01}	D_a	D_i	t	l_{02}	D_a	D_i	t	l_{03}	▲	▲
5760	0,68									31,5	16,3	1,25	4,65	31,5 x 16,3 x 1,25	
5820	0,41					25	12,2	1,5	3,55					25 x 12,2 x 1,5	
5850	0,38									22,5	11,2	1,25	4,25	22,5 x 11,2 x 1,25	
6540	0,68	40	20,4	2,25	3,15									40 x 20,4 x 2,25	
6990	0,45									23	12,2	1,25	4,35	23 x 12,2 x 1,25	
7180	1,31	63	31	2,5	4,25									63 x 31 x 2,5	
7320	0,98					45	22,4	1,75	4,8					45 x 22,4 x 1,75	
7720	0,75	45	22,4	2,5	3,5									45 x 22,4 x 2,5	
7800	0,53					31,5	16,3	1,75	4,2					31,5 x 16,3 x 1,75	
7860	0,86									40	20,4	1,5	5,65	40 x 20,4 x 1,5	
8550	0,49									28	14,2	1,5	5,15	28 x 14,2 x 1,5	
8730	0,41									25	12,2	1,5	5,05	25 x 12,2 x 1,5	
8880	1,20					56	28,5	2,0	5,6					56 x 28,5 x 2,0	
9060	1,05	50	25,4	2,5	3,9									50 x 25,4 x 2,5	
9520	1,05					50	25,4	2,0	5,4					50 x 25,4 x 2,0	
10380	0,60					35,5	18,3	2,0	4,8					35,5 x 18,3 x 2,0	
10980	0,98									45	22,4	1,75	6,55	45 x 22,4 x 1,75	
11400	0,98	56	28,5	3,0	4,3									56 x 28,5 x 3,0	
11700	0,53									31,5	16,3	1,75	5,95	31,5 x 16,3 x 1,75	
12000	0,83	50	25,4	3,0	4,1									50 x 25,4 x 3,0	
13080	0,68					40	20,4	2,25	5,4					40 x 20,4 x 2,25	
13320	1,20									56	28,5	2,0	7,6	56 x 28,5 x 2,0	
14280	1,05									50	25,4	2,0	7,4	50 x 25,4 x 2,0	
14360	1,31					63	31	2,5	6,75					63 x 31 x 2,5	
15000	1,05	63	31	3,5	4,9									63 x 31 x 3,5	
15440	0,75					45	22,4	2,5	6,0					45 x 22,4 x 2,5	
15570	0,60									35,5	18,3	2,0	6,8	35,5 x 18,3 x 2,0	
18120	1,05					50	25,4	2,5	6,4					50 x 25,4 x 2,5	
19620	0,68									40	20,4	2,25	7,65	40 x 20,4 x 2,25	
21540	1,31									63	31	2,5	9,25	63 x 31 x 2,5	
22800	0,98					56	28,5	3,0	7,3					56 x 28,5 x 3,0	
23160	0,75									45	22,4	2,5	8,5	45 x 22,4 x 2,5	
24000	0,83					50	25,4	3,0	7,1					50 x 25,4 x 3,0	
27180	1,05									50	25,4	2,5	8,9	50 x 25,4 x 2,5	
30000	1,05					63	31	3,5	8,4					63 x 31 x 3,5	
34200	0,98									56	28,5	3,0	10,3	56 x 28,5 x 3,0	
36000	0,83									50	25,4	3,0	10,1	50 x 25,4 x 3,0	
45000	1,05									63	31	3,5	11,9	63 x 31 x 3,5	

Three-Piece Stripper Bolt Unit SZ 8580



Three-Piece Stripper Bolt Unit

The three-piece stripper bolt unit is used as a holding piece, spring unit, fitting bolt or a distance collar unit.

Design:

Distance collar: Material 9 S Mn 28K
Case-hardened 62 – 65 HRC
Outside diameter ground

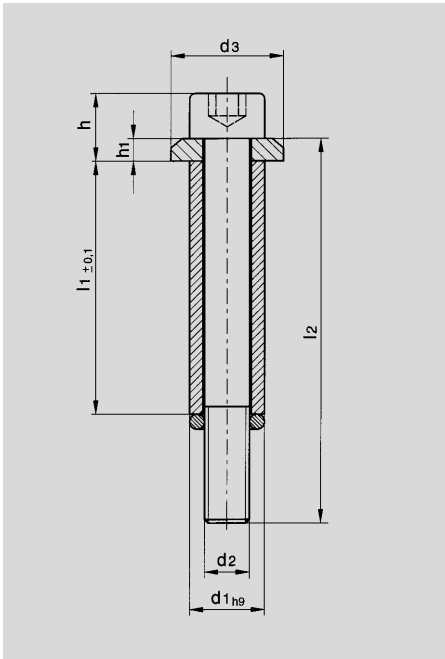
Tip:

The three-piece stripper bolt unit is mounted with an o-ring at delivery. Please remove it before installing.

Order example: Three-piece stripper bolt unit complete **SZ 8580**
 $d_1 = 12$ mm, $l_1 = 50$ mm
Add **12 x 050**
Order number **SZ 8580.12 x 050**

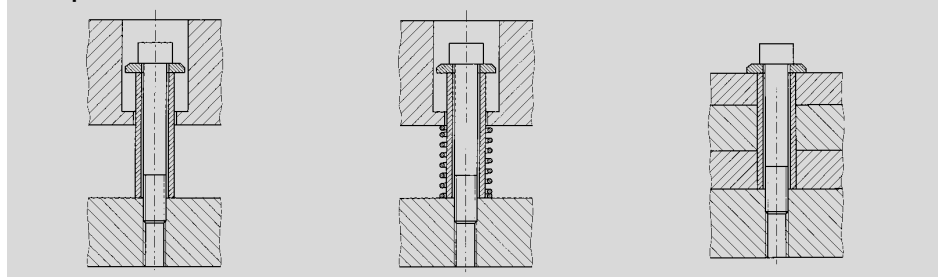
Add size to order number

Order number **SZ 8580.** x



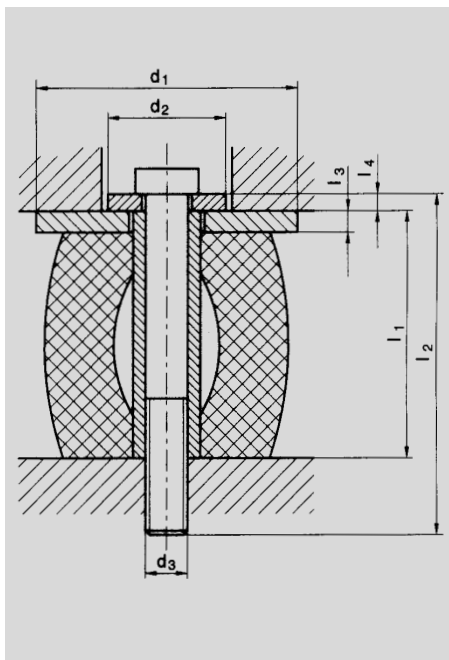
d_1	d_2	d_3	l_1	l_2	h	h_1	▲
10	M6	15	20	35	10	4	10 x 020
			30	45			10 x 030
			40	60			10 x 040
			50	70			10 x 050
			63	80			10 x 063
			80	100			10 x 080
12	M8	19	20	35	13	5	12 x 020
			30	45			12 x 030
			40	60			12 x 040
			50	70			12 x 050
			63	80			12 x 063
			80	100			12 x 080
16	M10	23	30	50	15,5	5,5	16 x 030
			40	60			16 x 040
			50	70			16 x 050
			63	80			16 x 063
			80	100			16 x 080
			100	120			16 x 100
20	M12	27	30	50	19	7	20 x 030
			40	60			20 x 040
			50	70			20 x 050
			63	90			20 x 063
			80	100			20 x 080
			100	120			20 x 100
25	M16	34	50	80	23	7	25 x 050
			63	90			25 x 063
			80	110			25 x 080
			100	130			25 x 100
			125	150			25 x 125

Examples of use



Spring Unit SZ 8526, SZ 8527

for Elastomer Springs



Elastomer spring unit complete

The elastomer spring units can be used for any compression distance / stroke. The spring travel including pre-load is max. 25% to 35% of L_0 of the elastomer spring in use.

The elastomer spring unit complete consists of:

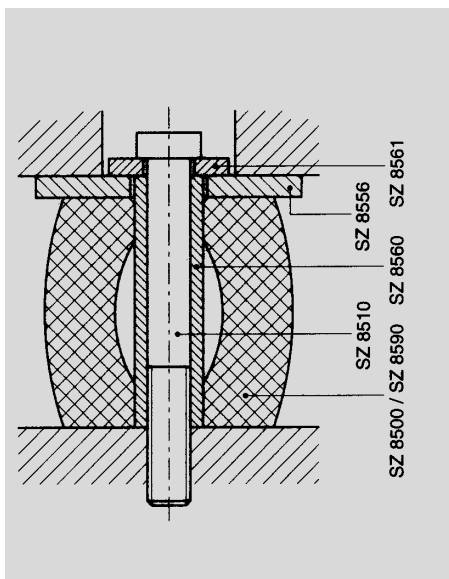
- Elastomer spring SZ 8500 or SZ 8590
- Spring washer SZ 8556
- Disc SZ 8561
- Distance collar SZ 8560
- Cheese head screw SZ 8510

Order example: Elastomer spring unit with rubber spring SZ 8500

$d_1 = 50\text{ mm}$, $l_1 = 63\text{ mm}$

Add: **050 x 063**

Order number **SZ 8526.050 x 063**



Add
size to
order number

with rubber spring SZ 8500

Order number **SZ 8526.**

x

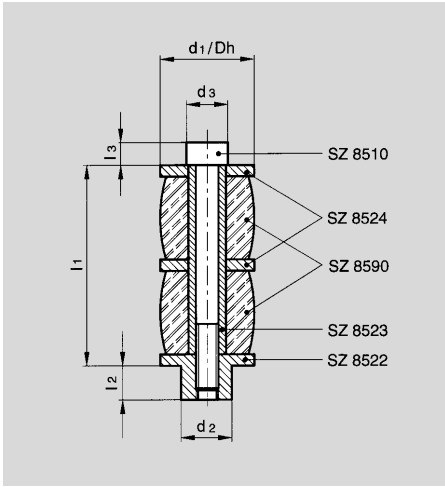
with polyurethane spring SZ 8590

Order number **SZ 8527.**

x

d_1	d_2	d_3	l_1	l_2	l_3	l_4	Elast. spring	▲
30	17	M6	20	30	5	3	025 x 020	030 x 020
30	17	M6	30	40	5	3	025 x 032	030 x 032
30	17	M6	40	50	5	3	025 x 040	030 x 040
40	23	M8	30	50	5	4	032 x 032	040 x 032
40	23	M8	40	60	5	4	032 x 040	040 x 040
40	23	M8	50	70	5	4	032 x 050	040 x 050
40	23	M8	63	80	5	4	032 x 063	040 x 063
50	23	M8	30	50	5	4	040 x 032	050 x 032
50	23	M8	40	60	5	4	040 x 040	050 x 040
50	23	M8	50	70	5	4	040 x 050	050 x 050
50	23	M8	63	80	5	4	040 x 063	050 x 063
50	23	M8	80	100	5	4	040 x 080	050 x 080
60	26	M10	30	50	6	4	050 x 032	060 x 032
60	26	M10	40	60	6	4	050 x 040	060 x 040
60	26	M10	50	70	6	4	050 x 050	060 x 050
60	26	M10	63	80	6	4	050 x 063	060 x 063
60	26	M10	80	100	6	4	050 x 080	060 x 080
60	26	M10	100	120	6	4	050 x 100	060 x 100
80	26	M10	30	50	6	4	063 x 032	080 x 032
80	26	M10	40	60	6	4	063 x 040	080 x 040
80	26	M10	50	70	6	4	063 x 050	080 x 050
80	26	M10	63	80	6	4	063 x 063	080 x 063
80	26	M10	80	100	6	4	063 x 080	080 x 080
80	26	M10	100	120	6	4	063 x 100	080 x 100
80	26	M10	125	140	6	4	063 x 125	080 x 125
100	30	M12	30	50	8	5	080 x 032	100 x 032
100	30	M12	40	60	8	5	080 x 040	100 x 040
100	30	M12	50	70	8	5	080 x 050	100 x 050
100	30	M12	63	80	8	5	080 x 063	100 x 063
100	30	M12	80	100	8	5	080 x 080	100 x 080
100	30	M12	100	120	8	5	080 x 100	100 x 100
100	30	M12	125	140	8	5	080 x 125	100 x 125
120	30	M12	30	50	8	5	100 x 032	120 x 032
120	30	M12	40	60	8	5	100 x 040	120 x 040
120	30	M12	50	70	8	5	100 x 050	120 x 050
120	30	M12	63	80	8	5	100 x 063	120 x 063
120	30	M12	80	100	8	5	100 x 080	120 x 080
120	30	M12	100	120	8	5	100 x 100	120 x 100
120	30	M12	125	140	8	5	100 x 125	120 x 125

Elastomer Spring Units



Elastomer units complete, pre-tensed

The spring units can be used for any compression distance. The spring travel including pre-tension is maximally 25% of L_0 of the elastomer springs SZ 8590 in use. The spring force is visible on the Force/Travel diagram of SZ 8590.

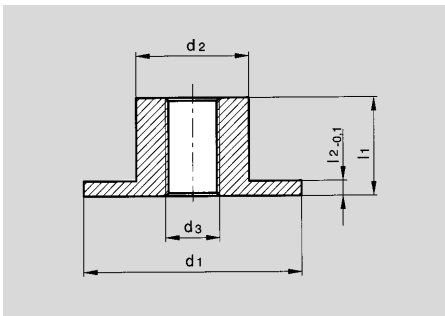
Order example: Spring unit complete, pre-tensed, **SZ 8520**.
Diameter 40 mm
Installation height 83 mm
Add **40 x 083**
Order number **SZ 8520 x 40 x 083**

Add size to order number

Order number **SZ 8520**. x

Tube Ø						SZ 8510 included in SZ 8520	SZ 8522 included in SZ 8520	SZ 8523 included in SZ 8520	SZ 8524 included in SZ 8520	SZ 8590 included in SZ 8520	▲
d_1/D_h	d_2	d_3	l_1	l_2	l_3						
25	13	10	53	9	6	06 x 060	25	08 x 050	25	020 x 025	25 x 053
			67			06 x 080	25	08 x 064	25	020 x 032	25 x 067
32	16	13	53	11	8	08 x 060	32	10 x 050	32	025 x 025	32 x 053
			67			08 x 080	32	10 x 064	32	025 x 032	32 x 067
			83			08 x 090	32	10 x 080	32	025 x 040	32 x 083
40	20	16	67	14	10	10 x 080	40	13 x 064	40	032 x 032	40 x 067
			83			10 x 090	40	13 x 080	40	032 x 040	40 x 083
			103			10 x 110	40	13 x 100	40	032 x 050	40 x 103
50	25	16	86	14	10	10 x 090	50	13 x 082	50	040 x 040	50 x 086
			106			10 x 120	50	13 x 102	50	040 x 050	50 x 106
			132			10 x 140	50	13 x 128	50	040 x 063	50 x 132

Single components of spring units

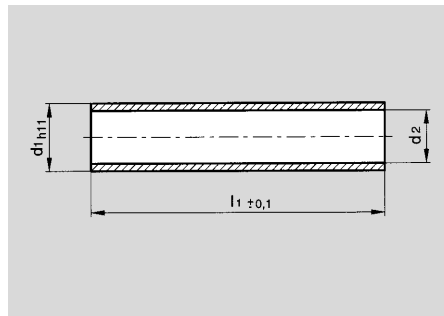


Holding socket

Add size to order number

Order number **SZ 8522**.

d_1	d_2	d_3	l_1	$l_{2-0,1}$	▲
25	13	M6	12	3	25
32	16	M8	14	3	32
40	20	M10	17	3	40
50	25	M10	18	4	50

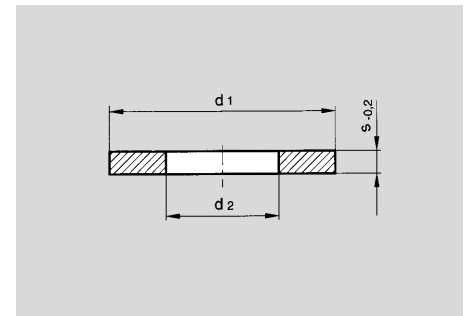


Distance tube

Add size to order number

Order number **SZ 8523**. x

d_1	d_2	l	▲
8,0	6,5	50	08 x 050
		64	08 x 064
		80	10 x 080
10,0	8,5	50	10 x 050
		64	10 x 064
		80	10 x 080
		64	13 x 064
		80	13 x 080
13,0	11,0	82	13 x 082
		100	13 x 100
		102	13 x 102
		128	13 x 128



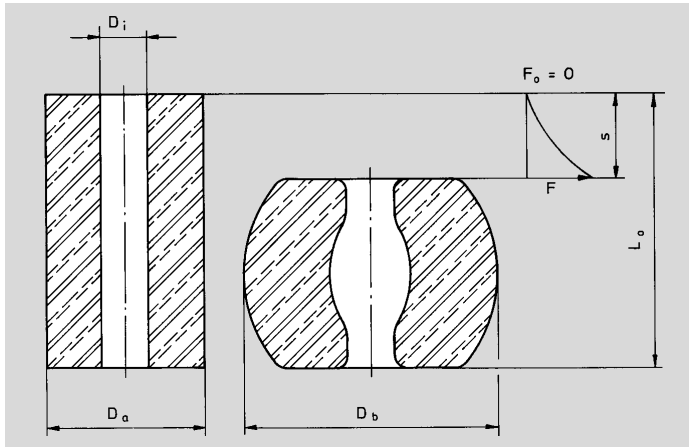
Disc

Add size to order number

Order number **SZ 8524**.

d_1	d_2	$s_{-0,2}$	▲
25	8,0	3	25
32	10,0	3	32
40	13,0	3	40
50	13,0	4	50

Elastomer springs



Rubber springs

DIN ISO 10 069

Material: Chloroprene-elastomer (CR)
hardness 70 ± 3 Shore A

Admissible travel stroke $s_{max} = 0,35 L_0$
Settling inclination 3 – 5 % von L_0
Rubber springs are qualified for large travel strokes.
Heat resistance up to + 80 °C
short-time up to 120 °C.

Add size to order number

Order example: Rubber spring SZ 8500

$D_a = 32$ mm, $L_0 = 40$ mm

Add **032 x 040**

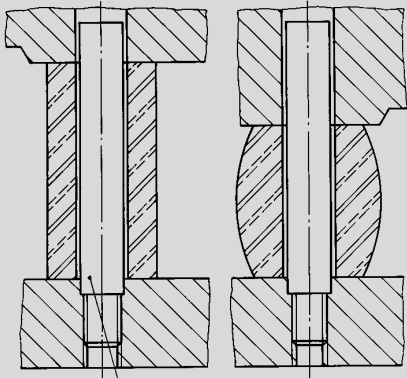
Order number **SZ 8500.032 x 040**

Order number SZ 8500. <input type="text"/> x <input type="text"/>						▲
D_a	D_i	L_0	D_b	D_1	Pieces/standard packing	
16	6,5	12	22	28	10	016 x 012
		16			10	016 x 016
		20			10	016 x 020
		25			10	016 x 025
20	8,5	16	27	32	10	020 x 016
		20			10	020 x 020
		25			10	020 x 025
		32			10	020 x 032
25	10,5	20	34	36	5	025 x 020
		25			5	025 x 025
		32			5	025 x 032
		40			5	025 x 040
32	13,5	32	43	45	5	032 x 032
		40			5	032 x 040
		50			5	032 x 050
		63			5	032 x 063
40	13,5	32	54	56	3	040 x 032
		40			3	040 x 040
		50			3	040 x 050
		63			3	040 x 063
		80			3	040 x 080
50	17	32	68	71	3	050 x 032
		40			3	050 x 040
		50			3	050 x 050
		63			2	050 x 063
		80			2	050 x 080
		100			2	050 x 100
63	17	32	85	90	2	063 x 032
		40			2	063 x 040
		50			2	063 x 050
		63			2	063 x 063
		80			1	063 x 080
		100			1	063 x 100
		125			1	063 x 125
80	21	32	108	112	1	080 x 032
		40			1	080 x 040
		50			1	080 x 050
		63			1	080 x 063
		80			1	080 x 080
		100			1	080 x 100
		125			1	080 x 125
100	21	32	135	140	1	100 x 032
		40			1	100 x 040
		50			1	100 x 050
		63			1	100 x 063
		80			1	100 x 080
		100			1	100 x 100
		125			1	100 x 125
125	27	32	169	180	1	125 x 032
		40			1	125 x 040
		50			1	125 x 050
		63			1	125 x 063
		80			1	125 x 080
		100			1	125 x 100
		125			1	125 x 125
		160			1	125 x 160

Elastomer springs

Mounting examples

Force – stroke diagrams for rubber springs SZ 8500



Guide bolt
SZ 8555
Single layer arrangement

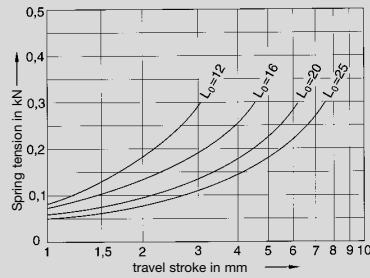


Fig. 1. Spring CR 16

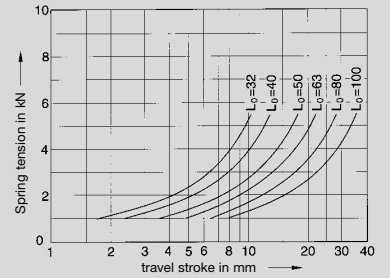


Fig. 6. Spring CR 50

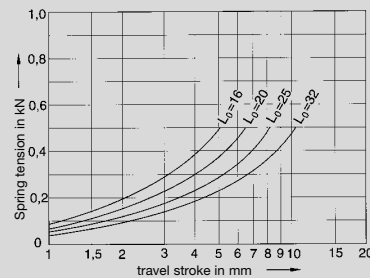


Fig. 2. Spring CR 20

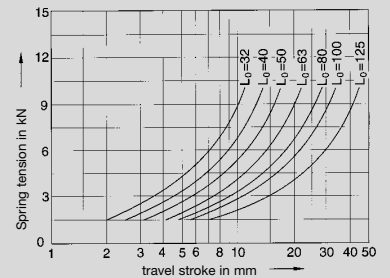
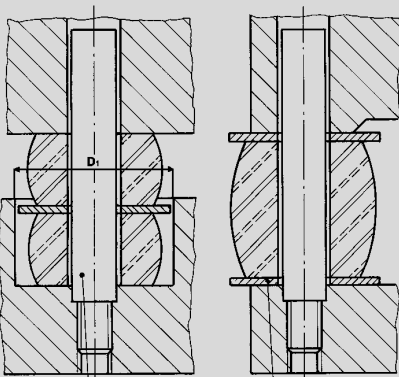


Fig. 7. Spring CR 63

Double layer arrangement Single layer arrangement



Guide bolt
SZ 8555 Spring washer
SZ 8556

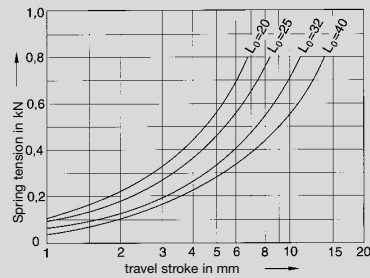


Fig. 3. Spring CR 25

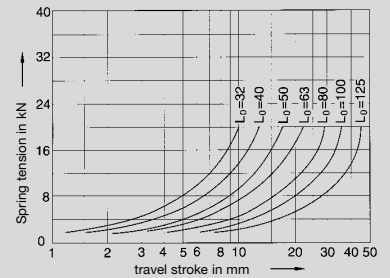


Fig. 8. Spring CR 80

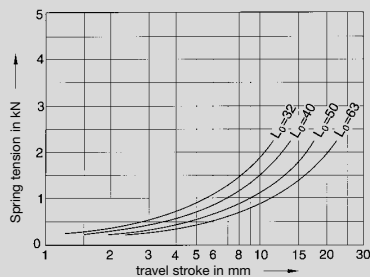


Fig. 4. Spring CR 32

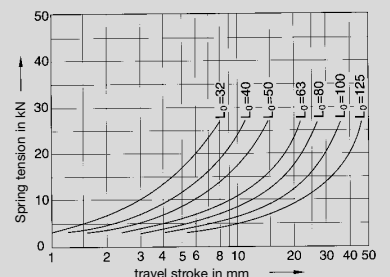


Fig. 9. Spring CR 100

Mounting examples

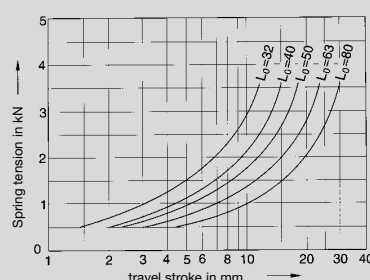


Fig. 5. Spring CR 40

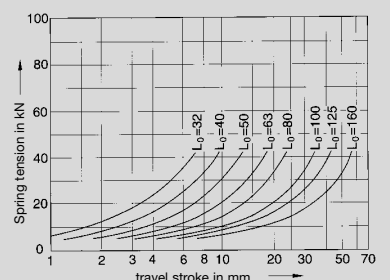
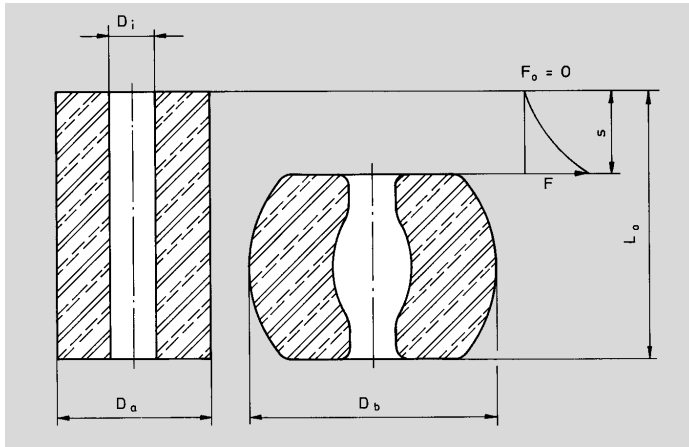


Fig. 10. Spring CR 125

Elastomer springs



Polyurethane spring

DIN ISO 10 069

Material: Vulkollan
polyurethane-elastomer (PUR)
hardness 90 ± 5 Shore A

Admissible travel stroke $s_{max} = 0,25 L_0$
Settling inclination 8 – 10 % von L_0
Polyurethane springs are qualified for strong spring powers.
Heat resistance up to + 80 °C
short-time up to +120 °C.

Add
size to
order number

Order example: Polyurethane spring **SZ 8590**

$D_a = 50$ mm, $L_0 = 63$ mm

Add **050 x 063**

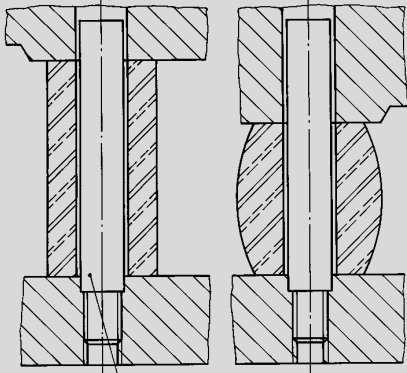
Order number **SZ 8590.050 x 063**

						Order number SZ 8590. <input type="checkbox"/> x <input type="checkbox"/>	
D_a	D_i	L_0	D_b	D_1	Pieces/standard packing		▲
16	6,5	12	20	28	10		016 x 012
		16			10	016 x 016	
		20			10	016 x 020	
		25			10	016 x 025	
20	8,5	16	25	32	10		020 x 016
		20			10	020 x 020	
		25			10	020 x 025	
		32			10	020 x 032	
25	10,5	20	31	36	5		025 x 020
		25			5	025 x 025	
		32			5	025 x 032	
		40			5	025 x 040	
32	13,5	32	40	45	5		032 x 032
		40			5	032 x 040	
		50			5	032 x 050	
		63			5	032 x 063	
40	13,5	32	50	56	3		040 x 032
		40			3	040 x 040	
		50			3	040 x 050	
		63			3	040 x 063	
		80			3	040 x 080	
50	17	32	63	71	3		050 x 032
		40			3	050 x 040	
		50			3	050 x 050	
		63			2	050 x 063	
		80			2	050 x 080	
		100			2	050 x 100	
63	17	32	79	90	2		063 x 032
		40			2	063 x 040	
		50			2	063 x 050	
		63			2	063 x 063	
		80			1	063 x 080	
		100			1	063 x 100	
		125			1	063 x 125	
80	21	32	100	112	1		080 x 032
		40			1	080 x 040	
		50			1	080 x 050	
		63			1	080 x 063	
		80			1	080 x 080	
		100			1	080 x 100	
		125			1	080 x 125	
100	21	32	125	140	1		100 x 032
		40			1	100 x 040	
		50			1	100 x 050	
		63			1	100 x 063	
		80			1	100 x 080	
		100			1	100 x 100	
		125			1	100 x 125	
125	27	32	156	180	1		125 x 032
		40			1	125 x 040	
		50			1	125 x 050	
		63			1	125 x 063	
		80			1	125 x 080	
		100			1	125 x 100	
		125			1	125 x 125	
		160			1	125 x 160	

Elastomer springs

Mounting examples

Force – stroke diagrams for rubber springs SZ 8590



Single layer arrangement

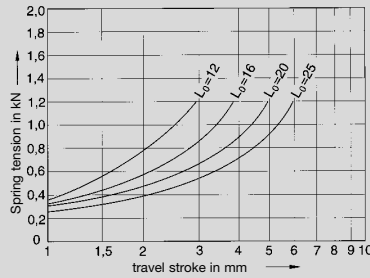


Fig. 1. Spring PUR 16

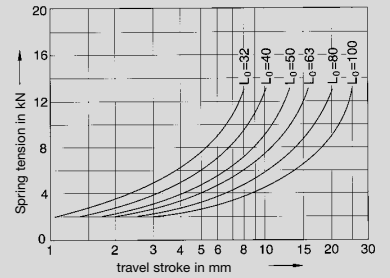


Fig. 6. Spring PUR 50

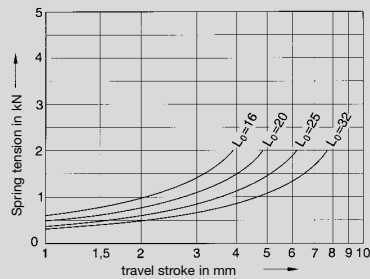


Fig. 2. Spring PUR 20

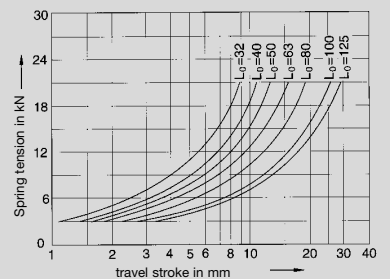
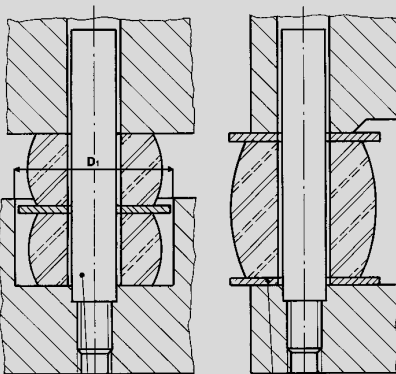


Fig. 7. Spring PUR 63

Double layer arrangement Single layer arrangement



Guide bolt
SZ 8555

Spring washer
SZ 8556

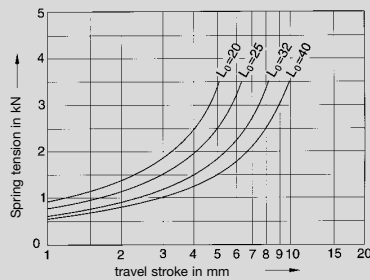


Fig. 3. Spring PUR 25

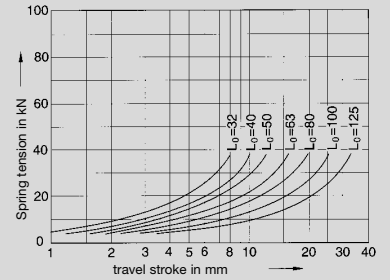


Fig. 8. Spring PUR 80

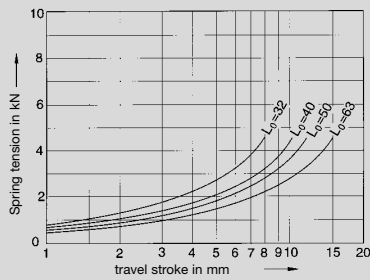


Fig. 4. Spring PUR 32

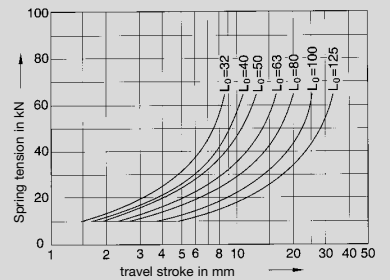


Fig. 9. Spring PUR 100

Mounting examples

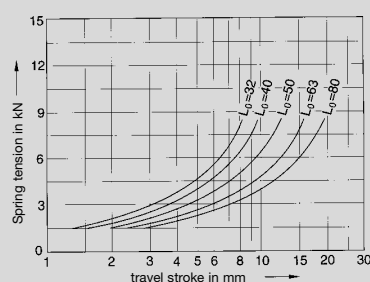


Fig. 5. Spring PUR 40

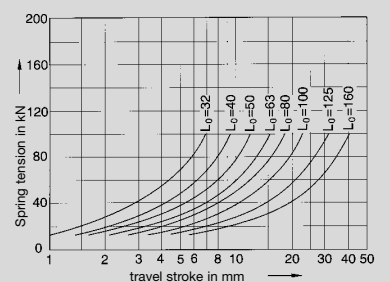
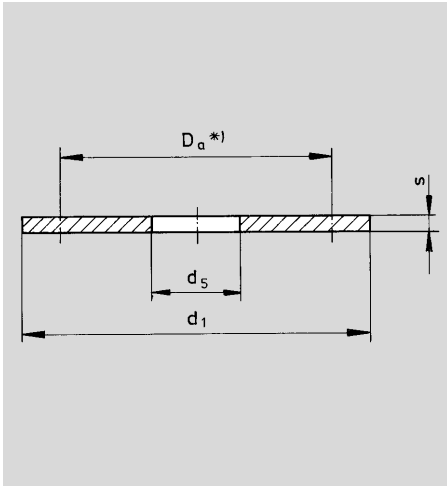


Fig. 10. Spring PUR 125

Spring washers

for rubber springs and polyurethane springs



Flat spring washer
DIN ISO 10 069

Material: brass

Order example: Flat spring washer **SZ 8556**
for rubber and plastic springs
 $D_a = 20$ mm
Add **020**
Order number **SZ 8556.020**

Add
size to
order number

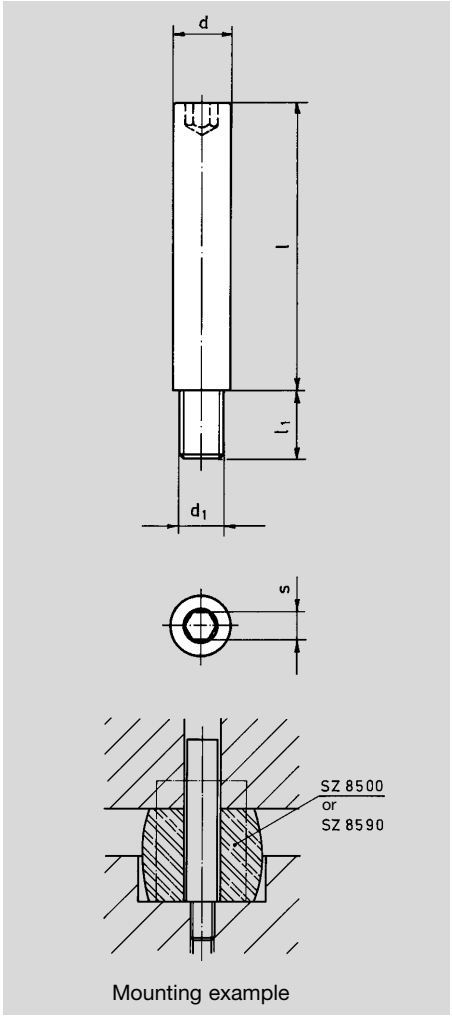
Order number **SZ 8556.**

$D_a^{*)}$	d_1	d_s	s	▲
16	20	6,5	4	016
20	25	8,5	4	020
25	30	10,5	5	025
32	40	13,5	5	032
40	50	13,5	5	040
50	60	16,5	6	050
63	80	16,5	6	063
80	100	20,5	8	080
100	120	20,5	8	100
125	150	26,0	8	125

*) D_a = spring diameter

Guide bolts

for rubber and polyurethane springs



DIN ISO 10 069

Material: Ruggedness grade 8.8

Order example: Guide bolt for rubber springs and polyurethane springs

SZ 8555

d = 10 mm, l = 32 mm

Add **10 x 032**

Order number **SZ 8555.10 x 032**

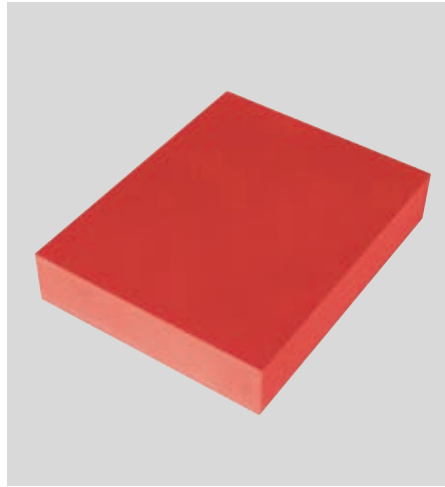
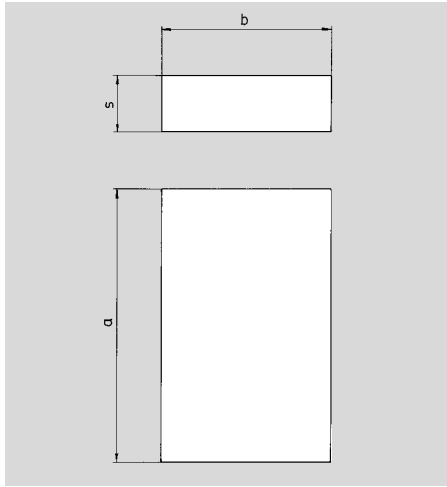
Add size to order number
Order number **SZ 8555.** x

d _{h11}	d ₁	l	l ₁	s	Pieces/standard packing ▲	
6	M4	20	6	3	10	06 x 020
		25			10	06 x 025
		32			10	06 x 032
8	M6	20	9	4	10	08 x 020
		25			10	08 x 025
		32			10	08 x 032
		40			10	08 x 040
		50			10	08 x 050
10	M8	20	15	5	10	10 x 020
		25			10	10 x 025
		32			5	10 x 032
		40			5	10 x 040
		50			5	10 x 050
		63			5	10 x 063
13	M10	32	15	6	5	13 x 032
		40			5	13 x 040
		50			5	13 x 050
		63			5	13 x 063
		80			5	13 x 080
		95			5	13 x 095

Add size to order number
Order number **SZ 8555.** x

d _{h11}	d ₁	l	l ₁	s	Pieces/standard packing ▲	
16	M12	32	18	8	5	16 x 032
		40			5	16 x 040
		50			5	16 x 050
		63			5	16 x 063
		80			2	16 x 080
		95			2	16 x 095
20	M16	118			2	16 x 118
		140			2	16 x 140
		50	25	10	2	20 x 050
		63			2	20 x 063
		80			2	20 x 080
		95			2	20 x 095
25	M20	118			2	20 x 118
		140			2	20 x 140
		140	30	14	2	25 x 050
		180			2	25 x 063
		80			2	25 x 080
		95			2	25 x 095
				2	25 x 118	
				2	25 x 140	
				2	25 x 180	

Polyurethane plates



Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A

Order example: Polyurethane plate **SZ 5190**
a x b = 150 x 100 mm, s = 50mm
Add **150 x 100 x 50**
Order number **SZ 5190 .150 x 100 x 50**

Add size to order number

Order number **SZ 5190.** x x

a	b	s	▲	▲
75	75	25	075 x 075 x 25	
		50	075 x 075 x 50	
		75	075 x 075 x 75	
100	75	12,5	100 x 075 x 12,5	
		25	100 x 075 x 25	
		50	100 x 075 x 50	
150	75	12,5	150 x 075 x 12,5	
		25	150 x 075 x 25	
		50	150 x 075 x 50	
100	100	12,5	100 x 100 x 12,5	
		25	100 x 100 x 25	
		50	100 x 100 x 50	
125	100	12,5	125 x 100 x 12,5	
		25	125 x 100 x 25	
		50	125 x 100 x 50	
150	100	12,5	150 x 100 x 12,5	
		25	150 x 100 x 25	
		50	150 x 100 x 50	
200	100	12,5	200 x 100 x 12,5	
		25	200 x 100 x 25	
		50	200 x 100 x 50	
125	125	12,5	125 x 125 x 12,5	
		25	125 x 125 x 25	
		50	125 x 125 x 50	
150	125	12,5	150 x 125 x 12,5	
		25	150 x 125 x 25	
		50	150 x 125 x 50	

Add size to order number

Order number **SZ 5190.** x x

a	b	s	▲	▲
200	125	12,5	200 x 125 x 12,5	
		25	200 x 125 x 25	
		50	200 x 125 x 50	
		75	200 x 125 x 75	
250	125	12,5	250 x 125 x 12,5	
		25	250 x 125 x 25	
		50	250 x 125 x 50	
		75	250 x 125 x 75	
150	150	12,5	150 x 150 x 12,5	
		25	150 x 150 x 25	
		50	150 x 150 x 50	
		75	150 x 150 x 75	
200	150	12,5	200 x 150 x 12,5	
		25	200 x 150 x 25	
		50	200 x 150 x 50	
		75	200 x 150 x 75	
250	150	12,5	250 x 150 x 12,5	
		25	250 x 150 x 25	
		50	250 x 150 x 50	
		75	250 x 150 x 75	
300	150	12,5	300 x 150 x 12,5	
		25	300 x 150 x 25	
		50	300 x 150 x 50	
		75	300 x 150 x 75	
200	200	12,5	200 x 200 x 12,5	
		25	200 x 200 x 25	
		50	200 x 200 x 50	
		75	200 x 200 x 75	
250	200	12,5	250 x 200 x 12,5	
		25	250 x 200 x 25	
		50	250 x 200 x 50	
		75	250 x 200 x 75	
300	200	12,5	300 x 200 x 12,5	
		25	300 x 200 x 25	
		50	300 x 200 x 50	
		75	300 x 200 x 75	

Add size to order number

Order number **SZ 5190.** x x

a	b	s	▲	▲
400	200	12,5	400 x 200 x 12,5	
		25	400 x 200 x 25	
		50	400 x 200 x 50	
		75	400 x 200 x 75	
250	250	12,5	250 x 250 x 12,5	
		25	250 x 250 x 25	
		50	250 x 250 x 50	
		75	250 x 250 x 75	
300	250	12,5	300 x 250 x 12,5	
		25	300 x 250 x 25	
		50	300 x 250 x 50	
		75	300 x 250 x 75	
400	250	12,5	400 x 250 x 12,5	
		25	400 x 250 x 25	
		50	400 x 250 x 50	
		75	400 x 250 x 75	
500	250	12,5	500 x 250 x 12,5	
		25	500 x 250 x 25	
		50	500 x 250 x 50	
		75	500 x 250 x 75	
300	300	12,5	300 x 300 x 12,5	
		25	300 x 300 x 25	
		50	300 x 300 x 50	
		75	300 x 300 x 75	
400	300	12,5	400 x 300 x 12,5	
		25	400 x 300 x 25	
		50	400 x 300 x 50	
		75	400 x 300 x 75	
500	300	12,5	500 x 300 x 12,5	
		25	500 x 300 x 25	
		50	500 x 300 x 50	
		75	500 x 300 x 75	
600	300	12,5	600 x 300 x 12,5	
		25	600 x 300 x 25	
		50	600 x 300 x 50	
		75	600 x 300 x 75	



Hollow plastic tubes

Material: Vulkollan
polyurethane-elastomer (PUR)
on Desmodur 15 base

Raw material for special length springs,
dampening washers, assembly parts and
prototypes.

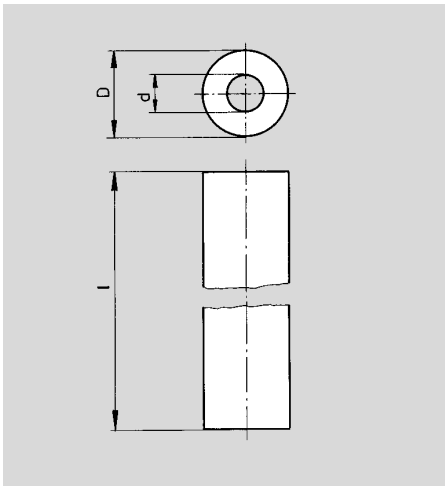
Available in strengths of
80 ± 5 Shore A and
90 ± 5 Shore A

Order example: Hollow plastic tube
strength 80, shore A, **SZ 5381**
D = 50 mm, l = 400 mm
Add **050 x 400**
Order number **SZ 5381.050 x 400**

Application tip

Resistant to: oil (lubricant oil), grease, alcohol,
benzene, ozone.

Partially resistant to: water lye, acids.
Please verify duration, temperature and/or
concentration before use.



SZ 5381

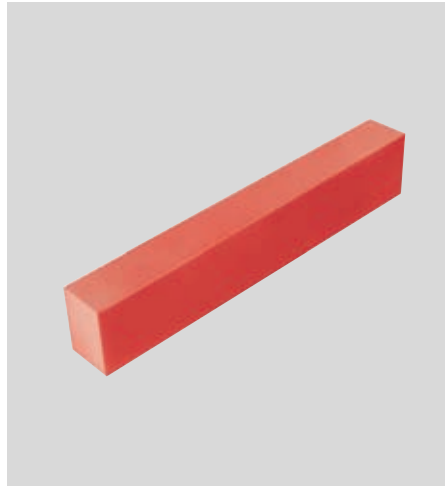
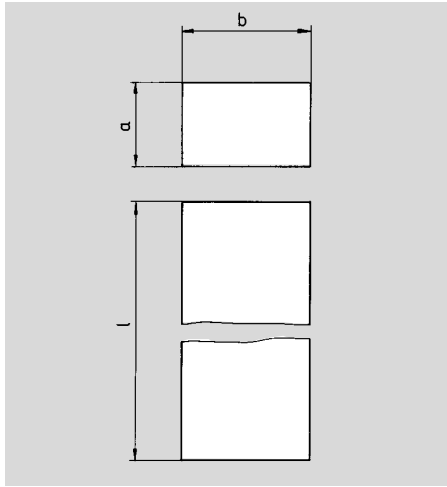
Permissible spring compression $s_{max} = 35\%$
spring sag 5 – 7 %
temperature range -20 °C to + 80 °C
temporarily -40 °C to +120 °C.

SZ 5391

Permissible spring compression $s_{max} = 30\%$
spring sag 6 – 8 %
temperature range -20 °C to + 80 °C
temporarily -40 °C to +120 °C.

			hardness	80 ± 5 Shore A	Add size order number	hardness	90 ± 5 Shore A	Add size to order number
			Order number SZ 5381. <input type="text"/> x <input type="text"/>			Order number SZ 5391. <input type="text"/> x <input type="text"/>		
D	d	l	▲			▲		
16	6,5	300	016 x 300			016 x 300		
20	8,5	300	020 x 300			020 x 300		
25	10,5	300	025 x 300			025 x 300		
32	13,5	300	032 x 300			032 x 300		
40	13,5	300	040 x 300			040 x 300		
50	17,0	400	050 x 400			050 x 400		
63	17,0	400	063 x 400			063 x 400		
80	21,0	400	080 x 400			080 x 400		
100	21,0	300	100 x 300			100 x 300		
125	27,0	300	125 x 300			125 x 300		

Polyurethane rods



Polyurethane rods rectangular

Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A

Order example: Polyurethane rod rectangular
SZ 5290
a x b = 50 x 75 mm, l = 100 mm
Add **50 x 75 x 100**
Order number **SZ 5290.50 x 75 x 100**

Add size to order number

Add size to order number

Add size to order number

Order number **SZ 5290.** x x

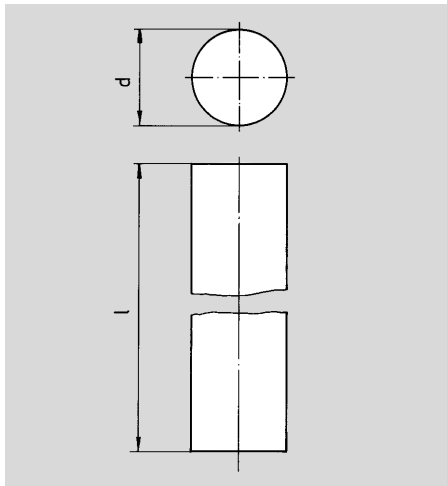
Order number **SZ 5290.** x x

Order number **SZ 5290.** x x

a x b	l	▲	▲
25 x 25	300	25 x 25	x 300
	600	25 x 25	x 600
	1200	25 x 25	x 1200
25 x 37,5	200	25 x 37,5	x 200
	300	25 x 37,5	x 300
	600	25 x 37,5	x 600
	1200	25 x 37,5	x 1200

a x b	l	▲	▲
50 x 50	100	50 x 50	x 100
	200	50 x 50	x 200
	300	50 x 50	x 300
	600	50 x 50	x 600
	1200	50 x 50	x 1200
50 x 75	100	50 x 75	x 100
	200	50 x 75	x 200
	300	50 x 75	x 300
	600	50 x 75	x 600
	1200	50 x 75	x 1200

a x b	l	▲	▲
75 x 75	100	75 x 75	x 100
	200	75 x 75	x 200
	300	75 x 75	x 300
	600	75 x 75	x 600
75 x 100	100	75 x 100	x 100
	200	75 x 100	x 200
	300	75 x 100	x 300
	600	75 x 100	x 600



Polyurethane rods round

Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A

Order example: Polyurethane rod round
SZ 5390
d = 50 mm, l = 100 mm
Add **50 x 100**
Order number **SZ 5390.50 x 100**

Add size to order number

Add size to order number

Add size to order number

Order number **SZ 5390.** x

Order number **SZ 5390.** x

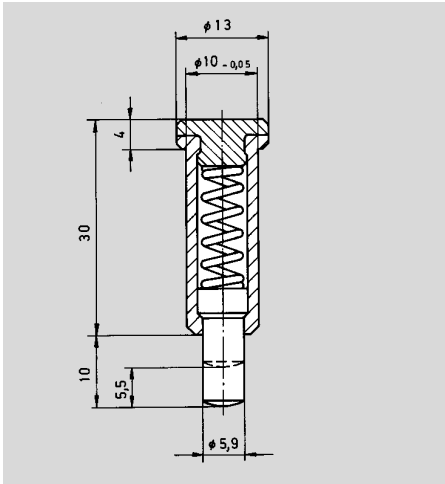
Order number **SZ 5390.** x

d	l	▲
25	200	25 x 200
	300	25 x 300
32	100	32 x 100
	200	32 x 200
	300	32 x 300

d	l	▲
50	63	50 x 063
	80	50 x 080
	100	50 x 100
	160	50 x 160
	200	50 x 200
	300	50 x 300

d	l	▲
75	80	75 x 080
	100	75 x 100
	160	75 x 160
	200	75 x 200
	300	75 x 300

Thrust pieces



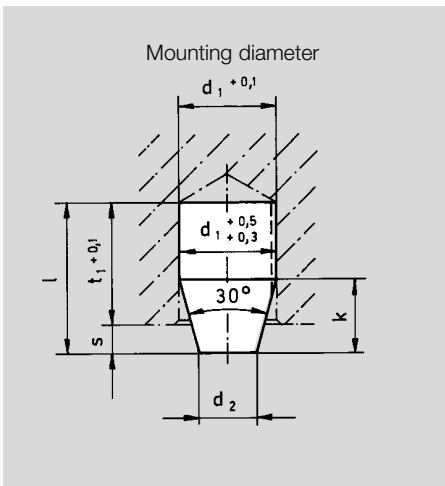
Cushioned thrust pieces

Material: Free cutting steel
ball hardened

Thrust
start ~ 45 N
finish ~ 100 N

Mounting in mounting bore holes 10 H7

Order example: Cushioned thrust piece
SZ 8135
mounting diameter 10 mm
Add **10**
Order number **SZ 8135.10**



Polyurethane thrust piece

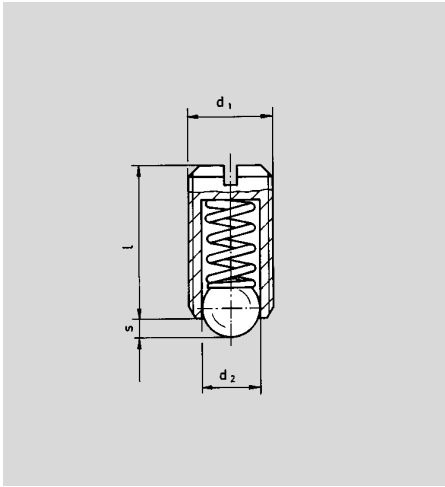
Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A
mounting in mounting bore holes $d_1 \pm 0,1$

Order example: Polyurethane thrust piece
SZ 8460
 $d_1 = 16$ mm
Add **16**
Order number **SZ 8460.16**

Add
size to
order number

Order number **SZ 8460.□**

$d_1^{+0,5}_{+0,3}$	d_2	l	k	$t_1^{+0,1}$	Compressive force (N)	at s	Pieces/standard packing	▲
6	3,6	9,5	4,5	8	150	1,5	20	06
10	6	15,5	7,5	13	350	2,5	20	10
16	9,5	25	12	21	1500	4	10	16



Cushioned thrust pieces

Material: Free cutting steel
ball hardened

Order example: Cushioned thrust piece

SZ 8130

d₁ = M 10

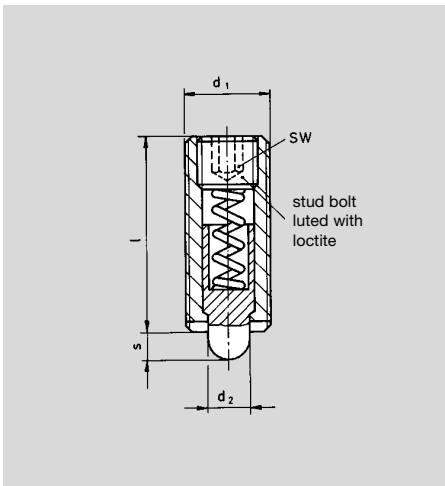
Add **10**

Order number **SZ 8130.10**

Add
size to
order number

Order number **SZ 8130.**

d ₁	d ₂	l	s	Thrust (N) start ~	Thrust (N) finish ~	Pieces/standard packing	▲
M3	1,5	7	0,5	2,2	3	50	03
M4	2,5	9	0,8	6	12	50	04
M5	3	12	0,9	7	13	50	05
M6	3,5	14	1	9	15	50	06
M8	5	16	1,5	20	35	50	08
M10	6	19	2	25	45	50	10
M12	8	22	2,5	35	60	25	12
M16	10	24	3,5	65	110	25	16



Cushioned thrust pieces

Material: Free cutting steel
thrust bolt hardened

Order example: Cushioned thrust piece

SZ 8131

d₁ = M 8

Add **08**

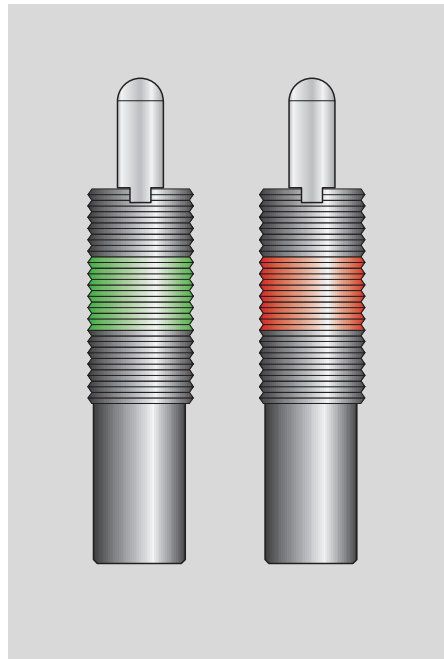
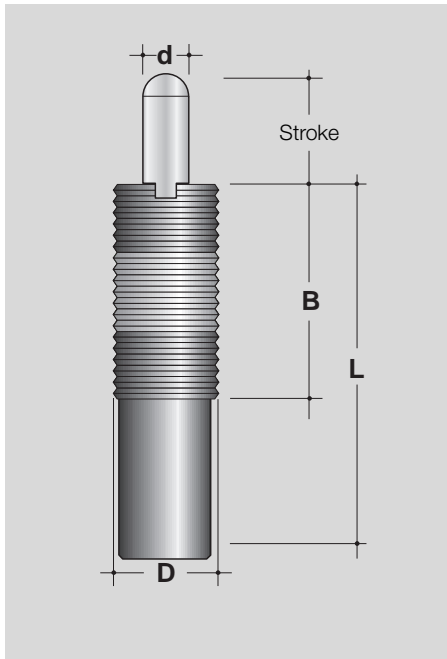
Order number **SZ 8131.08**

Add
size to
order number

Order number **SZ 8131.**

d ₁	d ₂	l	s	SW	Thrust (N) start ~	Thrust (N) finish ~	Pieces/standard packing	▲
M3	1	12	1	0,7	1,7	3,5	25	03
M4	1,5	15	1,5	1,3	5	15	25	04
M5	2,4	18	2,3	1,5	7	20	25	05
M6	2,7	20	2,5	2	7	20	25	06
M8	3,5	22	3	2,5	9	35	10	08
M10	4	22	3	3	9	35	10	10
M12	6	28	4	4	15	55	10	12
M16	7,5	32	5	5	45	100	10	16

Spring-mounted pressure devices mechanic



Application:

Pressure devices are mainly used in production of tool, equipment and machines as pressure pins, for holding parts down or ejecting parts, or for absorbing vibration.

Installation note:

Screwing the spring-mounted pressure devices in and out should only be done with the correct size special key SZ 8160. The coloured thread marking also serves to ensure threading.

Add
size to
order number

Order number SZ 8140. <input type="checkbox"/> x <input type="checkbox"/>							
D mm	Stroke mm	L mm	B mm	d mm	Initial pressure daN	Final pressure daN	▲
M 12	10	43	35	5,5	0,4	2	12 x 010
M 16	10	60	35	7,5	1,3	4	16 x 010
	15	60	16 x 015				
	20	80	16 x 020				
	30	125	16 x 030				
	40	150	16 x 040				
M 24	15	60	45	10	2,0	10	16 x 050
							24 x 015

Spring-mounted pressure device, light series

Colour coding: green

Order example: Spring-mounted pressure device, light series **SZ 8140**

D = M12, Stroke 10 mm

Add **12 x 010**

Order number **SZ 8140.12 x 010**

Add
size to
order number

Order number SZ 8145. <input type="checkbox"/> x <input type="checkbox"/>							
D mm	Stroke mm	L mm	B mm	d mm	Initial pressure daN	Final pressure daN	▲
M 12	10	43	35	5,5	0,7	4	12 x 010
M 16	10	60	35	7,5	2,7	8	16 x 010
	15	60	16 x 015				
	20	80	16 x 020				
	30	125	16 x 030				
	40	150	16 x 040				
M 24	15	60	45	10	4,0	20	16 x 050
							24 x 015

Spring-mounted pressure device, heavy series

Colour coding: red

Order example: Spring-mounted pressure device, heavy series **SZ 8145**

D = M16, Stroke 30 mm

Add **12 x 030**

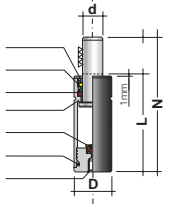
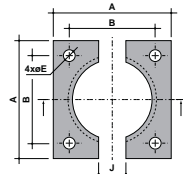
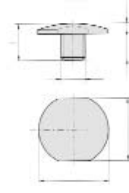



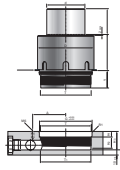
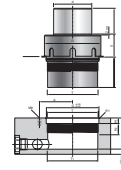





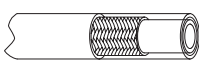
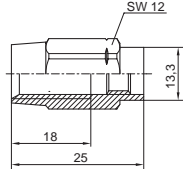
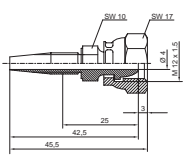
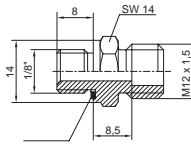
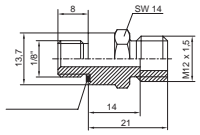
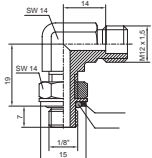
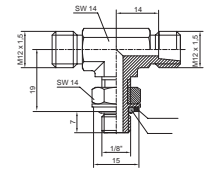
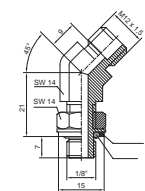
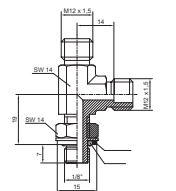
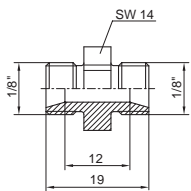
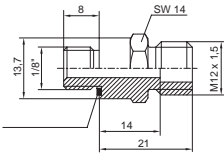
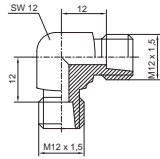
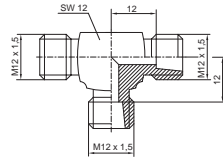
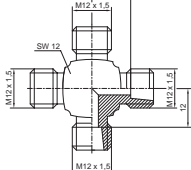
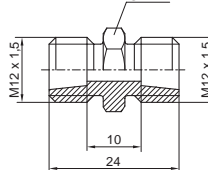
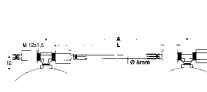
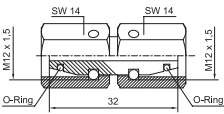
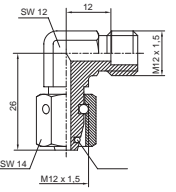
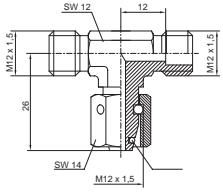
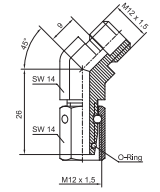
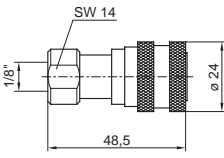
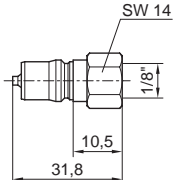


Order number **SZ 8145.16 x 030**

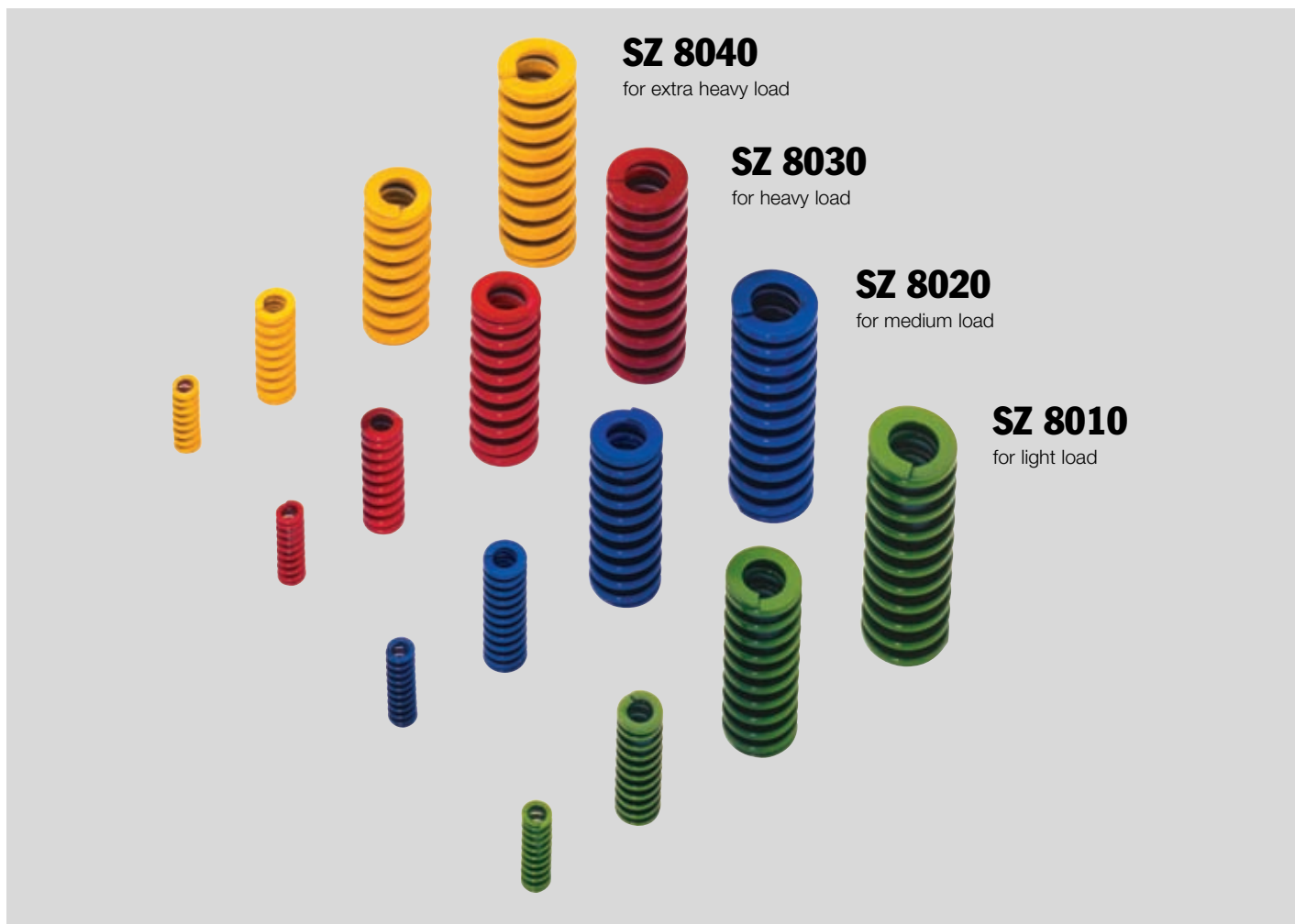
Springs

- Helical springs with round, square and flat bottom cross section
- Disc springs
- Rubber springs
- Plastic springs
- Springy thrust pieces
- Polyurethane plates and rods for example for metal deformation
- System springs
- System spring units
- Gas pressure springs



SZ 8005 page 5.05.1 	SZ 8010 page 5.06 	SZ 8020 page 5.08 	SZ 8030 page 5.10 	SZ 8040 page 5.12 	SZ 8045 page 5.15 
SZ 8565 page 5.16 	SZ 8560 page 5.18 	SZ 8561 page 5.19 	SZ 8563 page 5.19 	SZ 8100 page 5.20 	SZ 8101 page 5.21 
SZ 8200 page 5.22 	SZ 8201 page 5.23 	SZ 8400 page 5.24 	SZ 8401 page 5.25 	SZ 8300 page 5.27 	SZ 8580 page 5.31 
SZ 8520 page 5.33 	SZ 8500 page 5.34 	SZ 8590 page 5.36 	SZ 8556 page 5.38 	SZ 8555 page 5.39 	SZ 5190 page 5.40 
SZ 5381/91 p. 5.41 	SZ 5290 page 5.42 	SZ 5390 page 5.42 	SZ 8135 page 5.43 	SZ 8460 page 5.43 	SZ 8130 page 5.44 
SZ 8131 page 5.44 	SZ 8140 page 5.45 	SZ 8080 page 5.52 	SZ 7080 page 5.54 	SZ 8066 page 5.56 	SZ 7066 page 5.58 
SZ 8065 page 5.60 	SZ 8060 page 5.62 	SZ 7082 page 5.64 	SZ 8063 page 5.66 	SZ 8061 page 5.68 	SZ 8150 page 5.69 

<p>SZ 8067 page 5.70</p> 	<p>SZ 8069 page 5.74</p> 	<p>SZ 8069.5 page 5.76</p> 	<p>SZ 8055 page 5.76</p> 	<p>SZ 8160 page 5.76</p> 	<p>SZ 9004 page 5.76</p> 
<p>SZ 8051 page 5.78</p> 	<p>SZ 8052 page 5.78</p> 	<p>SZ 8085.2 page 5.80</p> 	<p>SZ 8090 page 5.81</p> 	<p>SZ 8086 page 5.81</p> 	<p>SZ 8089 page 5.81</p> 
<p>SZ 8091 page 5.82</p> 	<p>SZ 7010 page 5.83</p> 	<p>SZ 7011 page 5.83</p> 	<p>SZ 7012 page 5.83</p> 	<p>SZ 7013 page 5.83</p> 	<p>SZ 7020 page 5.83</p> 
<p>SZ 7014 page 5.83</p> 	<p>SZ 7015 page 5.83</p> 	<p>SZ 7016 page 5.83</p> 	<p>SZ 7017 page 5.84</p> 	<p>SZ 7019 page 5.84.1</p> 	<p>SZ 7020 page 5.83</p> 
<p>SZ 7021 page 5.84</p> 	<p>SZ 7022 page 5.84</p> 	<p>SZ 7023 page 5.84</p> 	<p>SZ 7024 page 5.84.1</p> 	<p>SZ 8074 page 5.84</p> 	<p>SZ 7033 page 5.84.1</p> 
<p>SZ 7034 page 5.84.1</p> 	<p>SZ 7035 page 5.84.1</p> 	<p>SZ 7036 page 5.84.1</p> 	<p>SZ 7041 page 5.84.1</p> 	<p>SZ 7042 page 5.84.1</p> 	<p>SZ 8079 page 5.85</p> 
<p>SZ 8078 page 5.85</p> 					



SZ 8040

for extra heavy load

SZ 8030

for heavy load

SZ 8020

for medium load

SZ 8010

for light load

Helical compression springs in four types of load

The system springs made of profiled valve-spring steel wire are available in four load types. Each of these four helical compression springs has got the same assembling dimensions, so that an increase respectively a reduction of compressive forces can ensue without any problems, also subsequently.

For immediate distinction the system springs are characterized by different colours and therefore can quickly be allocated to the respective type of load.

Ascending part numbers also mean ascending loads of the system springs, so it is only necessary to add the tube diameter (D_h) x of the unloaded spring length (L_0).

Order number	Types of load	Ident. colour
SZ8010. $D_h \times L_0$	light load	green
SZ8020. $D_h \times L_0$	medium load	blue
SZ8030. $D_h \times L_0$	heavy load	red
SZ8040. $D_h \times L_0$	extra heavy load	yellow

ISO 10243

Assembling dimensions – basic sizes

The STEINEL system springs are available in nine basic sizes with the following tube diameters (D_h) and rod diameters (D_d):

D_h/D_d	D_h/D_d	D_h/D_d
10/5	20/10	40/20
12,5/6,3	25/12,5	50/25
16/8	32/16	63/38

The assembling lengths of the unloaded springs (L_0) base on inch sizes according to 25 – 254 mm.

For all basic sizes there are 305 mm long springs available, too, which can be shortened as occasion demands.

Material

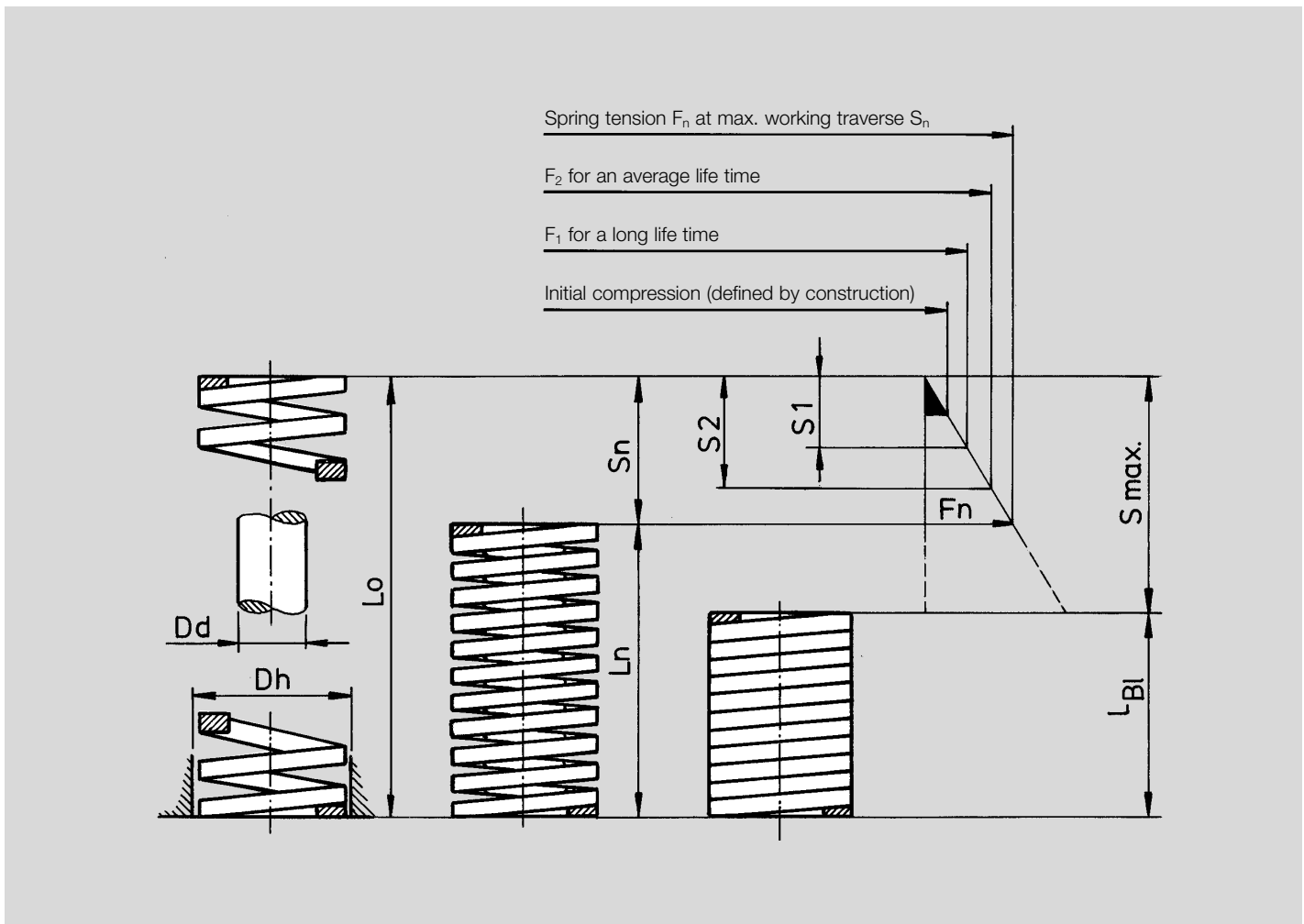
All springs are made of alloyed valve-spring steel wire (Cr-V/CR-Si). This wire is especially resistant against heat and vibration strains. Moreover this quality can also be used for higher temperature ranges up to 230 °C.

Manufacturing process and testing method

All springs are subject to special heat treatments, shot peened and initial-loaded. Thereby tensions are eliminated, to get a high fatigue limit.

The ends of the springs are closed and ground square with parallel faces.

The springs are subjected to strict quality checks, with vibration trials additional tests ensue concerning the working life.



Legend of the dimension symbols

- D_h = tube diameters (outward guiding) in mm
- D_d = rod diameter (internal guiding) in mm
- L_0 = length of the unloaded spring
- c = spring coefficient in N/mm
(spring tension causing spring strokes in mm)
- $s_1 - s_n$ = travel strokes in mm
caused to the spring tensions $F_1 - F_n$
- $F_1 - F_n$ = spring tensions in N
caused to the travel strokes $s_1 - s_n$
- L_n = minimal allowable length of the loaded spring ($L_0 - s_n$)
caused to the spring tension F_n
- S_{max} = maximal travel stroke in mm
- L_{BI} = block length of compacted spring ($L_0 - s_{max}$)

Constructional directives for selection

- priority the stroke
- priority the spring tension
- priority the working life

Note:

It is not allowed to exceed the travel stroke s_n (max. working traverse) and the resulting spring tension F_n , listed in the table.

Every spring should by principle be pre-loaded, because natural vibrations and push shock stresses of an unloaded spring reduce the working life.

Every spring has to be guided by an outward guiding (D_h) and/or an internal guiding (D_d). A rule of thumbs is: The crevasse depth of counterboring respectively the rod length should amount at minimum to 2 – 3 windings of the spring. The longer the spring, the longer the guiding.

Constructively it should always be aimed at a long working life of the springs. Therefore, the spring should preferable be chosen acc. to the travel stroke s_1 and the resulting spring tension F_1 .

Tolerances for the length of the unloaded spring, L_0

L_0 mm $\pm 3\%$	L_0 mm $\pm 2,5\%$	L_0 mm $\pm 2\%$
25	76	127
32	89	139
38	102	152
44	115	178
51		203
64		254
		305

Travel stroke symbols

- s_1 = long working life
- s_2 = average working life
- s_n = max. working traverse
- s_{max} = max. travel stroke

System springs

Quick review



Helical compression springs in four groups

Material: profiled valve-spring steel wire (Cr-V / Cr-Si)

The springs are initial-loaded, the ends are closed and ground square parallel.

Important characteristics data:

D_h = tube diameter in mm

L_0 = length of the unloaded spring in mm

c = spring coefficient in N/mm (spring tension causing spring strokes in mm)

ISO 10243

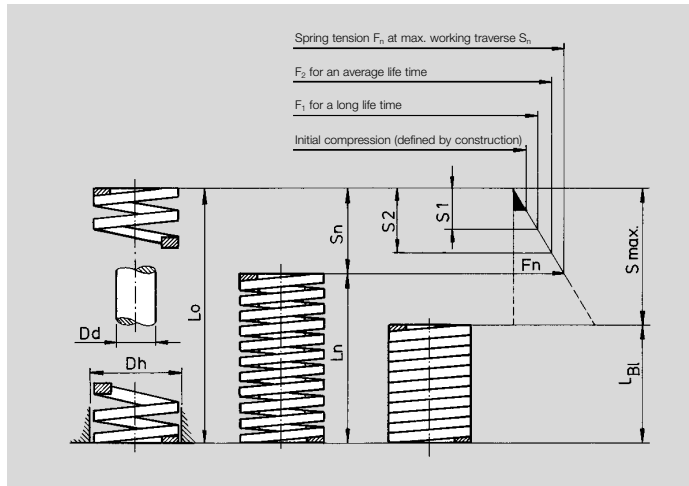
Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Unloaded length L_0	Green light load		Blue medium load		Red heavy load		Yellow extra heavy load	
			c	Order number	c	Order number	c	Order number	c	Order number
10	5	25	10	SZ 8010.10 x 025	16,0	SZ 8020.10 x 025	22,1	SZ 8030.10 x 025	36,8	SZ 8040.10 x 025
10	5	32	8,5	SZ 8010.10 x 032	13,0	SZ 8020.10 x 032	17,5	SZ 8030.10 x 032	27,9	SZ 8040.10 x 032
10	5	38	6,8	SZ 8010.10 x 038	11,9	SZ 8020.10 x 038	17,1	SZ 8030.10 x 038	23,7	SZ 8040.10 x 038
10	5	44	6,0	SZ 8010.10 x 044	10,3	SZ 8020.10 x 044	15,0	SZ 8030.10 x 044	19,2	SZ 8040.10 x 044
10	5	51	5,0	SZ 8010.10 x 051	8,9	SZ 8020.10 x 051	12,8	SZ 8030.10 x 051	16,5	SZ 8040.10 x 051
10	5	64	4,3	SZ 8010.10 x 064	7,5	SZ 8020.10 x 064	10,7	SZ 8030.10 x 064	13,2	SZ 8040.10 x 064
10	5	76	3,2	SZ 8010.10 x 076	5,3	SZ 8020.10 x 076	7,5	SZ 8030.10 x 076	10,9	SZ 8040.10 x 076
10	5	305	1,1	SZ 8010.10 x 305	1,6	SZ 8020.10 x 305	2,1	SZ 8030.10 x 305	2,6	SZ 8040.10 x 305
12,5	6,3	25	17,9	SZ 8010.13 x 025	30,0	SZ 8020.13 x 025	42,1	SZ 8030.13 x 025	58,5	SZ 8040.13 x 025
12,5	6,3	32	16,4	SZ 8010.13 x 032	24,8	SZ 8020.13 x 032	33,2	SZ 8030.13 x 032	43,9	SZ 8040.13 x 032
12,5	6,3	38	13,6	SZ 8010.13 x 038	21,4	SZ 8020.13 x 038	29,3	SZ 8030.13 x 038	36,0	SZ 8040.13 x 038
12,5	6,3	44	12,1	SZ 8010.13 x 044	18,5	SZ 8020.13 x 044	24,6	SZ 8030.13 x 044	30,3	SZ 8040.13 x 044
12,5	6,3	51	11,4	SZ 8010.13 x 051	15,5	SZ 8020.13 x 051	19,6	SZ 8030.13 x 051	26,2	SZ 8040.13 x 051
12,5	6,3	64	9,3	SZ 8010.13 x 064	12,1	SZ 8020.13 x 064	15,0	SZ 8030.13 x 064	21,2	SZ 8040.13 x 064
12,5	6,3	76	7,1	SZ 8010.13 x 076	10,2	SZ 8020.13 x 076	13,2	SZ 8030.13 x 076	17,1	SZ 8040.13 x 076
12,5	6,3	89	5,4	SZ 8010.13 x 089	8,4	SZ 8020.13 x 089	11,4	SZ 8030.13 x 089	14,5	SZ 8040.13 x 089
12,5	6,3	102	4,6	SZ 8010.13 x 102	7,1	SZ 8020.13 x 102	9,4	SZ 8030.13 x 102	12,5	SZ 8040.13 x 102
12,5	6,3	305	1,4	SZ 8010.13 x 305	2,1	SZ 8020.13 x 305	2,8	SZ 8030.13 x 305	4,3	SZ 8040.13 x 305
16	8	25	23,4	SZ 8010.16 x 025	49,4	SZ 8020.16 x 025	75,7	SZ 8030.16 x 025	118,0	SZ 8040.16 x 025
16	8	32	22,9	SZ 8010.16 x 032	37,1	SZ 8020.16 x 032	52,8	SZ 8030.16 x 032	89,0	SZ 8040.16 x 032
16	8	38	19,3	SZ 8010.16 x 038	33,9	SZ 8020.16 x 038	48,5	SZ 8030.16 x 038	72,1	SZ 8040.16 x 038
16	8	44	17,1	SZ 8010.16 x 044	30,0	SZ 8020.16 x 044	42,8	SZ 8030.16 x 044	60,9	SZ 8040.16 x 044
16	8	51	15,7	SZ 8010.16 x 051	26,4	SZ 8020.16 x 051	37,1	SZ 8030.16 x 051	52,3	SZ 8040.16 x 051
16	8	64	10,7	SZ 8010.16 x 064	20,5	SZ 8020.16 x 064	30,3	SZ 8030.16 x 064	41,2	SZ 8040.16 x 064
16	8	76	10,0	SZ 8010.16 x 076	17,8	SZ 8020.16 x 076	25,7	SZ 8030.16 x 076	34,1	SZ 8040.16 x 076
16	8	89	8,6	SZ 8010.16 x 089	15,2	SZ 8020.16 x 089	21,7	SZ 8030.16 x 089	29,5	SZ 8040.16 x 089
16	8	102	7,8	SZ 8010.16 x 102	13,5	SZ 8020.16 x 102	19,3	SZ 8030.16 x 102	25,6	SZ 8040.16 x 102
16	8	305	2,5	SZ 8010.16 x 305	4,8	SZ 8020.16 x 305	7,1	SZ 8030.16 x 305	8,4	SZ 8040.16 x 305
20	10	25	55,8	SZ 8010.20 x 025	98,0	SZ 8020.20 x 025	216,0	SZ 8030.20 x 025	293,0	SZ 8040.20 x 025
20	10	32	45,0	SZ 8010.20 x 032	72,6	SZ 8020.20 x 032	168,0	SZ 8030.20 x 032	224,0	SZ 8040.20 x 032
20	10	38	33,3	SZ 8010.20 x 038	56,0	SZ 8020.20 x 038	129,0	SZ 8030.20 x 038	177,0	SZ 8040.20 x 038
20	10	44	30,0	SZ 8010.20 x 044	47,5	SZ 8020.20 x 044	112,0	SZ 8030.20 x 044	149,0	SZ 8040.20 x 044
20	10	51	24,5	SZ 8010.20 x 051	41,7	SZ 8020.20 x 051	94,0	SZ 8030.20 x 051	128,0	SZ 8040.20 x 051
20	10	64	20,0	SZ 8010.20 x 064	32,3	SZ 8020.20 x 064	72,1	SZ 8030.20 x 064	99,0	SZ 8040.20 x 064
20	10	76	16,0	SZ 8010.20 x 076	25,1	SZ 8020.20 x 076	59,7	SZ 8030.20 x 076	81,7	SZ 8040.20 x 076
20	10	89	14,0	SZ 8010.20 x 089	22,0	SZ 8020.20 x 089	50,5	SZ 8030.20 x 089	69,5	SZ 8040.20 x 089
20	10	102	12,0	SZ 8010.20 x 102	19,8	SZ 8020.20 x 102	44,2	SZ 8030.20 x 102	60,6	SZ 8040.20 x 102
20	10	115	10,9	SZ 8010.20 x 115	18,1	SZ 8020.20 x 115	38,4	SZ 8030.20 x 115	53,0	SZ 8040.20 x 115
20	10	127	9,5	SZ 8010.20 x 127	16,6	SZ 8020.20 x 127	34,1	SZ 8030.20 x 127	47,5	SZ 8040.20 x 127
20	10	139	8,4	SZ 8010.20 x 139	15,1	SZ 8020.20 x 139	31,0	SZ 8030.20 x 139	43,0	SZ 8040.20 x 139
20	10	152	7,5	SZ 8010.20 x 152	13,2	SZ 8020.20 x 152	28,2	SZ 8030.20 x 152	39,0	SZ 8040.20 x 152
20	10	305	4,0	SZ 8010.20 x 305	6,1	SZ 8020.20 x 305	15,0	SZ 8030.20 x 305	21,2	SZ 8040.20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{dh15}	Unloaded length L _o	Green light load c	Blue medium load		Red heavy load		Yellow extra heavy load	
				Order number	c	Order number	c	Order number	c
25	12,5	25	100,0	SZ 8010.25 x 025	147,0	SZ 8020.25 x 025	375,0	SZ 8030.25 x 025	—
25	12,5	32	80,3	SZ 8010.25 x 032	118,0	SZ 8020.25 x 032	297,0	SZ 8030.25 x 032	374,4
25	12,5	38	62,0	SZ 8010.25 x 038	93,0	SZ 8020.25 x 038	219,0	SZ 8030.25 x 038	346,0
25	12,5	44	52,9	SZ 8010.25 x 044	80,0	SZ 8020.25 x 044	187,0	SZ 8030.25 x 044	244,0
25	12,5	51	44,0	SZ 8010.25 x 051	68,6	SZ 8020.25 x 051	156,0	SZ 8030.25 x 051	207,5
25	12,5	64	35,2	SZ 8010.25 x 064	53,0	SZ 8020.25 x 064	123,0	SZ 8030.25 x 064	161,0
25	12,5	76	28,0	SZ 8010.25 x 076	43,2	SZ 8020.25 x 076	99,0	SZ 8030.25 x 076	130,8
25	12,5	89	24,0	SZ 8010.25 x 089	38,2	SZ 8020.25 x 089	84,0	SZ 8030.25 x 089	110,5
25	12,5	102	21,1	SZ 8010.25 x 102	33,0	SZ 8020.25 x 102	73,0	SZ 8030.25 x 102	96,3
25	12,5	115	18,7	SZ 8010.25 x 115	28,0	SZ 8020.25 x 115	65,0	SZ 8030.25 x 115	85,7
25	12,5	127	16,7	SZ 8010.25 x 127	25,9	SZ 8020.25 x 127	57,7	SZ 8030.25 x 127	76,3
25	12,5	139	15,3	SZ 8010.25 x 139	23,2	SZ 8020.25 x 139	52,7	SZ 8030.25 x 139	—
25	12,5	152	14,0	SZ 8010.25 x 152	20,8	SZ 8020.25 x 152	47,8	SZ 8030.25 x 152	63,5
25	12,5	178	12,5	SZ 8010.25 x 178	17,8	SZ 8020.25 x 178	41,0	SZ 8030.25 x 178	53,9
25	12,5	203	10,4	SZ 8010.25 x 203	15,8	SZ 8020.25 x 203	35,8	SZ 8030.25 x 203	47,0
25	12,5	305	7,0	SZ 8010.25 x 305	10,2	SZ 8020.25 x 305	22,9	SZ 8030.25 x 305	30,9
32	16	38	94,0	SZ 8010.32 x 038	185,0	SZ 8020.32 x 038	388,0	SZ 8030.32 x 038	528,2
32	16	44	79,5	SZ 8010.32 x 044	158,0	SZ 8020.32 x 044	324,0	SZ 8030.32 x 044	424,4
32	16	51	67,0	SZ 8010.32 x 051	134,0	SZ 8020.32 x 051	272,0	SZ 8030.32 x 051	353,0
32	16	64	53,0	SZ 8010.32 x 064	99,0	SZ 8020.32 x 064	212,0	SZ 8030.32 x 064	269,2
32	16	76	44,0	SZ 8010.32 x 076	80,5	SZ 8020.32 x 076	172,0	SZ 8030.32 x 076	218,5
32	16	89	37,2	SZ 8010.32 x 089	69,1	SZ 8020.32 x 089	141,0	SZ 8030.32 x 089	180,3
32	16	102	32,0	SZ 8010.32 x 102	58,8	SZ 8020.32 x 102	122,0	SZ 8030.32 x 102	155,0
32	16	115	29,0	SZ 8010.32 x 115	51,5	SZ 8020.32 x 115	107,0	SZ 8030.32 x 115	140,0
32	16	127	25,0	SZ 8010.32 x 127	44,8	SZ 8020.32 x 127	93,0	SZ 8030.32 x 127	124,0
32	16	139	23,0	SZ 8010.32 x 139	42,3	SZ 8020.32 x 139	86,0	SZ 8030.32 x 139	—
32	16	152	21,5	SZ 8010.32 x 152	37,8	SZ 8020.32 x 152	78,0	SZ 8030.32 x 152	102,0
32	16	178	18,2	SZ 8010.32 x 178	32,5	SZ 8020.32 x 178	67,2	SZ 8030.32 x 178	88,2
32	16	203	15,8	SZ 8010.32 x 203	28,9	SZ 8020.32 x 203	59,1	SZ 8030.32 x 203	76,0
32	16	254	12,5	SZ 8010.32 x 254	21,4	SZ 8020.32 x 254	46,4	SZ 8030.32 x 254	60,8
32	16	305	10,3	SZ 8010.32 x 305	18,3	SZ 8020.32 x 305	38,0	SZ 8030.32 x 305	49,0
40	20	51	92,0	SZ 8010.40 x 051	181,6	SZ 8020.40 x 051	350,0	SZ 8030.40 x 051	628,0
40	20	64	73,0	SZ 8010.40 x 064	140,0	SZ 8020.40 x 064	269,0	SZ 8030.40 x 064	487,0
40	20	76	63,0	SZ 8010.40 x 076	108,0	SZ 8020.40 x 076	219,0	SZ 8030.40 x 076	379,0
40	20	89	51,0	SZ 8010.40 x 089	90,7	SZ 8020.40 x 089	190,0	SZ 8030.40 x 089	321,0
40	20	102	43,0	SZ 8010.40 x 102	81,0	SZ 8020.40 x 102	163,0	SZ 8030.40 x 102	281,0
40	20	115	39,6	SZ 8010.40 x 115	71,8	SZ 8020.40 x 115	142,0	SZ 8030.40 x 115	245,0
40	20	127	37,0	SZ 8010.40 x 127	62,7	SZ 8020.40 x 127	128,0	SZ 8030.40 x 127	221,0
40	20	139	32,0	SZ 8010.40 x 139	57,5	SZ 8020.40 x 139	115,0	SZ 8030.40 x 139	202,0
40	20	152	28,0	SZ 8010.40 x 152	51,6	SZ 8020.40 x 152	105,0	SZ 8030.40 x 152	168,0
40	20	178	25,2	SZ 8010.40 x 178	44,1	SZ 8020.40 x 178	89,0	SZ 8030.40 x 178	140,0
40	20	203	22,7	SZ 8010.40 x 203	36,7	SZ 8020.40 x 203	77,0	SZ 8030.40 x 203	132,0
40	20	254	17,0	SZ 8010.40 x 254	30,1	SZ 8020.40 x 254	61,0	SZ 8030.40 x 254	107,0
40	20	305	14,8	SZ 8010.40 x 305	24,6	SZ 8020.40 x 305	51,0	SZ 8030.40 x 305	87,8
50	25	64	156,0	SZ 8010.50 x 064	209,0	SZ 8020.50 x 064	413,0	SZ 8030.50 x 064	709,0
50	25	76	125,0	SZ 8010.50 x 076	168,0	SZ 8020.50 x 076	339,0	SZ 8030.50 x 076	572,0
50	25	89	109,0	SZ 8010.50 x 089	140,0	SZ 8020.50 x 089	288,0	SZ 8030.50 x 089	475,0
50	25	102	94,0	SZ 8010.50 x 102	119,0	SZ 8020.50 x 102	245,0	SZ 8030.50 x 102	405,0
50	25	115	81,0	SZ 8010.50 x 115	106,0	SZ 8020.50 x 115	215,0	SZ 8030.50 x 115	352,0
50	25	127	71,0	SZ 8010.50 x 127	97,0	SZ 8020.50 x 127	192,0	SZ 8030.50 x 127	316,0
50	25	139	66,5	SZ 8010.50 x 139	87,0	SZ 8020.50 x 139	168,0	SZ 8030.50 x 139	289,0
50	25	152	60,0	SZ 8010.50 x 152	80,0	SZ 8020.50 x 152	154,0	SZ 8030.50 x 152	239,0
50	25	178	52,0	SZ 8010.50 x 178	69,5	SZ 8020.50 x 178	134,0	SZ 8030.50 x 178	226,0
50	25	203	44,0	SZ 8010.50 x 203	59,8	SZ 8020.50 x 203	117,0	SZ 8030.50 x 203	187,0
50	25	254	35,0	SZ 8010.50 x 254	43,9	SZ 8020.50 x 254	89,0	SZ 8030.50 x 254	153,0
50	25	305	28,5	SZ 8010.50 x 305	38,6	SZ 8020.50 x 305	73,0	SZ 8030.50 x 305	127,0
63	38	76	189,0	SZ 8010.63 x 076	312,0	SZ 8020.63 x 076	630,0	SZ 8030.63 x 076	842,0
63	38	89	158,0	SZ 8010.63 x 089	260,0	SZ 8020.63 x 089	485,0	SZ 8030.63 x 089	726,0
63	38	102	131,0	SZ 8010.63 x 102	221,0	SZ 8020.63 x 102	434,0	SZ 8030.63 x 102	656,0
63	38	115	116,0	SZ 8010.63 x 115	187,0	SZ 8020.63 x 115	384,0	SZ 8030.63 x 115	534,0
63	38	127	103,0	SZ 8010.63 x 127	168,0	SZ 8020.63 x 127	349,0	SZ 8030.63 x 127	480,0
63	38	152	84,3	SZ 8010.63 x 152	136,0	SZ 8020.63 x 152	276,0	SZ 8030.63 x 152	396,0
63	38	178	71,5	SZ 8010.63 x 178	114,0	SZ 8020.63 x 178	237,0	SZ 8030.63 x 178	335,0
63	38	203	61,7	SZ 8010.63 x 203	100,0	SZ 8020.63 x 203	210,0	SZ 8030.63 x 203	297,0
63	38	254	47,0	SZ 8010.63 x 254	78,4	SZ 8020.63 x 254	165,0	SZ 8030.63 x 254	235,0
63	38	305	38,2	SZ 8010.63 x 305	64,7	SZ 8020.63 x 305	134,0	SZ 8030.63 x 305	194,0

System springs SZ 8005

for extra light load, colour purple

STEINEL[®]
NORMALIEN



Helical compression springs for extra light load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for extra light load **SZ 8005**

$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**

Order number **SZ 8005.25 x 076**


Add size to order number

Order number **SZ 8005.** x

Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire \varnothing	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 25\%$ in mm	F_1 in N	medium life $s_2 = 35\%$ in mm	F_2 in N	max. working traverse $s_n = 50\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
20	10	4,0 x 1,7	25	32,1	6,3	202	8,8	281	12,5	401	14	20 x 025
20	10		32	24,7	8,0	198	11,2	277	16,0	395	18	20 x 032
20	10		38	20,7	9,5	197	13,3	275	19,0	393	22	20 x 038
20	10		44	17,8	11,0	196	15,4	275	22,0	392	26	20 x 044
20	10		51	15,3	12,8	196	17,9	273	25,5	390	30	20 x 051
20	10		64	12,1	16,0	194	22,4	270	32,0	386	38	20 x 064
20	10		76	10,2	19,0	194	26,6	270	38,0	386	45	20 x 076
20	10		89	8,6	22,3	192	31,1	269	44,5	384	53	20 x 089
20	10		102	7,5	25,5	191	35,7	269	51,0	384	62	20 x 102
20	10		115	6,7	28,8	193	40,3	269	57,5	384	70	20 x 115
20	10		127	6,1	31,8	194	44,5	270	63,5	386	77	20 x 127
20	10		139	5,5	34,8	191	48,7	269	69,5	385	85	20 x 139
20	10		152	5,1	38,0	194	53,2	269	76,0	384	93	20 x 152
20	10		305	2,5	76,3	191	106,8	266	151,0	380	188	20 x 305
25	12,5	5,3 x 2,2	25	52,7	6,3	332	8,8	461	12,5	658	14	25 x 025
25	12,5		32	40,0	8,0	320	11,2	448	16,0	640	18	25 x 032
25	12,5		38	33,3	9,5	316	13,3	444	19,0	634	22	25 x 038
25	12,5		44	28,6	11,0	315	15,4	440	22,0	629	25	25 x 044
25	12,5		51	24,7	12,8	316	17,9	441	25,5	630	30	25 x 051
25	12,5		64	19,4	16,0	310	22,4	435	32,0	622	38	25 x 064
25	12,5		76	16,3	19,0	310	26,6	433	38,0	618	45	25 x 076
25	12,5		89	13,9	22,3	310	31,1	433	44,5	618	53	25 x 089
25	12,5		102	12,1	25,5	309	35,7	433	51,0	618	61	25 x 102
25	12,5		115	10,8	28,8	311	40,3	433	57,5	619	70	25 x 115
25	12,5		127	9,8	31,8	312	44,5	434	63,5	620	77	25 x 127
25	12,5		139	8,9	34,8	310	48,7	433	69,5	618	85	25 x 139
25	12,5		152	8,1	38,0	308	53,2	431	76,0	616	93	25 x 152
25	12,5		178	6,9	44,5	307	62,3	431	89,0	616	109	25 x 178
25	12,5		203	6,1	50,8	309	71,0	431	101,5	615	124	25 x 203
25	12,5		305	4,0	76,3	305	106,8	429	152,5	613	188	25 x 305
32	16	6,4 x 2,6	38	43,8	9,5	416	13,3	582	19,0	831	22	32 x 038
32	16		44	37,5	11,0	412	15,4	578	22,0	825	26	32 x 044
32	16		51	32,3	12,8	413	17,9	576	25,5	823	31	32 x 051
32	16		64	25,4	16,0	406	22,4	569	32,0	813	39	32 x 064
32	16		76	21,3	19,0	405	26,6	566	38,0	809	47	32 x 076
32	16		89	18,1	22,3	404	31,1	563	44,5	804	56	32 x 089
32	16		102	15,8	25,5	403	35,7	562	51,0	803	64	32 x 102
32	16		115	13,9	28,8	400	40,3	560	57,5	800	73	32 x 115
32	16		127	12,6	31,8	401	44,5	559	63,5	799	81	32 x 127
32	16		139	11,4	34,8	397	48,7	557	69,5	796	89	32 x 139
32	16		152	10,5	38,0	399	53,2	560	76,0	800	97	32 x 152
32	16		178	8,9	44,5	396	62,3	558	89,0	796	114	32 x 178
32	16		203	7,8	50,8	396	71,0	555	101,5	793	131	32 x 203
32	16		254	6,2	63,5	394	88,9	549	127,0	784	163	32 x 254
32	16		305	5,2	76,3	397	106,8	552	152,5	788	197	32 x 305

Add
size to
order number

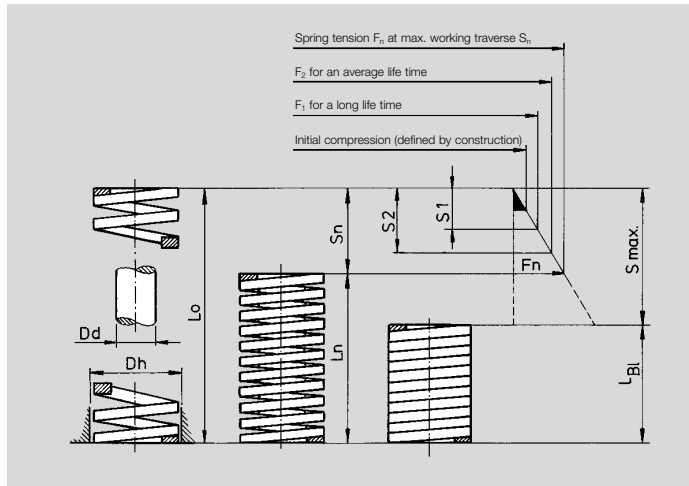
Order number **SZ 8005**. x

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c ± 10%	long life s ₁ = 25% in mm	F ₁ in N	medium life s ₂ = 35% in mm	F ₂ in N	max. working traverse s _n = 50% in mm	F _n in N	max. travel stroke S _{max}	▲
40	20	7,8 x 3,4	51	50,8	12,8	650	17,9	908	25,5	1297	26	40 x 051
40	20		64	39,7	16,0	635	22,4	888	32,0	1269	34	40 x 064
40	20		76	33,1	19,0	629	26,6	879	38,0	1256	40	40 x 076
40	20		89	28,1	22,3	627	31,1	874	44,5	1249	48	40 x 089
40	20		102	24,5	25,5	625	35,7	874	51,0	1249	55	40 x 102
40	20		115	21,6	28,8	622	40,3	871	57,5	1244	63	40 x 115
40	20		127	19,5	31,8	620	44,5	867	63,5	1239	70	40 x 127
40	20		139	17,8	34,8	619	48,7	867	69,5	1238	76	40 x 139
40	20		152	16,3	38,0	619	53,2	865	76,0	1235	84	40 x 152
40	20		178	13,8	44,5	614	62,3	862	89,0	1231	99	40 x 178
40	20		203	12,1	50,8	615	71,0	863	101,5	1232	113	40 x 203
40	20		254	9,7	63,5	616	88,9	859	127,0	1227	142	40 x 254
40	20		305	8,0	76,3	610	106,8	858	152,5	1226	171	40 x 305
50	25	10,7 x 4,4	64	80,2	16,0	1283	22,4	1796	32,0	2566	37	50 x 064
50	25		76	66,9	19,0	1271	26,6	1781	38,0	2544	45	50 x 076
50	25		89	56,6	22,3	1262	31,1	1763	44,5	2519	53	50 x 089
50	25		102	49,3	25,5	1257	35,7	1762	51,0	2517	62	50 x 102
50	25		115	43,5	28,8	1253	40,3	1751	57,5	2501	70	50 x 115
50	25		127	39,3	31,8	1250	44,5	1746	63,5	2494	78	50 x 127
50	25		139	35,8	34,8	1246	48,7	1742	69,5	2489	85	50 x 139
50	25		152	32,8	38,0	1246	53,2	1743	76,0	2490	94	50 x 152
50	25		178	27,8	44,5	1237	62,3	1731	89,0	2474	110	50 x 178
50	25		203	24,2	50,8	1230	71,0	1720	101,5	2457	126	50 x 203
50	25		254	19,2	63,5	1219	88,9	1711	127,0	2444	159	50 x 254
50	25		305	16,0	76,3	1221	106,8	1712	152,5	2446	192	50 x 305

System springs SZ 8010

for light load, colour green

STEINEL[®]
NORMALIEN



Helical compression springs for light load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for light load **SZ 8010**

$D_h = 25$ mm, $L_0 = 76$ mm

Add **25 x 076**


Order number **SZ 8010.25 x 076**

ISO 10243

Add size to order number

Order number **SZ 8010.** x

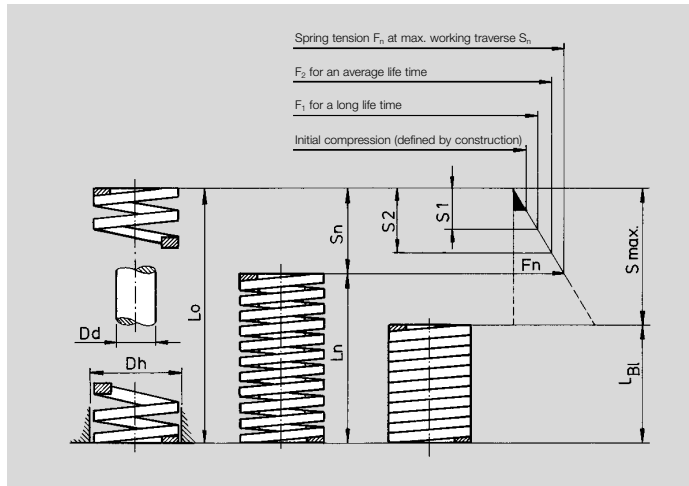
Tube \varnothing D_{hH15}	Rod \varnothing D_{dh15}	Wire 	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 25\%$ in mm	F_1 in N	medium life $s_2 = 35\%$ in mm	F_2 in N	max. working traverse $s_n = 40\%$ in mm	F_n in N	max. travel stroke S_{max}	
10	5	1,7x1,1	25	10,0	6,3	63	8,8	88	10,0	100	13	10 x 025
10	5		32	8,5	8,0	68	11,2	95	12,8	108	16	10 x 032
10	5		38	6,8	9,5	64	13,3	90	15,2	103	20	10 x 038
10	5		44	6,0	11,0	66	15,4	92	17,6	105	24	10 x 044
10	5		51	5,0	12,8	64	17,9	89	20,4	102	27	10 x 051
10	5		64	4,3	16,0	68	22,4	96	25,6	110	35	10 x 064
10	5		76	3,2	19,0	61	26,6	85	30,4	97	39	10 x 076
10	5		305	1,1	76,3	83	106,8	117	122,0	134	154	10 x 305
12,5	6,3	2,3x1,5	25	17,9	6,3	112	8,8	157	10,0	179	13	13 x 025
12,5	6,3		32	16,4	8,0	131	11,2	183	12,8	209	17	13 x 032
12,5	6,3		38	13,6	9,5	129	13,3	180	15,2	206	21	13 x 038
12,5	6,3		44	12,1	11,0	133	15,4	186	17,6	212	26	13 x 044
12,5	6,3		51	11,4	12,8	145	17,9	204	20,4	232	29	13 x 051
12,5	6,3		64	9,3	16,0	148	22,4	208	25,6	238	37	13 x 064
12,5	6,3		76	7,1	19,0	134	26,6	188	30,4	215	42	13 x 076
12,5	6,3		89	5,4	22,3	120	31,1	167	35,6	192	50	13 x 089
12,5	6,3		102	4,6	25,5	117	35,7	164	40,8	188	58	13 x 102
12,5	6,3		305	1,4	76,3	106	106,8	149	122,0	170	162	13 x 305
16	8	3,2x1,7	25	23,4	6,3	147	8,8	205	10,0	234	13	16 x 025
16	8		32	22,9	8,0	183	11,2	256	12,8	293	17	16 x 032
16	8		38	19,3	9,5	183	13,3	256	15,2	293	20	16 x 038
16	8		44	17,1	11,0	188	15,4	263	17,6	300	25	16 x 044
16	8		51	15,7	12,8	200	17,9	281	20,4	320	27	16 x 051
16	8		64	10,7	16,0	171	22,4	239	25,6	273	36	16 x 064
16	8		76	10,0	19,0	190	26,6	266	30,4	304	43	16 x 076
16	8		89	8,6	22,3	191	31,1	267	35,6	306	52	16 x 089
16	8		102	7,8	25,5	198	35,7	278	40,8	318	58	16 x 102
16	8		305	2,5	76,3	190	106,8	267	122,0	305	166	16 x 305
20	10	4,0x2,1	25	55,8	6,3	351	8,8	491	10,0	558	13	20 x 025
20	10		32	45,0	8,0	360	11,2	504	12,8	576	17	20 x 032
20	10		38	33,3	9,5	316	13,3	442	15,2	506	20	20 x 038
20	10		44	30,0	11,0	330	15,4	462	17,6	528	24	20 x 044
20	10		51	24,5	12,8	313	17,9	438	20,4	499	27	20 x 051
20	10		64	20,0	16,0	320	22,4	448	25,6	512	35	20 x 064
20	10		76	16,0	19,0	304	26,6	425	30,4	486	40	20 x 076
20	10		89	14,0	22,3	312	31,1	435	35,6	498	49	20 x 089
20	10		102	12,0	25,5	306	35,7	428	40,8	489	55	20 x 102
20	10		115	10,9	28,8	313	40,3	439	46,0	501	62	20 x 115
20	10		127	9,5	31,8	302	44,5	422	50,8	482	71	20 x 127
20	10		139	8,4	34,8	292	48,7	409	55,6	467	76	20 x 139
20	10		152	7,5	38,0	285	53,2	399	60,8	456	81	20 x 152
20	10		305	4,0	76,3	305	106,8	427	122,0	488	168	20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c±10%	long life s ₁ = 25% in mm	F ₁ in N	medium life s ₂ = 35% in mm	F ₂ in N	max. working traverse s _n = 40% in mm	F _n in N	max. travel stroke S _{max}	▲
25	12,5	5,3x2,7	25	100,0	6,3	630	8,8	880	10,0	1000	12	25 x 025
25	12,5		32	80,3	8,0	642	11,2	899	12,8	1027	16	25 x 032
25	12,5		38	62,0	9,5	589	13,3	824	15,2	942	19	25 x 038
25	12,5		44	52,9	11,0	581	15,4	814	17,6	931	22	25 x 044
25	12,5		51	44,0	12,8	563	17,9	787	20,4	897	25	25 x 051
25	12,5		64	35,2	16,0	563	22,4	788	25,6	901	34	25 x 064
25	12,5		76	28,0	19,0	532	26,6	744	30,4	851	38	25 x 076
25	12,5		89	24,0	22,3	535	31,1	746	35,6	854	48	25 x 089
25	12,5		102	21,1	25,5	538	35,7	753	40,8	860	54	25 x 102
25	12,5		115	18,7	28,8	538	40,3	753	46,0	860	61	25 x 115
25	12,5		127	16,7	31,8	531	44,5	743	50,8	848	69	25 x 127
25	12,5		139	15,3	34,8	532	48,7	745	55,6	851	75	25 x 139
25	12,5		152	14,0	38,0	532	53,2	744	60,8	851	81	25 x 152
25	12,5		178	12,5	44,5	556	62,3	778	71,2	890	96	25 x 178
25	12,5		203	10,4	50,8	528	71,0	738	81,2	844	110	25 x 203
25	12,5		305	7,0	76,3	534	106,8	747	122,0	854	168	25 x 305
32	16	6,7x3,3	38	94,0	9,5	893	13,3	1250	15,2	1428	18	32 x 038
32	16		44	79,5	11,0	874	15,4	1224	17,6	1399	22	32 x 044
32	16		51	67,0	12,8	857	17,9	1199	20,4	1366	25	32 x 051
32	16		64	53,0	16,0	848	22,4	1187	25,6	1356	34	32 x 064
32	16		76	44,0	19,0	836	26,6	1170	30,4	1337	40	32 x 076
32	16		89	37,2	22,3	829	31,1	1156	35,6	1324	48	32 x 089
32	16		102	32,0	25,5	816	35,7	1142	40,8	1305	55	32 x 102
32	16		115	29,0	28,8	835	40,3	1168	46,0	1334	63	32 x 115
32	16		127	25,0	31,8	795	44,5	1112	50,8	1270	69	32 x 127
32	16		139	23,0	34,8	800	48,7	1120	55,6	1279	77	32 x 139
32	16		152	21,5	38,0	817	53,2	1143	60,8	1307	81	32 x 152
32	16		178	18,2	44,5	809	62,3	1133	71,2	1295	95	32 x 178
32	16		203	15,8	50,8	802	71,0	1121	81,2	1282	112	32 x 203
32	16		254	12,5	63,5	793	88,9	1111	101,6	1270	143	32 x 254
32	16		305	10,3	76,3	785	106,8	1100	122,0	1256	175	32 x 305
40	20	8,0x4,0	51	92,0	12,8	1177	17,9	1646	20,4	1876	25	40 x 051
40	20		64	73,0	16,0	1168	22,4	1635	25,6	1868	33	40 x 064
40	20		76	63,0	19,0	1197	26,6	1675	30,4	1915	39	40 x 076
40	20		89	51,0	22,3	1137	31,1	1586	35,6	1815	47	40 x 089
40	20		102	43,0	25,5	1096	35,7	1535	40,8	1754	54	40 x 102
40	20		115	39,6	28,8	1140	40,3	1595	46,0	1821	61	40 x 115
40	20		127	37,0	31,8	1176	44,5	1646	50,8	1879	66	40 x 127
40	20		139	32,0	34,8	1114	48,7	1558	55,6	1779	76	40 x 139
40	20		152	28,0	38,0	1064	53,2	1489	60,8	1702	81	40 x 152
40	20		178	25,2	44,5	1121	62,3	1569	71,2	1794	93	40 x 178
40	20		203	22,7	50,8	1153	71,0	1611	81,2	1843	110	40 x 203
40	20		254	17,0	63,5	1079	88,9	1511	101,6	1727	136	40 x 254
40	20		305	14,8	76,3	1129	106,8	1580	122,0	1805	163	40 x 305
50	25	11,5x5,5	64	156,0	16,0	2496	22,4	3494	25,6	3993	31	50 x 064
50	25		76	125,0	19,0	2375	26,6	3325	30,4	3800	36	50 x 076
50	25		89	109,0	22,3	2430	31,1	3389	35,6	3880	44	50 x 089
50	25		102	94,0	25,5	2397	35,7	3355	40,8	3835	49	50 x 102
50	25		115	81,0	28,8	2332	40,3	3264	46,0	3726	60	50 x 115
50	25		127	71,0	31,8	2257	44,5	3159	50,8	3606	64	50 x 127
50	25		139	66,5	34,8	2314	48,7	3239	55,6	3697	70	50 x 139
50	25		152	60,0	38,0	2280	53,2	3192	60,8	3648	77	50 x 152
50	25		178	52,0	44,5	2314	62,3	3239	71,2	3702	94	50 x 178
50	25		203	44,0	50,8	2235	71,0	3124	81,2	3572	105	50 x 203
50	25		254	35,0	63,5	2222	88,9	3111	101,6	3556	126	50 x 254
50	25		305	28,5	76,3	2174	106,8	3044	122,0	3477	168	50 x 305
63	38	11,6x7,7	76	189,0	19,0	3591	26,6	5027	30,4	5744	38	63 x 076
63	38		89	158,0	22,3	3523	31,1	4913	35,6	5624	45	63 x 089
63	38		102	131,0	25,5	3340	35,7	4676	40,8	5344	52	63 x 102
63	38		115	116,0	28,8	3340	40,3	4674	46,0	5336	60	63 x 115
63	38		127	103,0	31,8	3275	44,5	4583	50,8	5232	63	63 x 127
63	38		152	84,3	38,0	3203	53,2	4484	60,8	5125	78	63 x 152
63	38		178	71,5	44,5	3181	62,3	4454	71,2	5090	89	63 x 178
63	38		203	61,7	50,8	3134	71,0	4380	81,2	5010	108	63 x 203
63	38		254	47,0	63,5	2984	88,9	4178	101,6	4775	137	63 x 254
63	38		305	38,2	76,3	2914	106,8	4079	122,0	4660	163	63 x 305

System springs SZ 8020

for medium load, colour blue

STEINEL®
NORMALIEN



Helical compression springs for medium load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for medium load **SZ 8020**

$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**


Order number **SZ 8020.25 x 076**

ISO 10243

Add size to order number

Order number **SZ 8020.** x

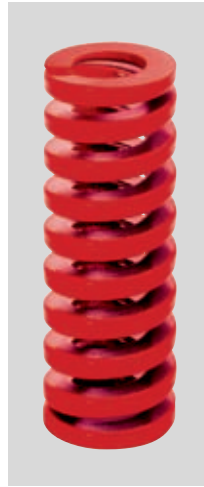
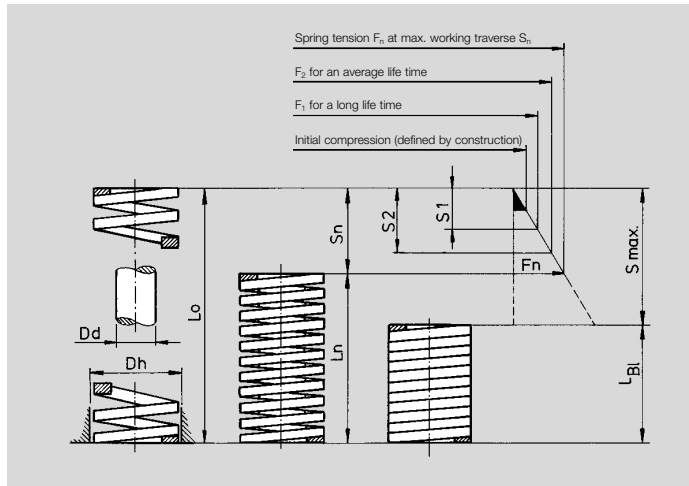
Tube \varnothing D_{hH15}	Rod \varnothing D_{dh15}	Wire	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 20\%$ in mm	F_1 in N	medium life $s_2 = 25\%$ in mm	F_2 in N	max. working traverse $s_n = 35\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
10	5	1,8x1,2	25	16,0	5,0	80	6,3	100	8,8	140	12	10 x 025
10	5		32	13,0	6,4	83	8,0	104	11,2	145	14	10 x 032
10	5		38	11,9	7,6	90	9,5	113	13,3	158	19	10 x 038
10	5		44	10,3	8,8	90	11,4	117	15,4	158	23	10 x 044
10	5		51	8,9	10,2	90	12,8	113	17,9	159	27	10 x 051
10	5		64	7,5	12,8	96	16,0	120	22,4	168	31	10 x 064
10	5		76	5,3	15,2	80	19,0	100	26,6	140	37	10 x 076
10	5		305	1,6	61,0	97	76,3	122	106,8	170	137	10 x 305
12,5	6,3	2,5x1,7	25	30,0	5,0	150	6,3	189	8,8	264	10	13 x 025
12,5	6,3		32	24,8	6,4	158	8,0	198	11,2	277	13	13 x 032
12,5	6,3		38	21,4	7,6	162	9,5	203	13,3	284	16	13 x 038
12,5	6,3		44	18,5	8,8	162	11,0	203	15,4	284	20	13 x 044
12,5	6,3		51	15,5	10,2	158	12,8	198	17,9	277	25	13 x 051
12,5	6,3		64	12,1	12,8	154	16,0	193	22,4	271	28	13 x 064
12,5	6,3		76	10,2	15,2	155	19,0	193	26,6	271	34	13 x 076
12,5	6,3		89	8,4	17,8	149	22,3	187	31,1	261	41	13 x 089
12,5	6,3		102	7,1	20,4	145	25,5	181	35,7	253	46	13 x 102
12,5	6,3		305	2,1	61,0	128	76,3	160	106,8	224	128	13 x 305
16	8	3,2x2,0	25	49,4	5,0	247	6,3	311	8,8	434	11	16 x 025
16	8		32	37,1	6,4	237	8,0	296	11,2	415	15	16 x 032
16	8		38	33,9	7,6	257	9,5	322	13,3	450	18	16 x 038
16	8		44	30,0	8,8	264	11,0	330	15,4	462	22	16 x 044
16	8		51	26,4	10,2	269	12,8	337	17,9	472	24	16 x 051
16	8		64	20,5	12,8	262	16,0	328	22,4	459	32	16 x 064
16	8		76	17,8	15,2	270	19,0	338	26,6	473	36	16 x 076
16	8		89	15,2	17,8	270	22,3	338	31,1	472	43	16 x 089
16	8		102	13,5	20,4	275	25,5	344	35,7	481	47	16 x 102
16	8		305	4,8	61,0	292	76,3	366	106,8	512	139	16 x 305
20	10	4,0x2,4	25	98,0	5,0	490	6,3	617	8,8	862	10	20 x 025
20	10		32	72,6	6,4	464	8,0	580	11,2	813	13	20 x 032
20	10		38	56,0	7,6	425	9,5	532	13,3	744	16	20 x 038
20	10		44	47,5	8,8	418	11,0	522	15,4	731	19	20 x 044
20	10		51	41,7	10,2	425	12,8	533	17,9	746	21	20 x 051
20	10		64	32,3	12,8	413	16,0	516	22,4	723	28	20 x 064
20	10		76	25,1	15,2	381	19,0	476	26,6	667	33	20 x 076
20	10		89	22,0	17,8	391	22,3	490	31,1	684	41	20 x 089
20	10		102	19,8	20,4	403	25,5	504	35,7	706	48	20 x 102
20	10		115	18,1	23,0	416	28,8	521	40,3	729	55	20 x 115
20	10		127	16,6	25,4	421	31,8	527	44,5	738	61	20 x 127
20	10		139	15,1	27,8	420	34,8	525	48,7	735	67	20 x 139
20	10		152	13,2	30,4	401	38,0	501	53,2	702	74	20 x 152
20	10		305	6,1	61,0	372	76,3	465	106,8	651	146	20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c ± 10%	long life s ₁ = 20% in mm	F ₁ in N	medium life s ₂ = 25% in mm	F ₂ in N	max. working traverse s _n = 35% in mm	F _n in N	max. travel stroke S _{max}	▲
25	12,5	5,3x3,1	25	147,0	5,0	735	6,3	926	8,8	1293	11	25 x 025
25	12,5		32	118,0	6,4	755	8,0	944	11,2	1321	13	25 x 032
25	12,5		38	93,0	7,6	706	9,5	883	13,3	1236	18	25 x 038
25	12,5		44	80,8	8,8	711	11,0	888	15,4	1244	21	25 x 044
25	12,5		51	68,6	10,2	699	12,8	878	17,9	1227	23	25 x 051
25	12,5		64	53,0	12,8	678	16,0	848	22,4	1187	30	25 x 064
25	12,5		76	43,2	15,2	656	19,0	820	26,6	1149	35	25 x 076
25	12,5		89	38,2	17,8	679	22,3	851	31,1	1188	43	25 x 089
25	12,5		102	33,0	20,4	673	25,5	841	35,7	1178	49	25 x 102
25	12,5		115	28,0	23,0	644	28,8	806	40,3	1128	56	25 x 115
25	12,5		127	25,9	25,4	657	31,8	823	44,5	1152	60	25 x 127
25	12,5		139	23,2	27,8	645	34,8	807	48,7	1130	65	25 x 139
25	12,5		152	20,8	30,4	632	38,0	790	53,2	1106	71	25 x 152
25	12,5		178	17,8	35,6	633	44,5	792	62,3	1108	85	25 x 178
25	12,5		203	15,8	40,6	641	50,8	802	71,0	1121	96	25 x 203
25	12,5		305	10,2	61,0	622	76,3	778	106,8	1089	150	25 x 305
32	16	6,8x4,0	38	185,0	7,6	1406	9,5	1757	13,3	2460	17	32 x 038
32	16		44	158,0	8,8	1390	11,0	1738	15,4	2433	19	32 x 044
32	16		51	134,0	10,2	1366	12,8	1715	17,9	2398	23	32 x 051
32	16		64	99,0	12,8	1267	16,0	1584	22,4	2217	30	32 x 064
32	16		76	80,5	15,2	1223	19,0	1529	26,6	2141	34	32 x 076
32	16		89	69,1	17,8	1229	22,3	1540	31,1	2149	42	32 x 089
32	16		102	58,8	20,4	1199	25,5	1499	35,7	2099	47	32 x 102
32	16		115	51,5	23,0	1184	28,8	1483	40,3	2059	55	32 x 115
32	16		127	44,8	25,4	1137	31,8	1424	44,5	1993	61	32 x 127
32	16		139	42,3	27,8	1176	34,8	1472	48,7	2060	68	32 x 139
32	16		152	37,8	30,4	1149	38,0	1436	53,2	2010	75	32 x 152
32	16		178	32,5	35,6	1157	44,5	1446	62,3	2024	89	32 x 178
32	16		203	28,9	40,6	1173	50,8	1468	71,0	2051	101	32 x 203
32	16		254	21,4	50,8	1097	63,5	1358	88,9	1902	124	32 x 254
32	16		305	18,3	61,0	1116	76,3	1396	106,8	1954	150	32 x 305
40	20	8,1x4,8	51	181,6	10,2	1852	12,8	2324	17,9	3250	21	40 x 051
40	20		64	140,0	12,8	1792	16,0	2240	22,4	3136	28	40 x 064
40	20		76	108,0	15,2	1641	19,0	2052	26,6	2872	33	40 x 076
40	20		89	90,7	17,8	1614	22,3	2022	31,1	2820	41	40 x 089
40	20		102	81,0	20,4	1652	25,5	2065	35,7	2891	45	40 x 102
40	20		115	71,8	23,0	1651	28,8	2067	40,3	2893	52	40 x 115
40	20		127	62,7	25,4	1592	31,8	1993	44,5	2790	59	40 x 127
40	20		139	57,5	27,8	1599	34,8	2001	48,7	2800	66	40 x 139
40	20		152	51,6	30,4	1568	38,0	1960	53,2	2745	71	40 x 152
40	20		178	44,1	35,6	1569	44,5	1962	62,3	2747	83	40 x 178
40	20		203	36,7	40,6	1490	50,8	1864	71,0	2605	94	40 x 203
40	20		254	30,1	50,8	1529	63,5	1911	88,9	2675	114	40 x 254
40	20		305	24,6	61,0	1500	76,3	1876	106,8	2627	148	40 x 305
50	25	10,9x6,0	64	209,0	12,8	2775	16,0	3344	22,4	4681	30	50 x 064
50	25		76	168,0	15,2	2553	19,0	3192	26,6	4468	36	50 x 076
50	25		89	140,0	17,8	2492	22,3	3122	31,1	4354	43	50 x 089
50	25		102	119,0	20,4	2427	25,5	3034	35,7	4248	48	50 x 102
50	25		115	106,0	23,0	2438	28,8	3052	40,3	4271	55	50 x 115
50	25		127	97,0	25,4	2463	31,8	3084	44,5	4316	63	50 x 127
50	25		139	87,0	27,8	2419	34,8	3028	48,7	4237	66	50 x 139
50	25		152	80,0	30,4	2432	38,0	3040	53,2	4256	72	50 x 152
50	25		178	69,5	35,6	2474	44,5	3092	62,3	4329	85	50 x 178
50	25		203	59,8	40,6	2427	50,8	3037	71,0	4245	95	50 x 203
50	25		254	43,9	50,8	2230	63,5	2787	88,9	3902	125	50 x 254
50	25		305	38,6	61,0	2354	76,3	2945	106,8	4122	150	50 x 305
63	38	11,5x9,3	76	312,0	15,2	4742	19,0	5928	26,6	8299	30	63 x 076
63	38		89	260,0	17,8	4628	22,3	5798	31,1	8086	38	63 x 089
63	38		102	221,0	20,4	4508	25,5	5635	35,7	7889	43	63 x 102
63	38		115	178,0	23,0	4301	28,8	5385	40,3	7536	50	63 x 115
63	38		127	168,0	25,4	4267	31,8	5342	44,5	7476	52	63 x 127
63	38		152	136,0	30,4	4134	38,0	5168	53,2	7235	67	63 x 152
63	38		178	114,0	35,6	4058	44,5	5073	62,3	7102	78	63 x 178
63	38		203	100,0	40,6	4060	50,8	5080	71,0	7100	88	63 x 203
63	38		254	78,4	50,8	3982	63,5	4978	88,9	6969	115	63 x 254
63	38		305	64,7	61,0	3946	76,3	4936	106,8	6909	134	63 x 305

System springs SZ 8030

for heavy load, colour red

STEINEL[®]
NORMALIEN



Helical compression springs for heavy load

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for heavy load **SZ 8030**

$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**


Order number **SZ 8030.25 x 076**

ISO 10243

Add size to order number

Order number **SZ 8030.** x

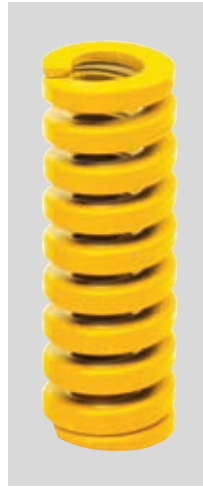
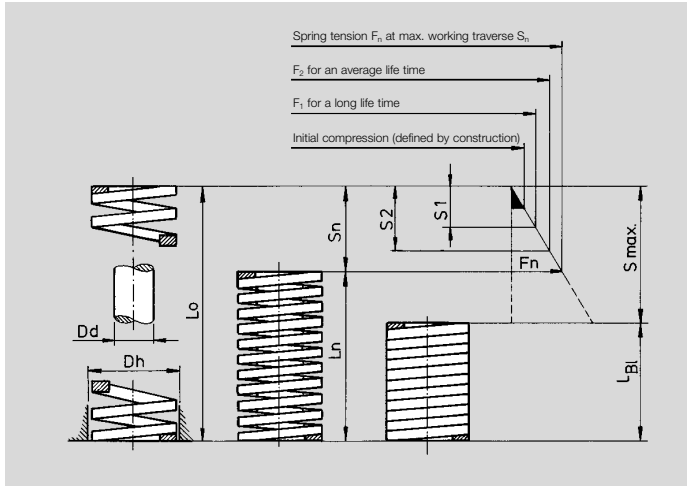
Tube \varnothing D_{hH15}	Rod \varnothing D_{dh15}	Wire \varnothing	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 15\%$ in mm	F_1 in N	medium life $s_2 = 20\%$ in mm	F_2 in N	max. working traverse $s_n = 30\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
10	5	1,9x1,5	25	22,1	3,7	81	5,0	110	7,5	165	9	10 x 025
10	5		32	17,5	4,8	84	6,4	112	9,6	168	12	10 x 032
10	5		38	17,1	5,7	97	7,6	129	11,4	194	15	10 x 038
10	5		44	15,0	6,6	99	8,8	132	13,2	198	17	10 x 044
10	5		51	12,8	7,6	97	10,2	130	15,3	195	21	10 x 051
10	5		64	10,7	9,6	102	12,8	136	19,2	205	26	10 x 064
10	5		76	7,5	11,4	85	15,2	114	22,8	171	31	10 x 076
10	5		305	2,1	45,7	95	61,0	128	91,5	192	122	10 x 305
12,5	6,3	2,4x2,0	25	42,1	3,7	155	5,0	210	7,5	315	9	13 x 025
12,5	6,3		32	33,2	4,8	159	6,4	212	9,6	318	13	13 x 032
12,5	6,3		38	29,3	5,7	167	7,6	222	11,4	334	15	13 x 038
12,5	6,3		44	24,6	6,6	162	8,8	216	13,2	324	18	13 x 044
12,5	6,3		51	19,6	7,6	148	10,2	199	15,3	299	20	13 x 051
12,5	6,3		64	15,0	9,6	144	12,8	192	19,2	288	26	13 x 064
12,5	6,3		76	13,2	11,4	150	15,2	200	22,8	300	30	13 x 076
12,5	6,3		89	11,4	13,3	151	17,8	202	26,7	304	35	13 x 089
12,5	6,3		102	9,4	15,3	144	20,4	192	30,6	287	41	13 x 102
12,5	6,3		305	2,8	45,7	127	61,0	170	91,5	247	123	13 x 305
16	8	3,0x2,4	25	75,7	3,7	280	5,0	378	7,5	567	9	16 x 025
16	8		32	52,8	4,8	253	6,4	337	9,6	506	14	16 x 032
16	8		38	48,5	5,7	276	7,6	368	11,4	552	17	16 x 038
16	8		44	42,8	6,6	282	8,8	376	13,2	564	20	16 x 044
16	8		51	37,1	7,6	281	10,2	378	15,3	567	21	16 x 051
16	8		64	30,3	9,6	290	12,8	387	19,2	581	28	16 x 064
16	8		76	25,7	11,4	292	15,2	390	22,8	585	33	16 x 076
16	8		89	21,7	13,3	288	17,8	386	26,7	579	39	16 x 089
16	8		102	19,3	15,3	295	20,4	393	30,6	590	44	16 x 102
16	8		305	7,1	45,7	324	61,0	433	91,5	649	127	16 x 305
20	10	4,0x3,2	25	216,0	3,7	799	5,0	1080	7,6	1641	9	20 x 025
20	10		32	168,0	4,8	806	6,4	1075	9,6	1612	11	20 x 032
20	10		38	129,0	5,7	735	7,6	980	11,4	1470	13	20 x 038
20	10		44	112,0	6,6	739	8,8	985	13,2	1478	16	20 x 044
20	10		51	94,0	7,6	714	10,2	958	15,3	1438	20	20 x 051
20	10		64	72,1	9,6	692	12,8	922	19,2	1384	25	20 x 064
20	10		76	59,7	11,4	680	15,2	907	22,8	1361	29	20 x 076
20	10		89	50,5	13,3	671	17,8	898	26,7	1348	35	20 x 089
20	10		102	44,2	15,3	676	20,4	901	30,6	1352	40	20 x 102
20	10		115	38,4	17,2	660	23,0	883	34,5	1324	47	20 x 115
20	10		127	34,1	19,0	647	25,4	866	38,1	1299	52	20 x 127
20	10		139	31,0	20,9	648	27,8	862	41,7	1293	57	20 x 139
20	10		152	28,2	22,8	642	30,4	857	45,6	1285	62	20 x 152
20	10		305	15,0	45,7	685	61,0	915	91,5	1372	121	20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c ± 10%	long life s ₁ = 15% in mm	F ₁ in N	medium life s ₂ = 20% in mm	F ₂ in N	max. working traverse s _n = 30% in mm	F _n in N	max. travel stroke S _{max}	▲	
25	12,5	5,6x4,1	25	375,0	3,7	1387	5,0	1875	7,5	2812	9	25 x 025	
25	12,5		32	297,0	4,8	1425	6,4	1900	9,6	2851	11	25 x 032	
25	12,5		38	219,0	5,7	1248	7,6	1664	11,4	2496	14	25 x 038	
25	12,5		44	187,0	6,6	1234	8,8	1645	13,2	2468	16	25 x 044	
25	12,5		51	156,0	7,6	1185	10,2	1591	15,3	2386	19	25 x 051	
25	12,5		64	123,0	9,6	1180	12,8	1574	19,2	2361	26	25 x 064	
25	12,5		76	99,0	11,4	1128	15,2	1504	22,8	2257	29	25 x 076	
25	12,5		89	84,0	13,3	1117	17,8	1495	26,7	2242	35	25 x 089	
25	12,5		102	73,0	15,3	1116	20,4	1489	30,6	2233	39	25 x 102	
25	12,5		115	65,0	17,2	1118	23,0	1495	34,5	2242	45	25 x 115	
25	12,5		127	57,7	19,0	1096	25,4	1465	38,1	2198	48	25 x 127	
25	12,5		139	52,7	20,9	1101	27,8	1465	41,7	2198	54	25 x 139	
25	12,5		152	47,8	22,8	1089	30,4	1453	45,6	2179	60	25 x 152	
25	12,5		178	41,0	26,7	1094	35,6	1459	53,4	2189	67	25 x 178	
25	12,5		203	35,8	30,4	1088	40,6	1453	60,9	2180	80	25 x 203	
25	12,5	305	22,9	45,7	1046	61,0	1396	91,5	2095	119	25 x 305		
32	16	6,9x5,3	38	388,0	5,7	2111	7,6	2948	11,4	4423	13	32 x 038	
32	16		44	324,0	6,6	2138	8,8	2851	13,2	4276	16	32 x 044	
32	16		51	272,0	7,6	2067	10,2	2774	15,3	4161	18	32 x 051	
32	16		64	212,0	9,6	2035	12,8	2713	19,2	4070	23	32 x 064	
32	16		76	172,0	11,4	1960	15,2	2614	22,8	3921	27	32 x 076	
32	16		89	141,0	13,3	1875	17,8	2509	26,7	3764	33	32 x 089	
32	16		102	122,0	15,3	1866	20,4	2488	30,6	3733	39	32 x 102	
32	16		115	107,0	17,2	1840	23,0	2461	34,5	3691	43	32 x 115	
32	16		127	93,0	19,0	1767	25,4	2362	38,1	3543	47	32 x 127	
32	16		139	86,0	20,9	1797	27,8	2391	41,7	3586	51	32 x 139	
32	16		152	78,0	22,8	1778	30,4	2371	45,6	3556	55	32 x 152	
32	16		178	67,2	26,7	1794	35,6	2392	53,4	3588	69	32 x 178	
32	16		203	59,1	30,4	1796	40,6	2399	60,9	3599	81	32 x 203	
32	16		254	46,4	38,1	1767	50,8	2357	76,2	3535	99	32 x 254	
32	16		305	38,0	45,7	1736	61,0	2318	91,5	3477	119	32 x 305	
40	20	8,4x6,2	51	350,0	7,6	2660	10,2	3570	15,3	5355	18	40 x 051	
40	20		64	269,0	9,6	2582	12,8	3443	19,2	5164	25	40 x 064	
40	20		76	219,0	11,4	2496	15,2	3328	22,8	4993	30	40 x 076	
40	20		89	190,0	13,3	2527	17,8	3382	26,7	5073	36	40 x 089	
40	20		102	163,0	15,3	2493	20,4	3325	30,6	4987	41	40 x 102	
40	20		115	142,0	17,2	2442	23,0	3266	34,5	4899	47	40 x 115	
40	20		127	128,0	19,0	2432	25,4	3251	38,1	4876	53	40 x 127	
40	20		139	115,0	20,9	2404	27,8	3197	41,7	4796	56	40 x 139	
40	20		152	105,0	22,8	2394	30,4	3192	45,6	4788	62	40 x 152	
40	20		178	89,0	26,7	2376	35,6	3168	53,4	4752	70	40 x 178	
40	20		203	77,0	30,4	2340	40,6	3126	60,9	4689	83	40 x 203	
40	20		254	61,0	38,1	2324	50,8	3098	76,2	4648	101	40 x 254	
40	20		305	51,0	45,7	2330	61,0	3111	91,5	4666	127	40 x 305	
50	25		11,3x7,4	64	413,0	9,6	3964	12,8	5286	19,2	7929	26	50 x 064
50	25			76	339,0	11,4	3864	15,2	5152	22,8	7729	29	50 x 076
50	25	89		288,0	13,3	3830	17,8	5126	26,7	7689	35	50 x 089	
50	25	102		245,0	15,3	3748	20,4	4998	30,6	7497	41	50 x 102	
50	25	115		215,0	17,2	3698	23,0	4945	34,5	7417	47	50 x 115	
50	25	127		192,0	19,0	3648	25,4	4876	38,1	7315	55	50 x 127	
50	25	139		168,0	20,9	3511	27,8	4670	41,7	7006	61	50 x 139	
50	25	152		154,0	22,8	3511	30,4	4681	45,6	7022	66	50 x 152	
50	25	178		134,0	26,7	3577	35,6	4770	53,4	7155	75	50 x 178	
50	25	203		117,0	30,4	3556	40,6	4750	60,9	7125	87	50 x 203	
50	25	254		89,0	38,1	3390	50,8	4521	76,2	6781	108	50 x 254	
50	25	305		73,0	45,7	3336	61,0	4453	91,5	6679	133	50 x 305	
63	38	12,5x11,0		76	630,0	11,4	7182	15,2	9576	22,8	14364	24	63 x 076
63	38			89	485,0	13,3	6450	17,8	8633	26,7	12950	32	63 x 089
63	38			102	434,0	15,3	5772	20,4	8854	30,6	13280	36	63 x 102
63	38		115	384,0	17,2	5875	23,0	8832	34,5	13248	40	63 x 115	
63	38		127	349,0	19,0	6631	25,4	8865	38,1	13297	44	63 x 127	
63	38		152	276,0	22,8	6293	30,4	8390	45,6	12586	56	63 x 152	
63	38		178	237,0	26,7	6328	35,6	8437	53,4	12656	65	63 x 178	
63	38		203	210,0	30,4	6384	40,6	8526	60,9	12789	74	63 x 203	
63	38		254	165,0	38,1	6286	50,8	8382	76,2	12573	94	63 x 254	
63	38		305	134,0	45,7	6124	61,0	8174	91,5	12261	115	63 x 305	

System springs SZ 8040

for extra heavy load, colour yellow

STEINEL[®]
NORMALIEN



Helical compression springs for extra heavy load

Material: profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for extra heavy load **SZ 8040**

$D_h = 25 \text{ mm}$, $L_0 = 76 \text{ mm}$

Add **25 x 076**


Order number **SZ 8040.25 x 076**

ISO 10243

Add size to order number

Order number **SZ 8040.** x

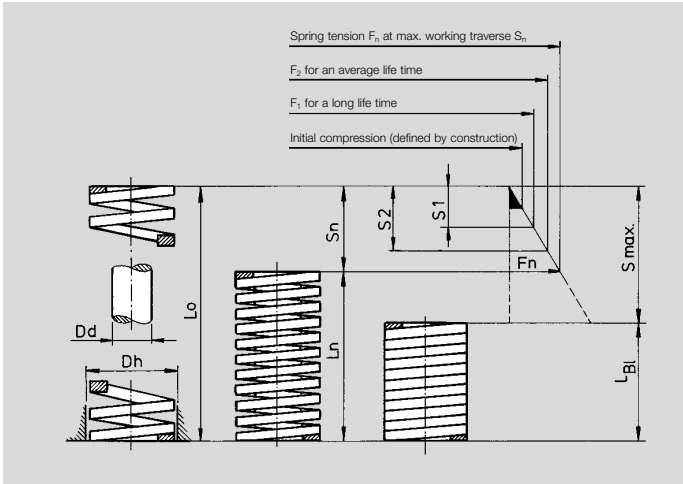
Tube \varnothing D_{hH15}	Rod \varnothing D_{dh15}	Wire \varnothing	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 15\%$ in mm	F_1 in N	medium life $s_2 = 20\%$ in mm	F_2 in N	max. working traverse $s_n = 25\%$ in mm	F_n in N	max. travel stroke S_{max}	\blacktriangle
10	5	1,9x1,5	25	36,8	3,7	136	5,0	184	6,3	231	9	10 x 025
10	5		32	27,9	4,8	133	6,4	178	8,0	223	12	10 x 032
10	5		38	23,7	5,7	135	7,6	180	9,5	225	14	10 x 038
10	5		44	19,2	6,6	126	8,8	168	11,0	211	17	10 x 044
10	5		51	16,5	7,6	125	10,2	168	12,8	211	19	10 x 051
10	5		64	13,2	9,6	126	12,8	168	16,0	211	23	10 x 064
10	5		76	10,9	11,4	124	15,2	165	19,0	207	30	10 x 076
10	5		305	2,6	45,7	118	61,0	158	76,3	198	117	10 x 305
12,5	6,3	2,3x2,2	25	58,5	3,7	216	5,0	292	6,3	368	9	13 x 025
12,5	6,3		32	43,9	4,8	210	6,4	280	8,0	351	12	13 x 032
12,5	6,3		38	36,0	5,7	205	7,6	273	9,5	342	14	13 x 038
12,5	6,3		44	30,3	6,6	199	8,8	266	11,0	333	18	13 x 044
12,5	6,3		51	26,2	7,6	199	10,2	267	12,8	335	20	13 x 051
12,5	6,3		64	21,2	9,6	203	12,8	271	16,0	339	27	13 x 064
12,5	6,3		76	17,1	11,4	194	15,2	259	19,0	324	32	13 x 076
12,5	6,3		89	14,5	13,3	192	17,8	258	22,3	323	38	13 x 089
12,5	6,3		102	12,5	15,3	191	20,4	255	25,5	319	41	13 x 102
12,5	6,3		305	4,3	45,7	196	61,0	262	76,3	328	115	13 x 305
16	8	3,2x2,7	25	118,0	3,7	436	5,0	590	6,3	743	10	16 x 025
16	8		32	89,0	4,8	427	6,4	569	8,0	712	12	16 x 032
16	8		38	72,1	5,7	410	7,6	547	9,5	684	14	16 x 038
16	8		44	60,9	6,6	401	8,8	535	11,0	669	17	16 x 044
16	8		51	52,3	7,6	397	10,2	533	12,8	669	19	16 x 051
16	8		64	41,2	9,6	395	12,8	527	16,0	659	25	16 x 064
16	8		76	34,1	11,4	388	15,2	518	19,0	647	29	16 x 076
16	8		89	29,5	13,3	392	17,8	525	22,3	657	36	16 x 089
16	8		102	25,6	15,3	391	20,4	522	25,5	652	38	16 x 102
16	8		305	8,4	45,7	383	61,0	512	76,3	640	120	16 x 305
20	10	4,1x3,7	25	293,0	3,7	1084	5,0	1465	6,3	1845	7	20 x 025
20	10		32	224,0	4,8	1075	6,4	1433	8,0	1792	10	20 x 032
20	10		38	177,0	5,7	1008	7,6	1345	9,5	1681	12	20 x 038
20	10		44	149,0	6,6	983	8,8	1311	11,0	1639	14	20 x 044
20	10		51	128,0	7,6	972	10,2	1305	12,8	1638	16	20 x 051
20	10		64	99,0	9,6	950	12,8	1267	16,0	1584	22	20 x 064
20	10		76	81,7	11,4	931	15,2	1241	19,0	1552	25	20 x 076
20	10		89	69,5	13,3	924	17,8	1237	22,3	1549	31	20 x 089
20	10		102	60,6	15,3	927	20,4	1236	25,5	1545	36	20 x 102
20	10		115	53,0	17,2	911	23,0	1219	28,8	1526	42	20 x 115
20	10		127	47,5	19,0	902	25,4	1206	31,8	1510	43	20 x 127
20	10		139	43,0	20,9	899	27,8	1195	34,8	1496	48	20 x 139
20	10		152	39,0	22,8	889	30,4	1185	38,4	1497	52	20 x 152
20	10		305	21,2	45,7	968	61,0	1293	76,3	1617	105	20 x 305

Tube Ø D _h ^{H15}	Rod Ø D _{gh15}	Wire 	Unloaded length L ₀	Spring coefficient in N/mm c±10%	long life s ₁ = 15% in mm	F ₁ in N	medium life s ₂ = 20% in mm	F ₂ in N	max. working traverse s _n = 25% in mm	F _n in N	max. travel stroke S _{max}	▲
25	12,5	5,6x4,6	32	374,4	4,8	1797	6,4	2396	8,0	2995	11	25 x 032
25	12,5		38	346,0	5,7	1972	7,6	2629	9,5	3287	13	25 x 038
25	12,5		44	244,0	6,6	1610	8,8	2147	11,0	2684	16	25 x 044
25	12,5		51	207,5	7,6	1577	10,2	2116	12,8	2656	18	25 x 051
25	12,5		64	161,0	9,6	1545	12,8	2060	16,0	2576	23	25 x 064
25	12,5		76	130,8	11,4	1491	15,2	1988	19,0	2485	26	25 x 076
25	12,5		89	110,5	13,3	1469	17,8	1966	22,3	2464	31	25 x 089
25	12,5		102	96,3	15,3	1473	20,4	1964	25,5	2455	36	25 x 102
25	12,5		115	85,7	17,2	1474	23,0	1971	28,8	2468	41	25 x 115
25	12,5		127	76,3	19,0	1449	25,4	1938	31,8	2426	47	25 x 127
25	12,5		152	63,5	22,8	1447	30,4	1930	38,0	2413	54	25 x 152
25	12,5		178	53,9	26,7	1439	35,6	1918	44,5	2398	63	25 x 178
25	12,5		203	47,0	30,4	1428	40,6	1908	50,8	2387	72	25 x 203
25	12,5		305	30,9	45,7	1412	61,0	1884	76,3	2357	113	25 x 305
32	16	7,2x5,6	38	528,2	5,7	3010	7,6	4014	9,5	5017	12	32 x 038
32	16		44	424,4	6,6	2810	8,8	3734	11,0	4668	15	32 x 044
32	16		51	353,0	7,6	2682	10,2	3600	12,8	4518	17	32 x 051
32	16		64	269,2	9,6	2584	12,8	3445	16,0	4307	22	32 x 064
32	16		76	218,5	11,4	2490	15,2	3321	19,0	4151	25	32 x 076
32	16		89	180,3	13,3	2397	17,8	3209	22,3	4020	33	32 x 089
32	16		102	155,0	15,3	2371	20,4	3162	25,5	3952	36	32 x 102
32	16		115	140,0	17,2	2408	23,0	3220	28,8	4032	42	32 x 115
32	16		127	124,0	19,0	2356	25,4	3149	31,8	3943	46	32 x 127
32	16		152	102,0	22,8	2325	30,4	3100	38,0	3876	56	32 x 152
32	16		178	88,2	26,7	2354	35,6	3139	44,5	3924	64	32 x 178
32	16		203	76,0	30,4	2310	40,6	3085	50,8	3860	71	32 x 203
32	16		254	60,8	38,1	2316	50,8	3088	63,5	3860	90	32 x 254
32	16		305	49,0	45,7	2239	61,0	2989	76,3	3738	103	32 x 305
40	20	8,7x7,3	51	628,0	7,6	4772	10,2	6405	12,8	8038	17	40 x 051
40	20		64	487,0	9,6	4675	12,8	6233	16,0	7792	23	40 x 064
40	20		76	379,0	11,4	4320	15,2	5760	19,0	7201	27	40 x 076
40	20		89	321,0	13,3	4269	17,8	5713	22,3	7158	31	40 x 089
40	20		102	281,0	15,3	4299	20,4	5732	25,5	7165	36	40 x 102
40	20		115	245,0	17,2	4214	23,0	5635	28,8	7056	40	40 x 115
40	20		127	221,0	19,0	4199	25,4	5613	31,8	7027	44	40 x 127
40	20		139	202,0	20,9	4222	27,8	5616	34,8	7030	52	40 x 139
40	20		152	168,0	22,8	3830	30,4	5107	38,0	6384	56	40 x 152
40	20		178	140,0	26,7	3738	35,6	4984	44,5	6230	61	40 x 178
40	20		203	132,0	30,4	4012	40,6	5359	50,8	6705	73	40 x 203
40	20		254	107,0	38,1	4076	50,8	5435	63,5	6794	93	40 x 254
40	20		305	87,8	45,7	4012	61,0	5355	76,3	6699	106	40 x 305
50	25	11,4x9,1	64	709,0	9,6	6806	12,8	9075	16,0	11344	21	50 x 064
50	25		76	572,0	11,4	6520	15,2	8694	19,0	10868	25	50 x 076
50	25		89	475,0	13,3	6317	17,8	8455	22,3	10592	28	50 x 089
50	25		102	405,0	15,3	6196	20,4	8262	25,5	10327	33	50 x 102
50	25		115	352,0	17,2	6054	23,0	8096	28,8	10137	38	50 x 115
50	25		127	316,0	19,0	6004	25,4	8026	31,8	10048	43	50 x 127
50	25		139	289,0	20,9	6040	27,8	8034	34,8	10057	47	50 x 139
50	25		152	239,0	22,8	5449	30,4	7265	38,0	9082	53	50 x 152
50	25		178	226,0	26,7	6034	35,6	8045	44,5	10057	60	50 x 178
50	25		203	187,0	30,4	5684	40,6	7592	50,8	9499	71	50 x 203
50	25		254	153,0	38,1	5829	50,8	7772	63,5	9715	91	50 x 254
50	25		305	127,0	45,7	5803	61,0	7747	76,3	9690	106	50 x 305
63	38	13,3x11,8	76	842,0	11,4	9599	15,2	12798	19,0	15998	24	63 x 076
63	38		89	726,0	13,3	9656	17,8	12923	22,3	16190	28	63 x 089
63	38		102	656,0	15,3	10037	20,4	13382	25,5	16728	31	63 x 102
63	38		115	534,0	17,2	9185	23,0	12282	28,8	15379	38	63 x 115
63	38		127	480,0	19,0	9120	25,4	12192	31,8	15264	42	63 x 127
63	38		152	396,0	22,8	9029	30,4	12038	38,0	15048	51	63 x 152
63	38		178	335,0	26,7	8945	35,6	11926	44,5	14908	60	63 x 178
63	38		203	297,0	30,4	9029	40,6	12058	50,8	15088	68	63 x 203
63	38		254	235,0	38,1	8954	50,8	11938	63,5	14923	85	63 x 254
63	38		305	194,0	45,7	8866	61,0	11834	76,3	14802	103	63 x 305

System springs SZ 8045

for extra heavy loads

STEINEL®
NORMALIEN



Screw pressure springs for extra heavy loads

Material: Profiled valve-spring steel wire (Cr-V / Cr-Si)

Tolerances similar to DIN 2095

The springs are initial-loaded, the ends are closed and ground square parallel.

Order example: System spring for extra heavy load **SZ 8045**

$D_h = 25$ mm, $L_0 = 89$ mm

Add **25 x 089**

Order number **SZ 8045.25 x 089**


Add size to order number

Order number **SZ 8045.** x

Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 7\%$ in mm	F_1 in N	medium life $s_2 = 10\%$ in mm	F_2 in N	max. working traverse $s_n = 15\%$ in mm	F_n in N	max. travel stroke S_{max}	▲
16	8	3,45x4,6	32	449	2,2	988	3,2	1437	4,8	2155	6	16 x 032
16	8		38	363	2,6	944	3,8	1379	5,7	2069	7	16 x 038
16	8		44	309	3,1	958	4,4	1360	6,6	2039	8	16 x 044
16	8		51	256	3,6	922	5,1	1306	7,7	1958	9	16 x 051
16	8		64	203	4,5	914	6,4	1299	9,6	1949	11	16 x 064
16	8		76	166	5,3	880	7,6	1262	11,4	1892	14	16 x 076
16	8		89	139	6,2	862	8,9	1237	13,4	1856	16	16 x 089
16	8		102	114	7,1	809	10,2	1163	15,3	1744	19	16 x 102
16	8		115	105	8,1	851	11,5	1208	17,3	1811	22	16 x 115
16	8		127	94	8,9	837	12,7	1194	19,1	1791	25	16 x 127
16	8		152	69	10,6	731	15,2	1049	22,8	1573	34	16 x 152
16	8		305	37	21,4	792	30,5	1129	45,8	1693	70	16 x 305
20	10	4,05x5,9	44	452	3,1	1401	4,4	1989	6,6	2983	8	20 x 044
20	10		51	378	3,6	1361	5,1	1928	7,7	2892	10	20 x 051
20	10		64	301	4,5	1355	6,4	1926	9,6	2890	13	20 x 064
20	10		76	247	5,3	1309	7,6	1877	11,4	2816	16	20 x 076
20	10		89	208	6,2	1290	8,9	1851	13,4	2777	19	20 x 089
20	10		102	188	7,1	1335	10,2	1918	15,3	2876	21	20 x 102
20	10		115	159	8,1	1288	11,5	1829	17,3	2743	24	20 x 115
20	10		127	146	8,9	1299	12,7	1854	19,1	2781	26	20 x 127
20	10		152	91	10,6	965	15,2	1383	22,8	2075	45	20 x 152
20	10		305	60	21,4	1284	30,5	1830	45,8	2745	70	20 x 305
25	12,5	5,7x7,4	44	1158	3,1	3590	4,4	5095	6,6	7643	8	25 x 044
25	12,5		51	933	3,6	3359	5,1	4758	7,6	7091	10	25 x 051
25	12,5		64	644	4,5	2898	6,4	4122	9,6	6182	13	25 x 064
25	12,5		76	556	5,3	2947	7,6	4226	11,4	6338	16	25 x 076
25	12,5		89	462	6,2	2864	8,9	4112	13,4	6191	20	25 x 089
25	12,5		102	390	7,1	2769	10,2	3978	15,3	5967	23	25 x 102
25	12,5		115	360	8,1	2916	11,5	4140	17,3	6228	26	25 x 115
25	12,5		127	336	8,9	2990	12,7	4267	19,1	6418	28	25 x 127
25	12,5		152	248	10,6	2629	15,2	3770	22,8	5654	34	25 x 152
25	12,5		178	220	12,5	2750	17,8	3916	26,7	5874	39	25 x 178
25	12,5		203	199	14,2	2826	20,3	4040	30,5	5313	45	25 x 203
25	12,5		305	134	21,4	2868	30,5	4087	45,8	6137	63	25 x 305
32	16	7,4x8,8	44	1300	3,1	4030	4,4	5720	6,6	8580	8	32 x 044
32	16		51	1150	3,6	4140	5,1	5864	7,6	8740	11	32 x 051
32	16		64	887	4,5	3992	6,4	5677	9,6	8515	14	32 x 064
32	16		76	705	5,3	3737	7,6	5358	11,4	8037	17	32 x 076
32	16		89	594	6,2	3683	8,9	5287	13,4	7960	21	32 x 089
32	16		102	520	7,1	3692	10,2	5304	15,3	7956	23	32 x 102
32	16		115	465	8,1	3767	11,5	5348	17,3	8045	25	32 x 115
32	16		127	413	8,9	3676	12,7	5245	19,1	7888	30	32 x 127
32	16		152	348	10,6	3689	15,2	5290	22,8	7934	35	32 x 152
32	16		178	294	12,5	3675	17,8	5233	26,7	7850	41	32 x 178
32	16		203	256	14,2	3635	20,3	5197	30,5	7808	47	32 x 203
32	16		254	201	17,8	3578	25,4	5105	38,1	7658	58	32 x 254
32	16		305	168	21,4	3595	30,5	5124	45,8	7694	70	32 x 305

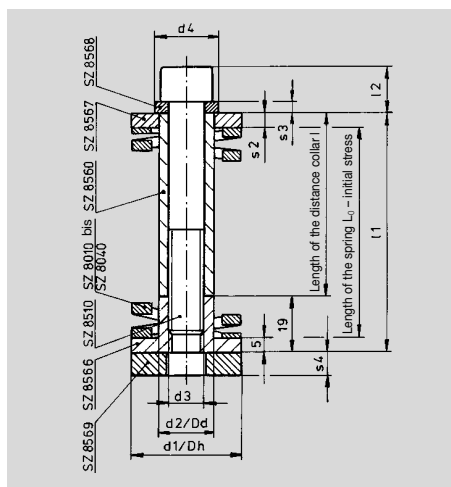
Add
size to
order number

Order number **SZ 8045.** x

Tube \varnothing D_h^{H15}	Rod \varnothing D_{dh15}	Wire 	Unloaded length L_0	Spring coefficient in N/mm $c \pm 10\%$	long life $s_1 = 7\%$ in mm	F_1 in N	medium life $s_2 = 10\%$ in mm	F_2 in N	max. working $s_n = 15\%$ in mm	traverse F_n in N	max. travel stroke S_{max}	▲
40	20	8,7x10,6	64	1228	4,5	5526	6,4	7859	9,6	11789	13	40 x 064
40	20		76	1017	5,3	5390	7,6	7729	11,4	11594	16	40 x 076
40	20		89	880	6,2	5456	8,9	7832	13,4	11792	20	40 x 089
40	20		102	762	7,1	5410	10,2	7772	15,3	11659	23	40 x 102
40	20		115	679	8,1	5500	11,5	7809	17,3	11747	26	40 x 115
40	20		127	622	8,9	5536	12,7	7899	19,1	11880	28	40 x 127
40	20		152	509	10,6	5395	15,2	7737	22,8	11605	36	40 x 152
40	20		178	429	12,5	5363	17,8	7636	26,7	11454	43	40 x 178
40	20		203	374	14,2	5311	20,3	7592	30,5	11407	49	40 x 203
40	20		254	296	17,6	5269	25,4	7518	38,1	11278	62	40 x 254
40	20		305	246	21,4	5264	30,5	7503	45,8	11267	75	40 x 305
50	25	11,8x13,4	64	1980	4,5	8910	6,4	12672	9,6	19008	11	50 x 064
50	25		76	1811	5,3	9598	7,6	13764	11,4	20645	14	50 x 076
50	25		89	1410	6,2	8742	8,9	12549	13,4	18894	19	50 x 089
50	25		102	1215	7,1	8626	10,2	12393	15,3	18590	22	50 x 102
50	25		115	1076	8,1	8716	11,5	12374	17,3	18615	25	50 x 115
50	25		127	968	8,9	8615	12,7	12294	19,1	18489	28	50 x 127
50	25		152	806	10,6	8444	15,2	12251	22,8	18377	34	50 x 152
50	25		178	698	12,5	8725	17,8	12424	26,7	18637	40	50 x 178
50	25		203	612	14,2	8690	20,3	12424	30,5	18666	45	50 x 203
50	25		254	472	17,8	8402	25,4	11989	38,1	17983	58	50 x 254
50	25		305	388	21,4	8303	30,5	11834	45,8	17770	70	50 x 305

System spring units SZ 8565

STEINEL®
NORMALIEN



System spring unit SZ 8565.00 complete, however without spring:

- 1 cheese-head screw SZ 8510
- 1 distance collar SZ 8560
- 1 thread disc SZ 8566
- 1 mating disc SZ 8567
- 1 tightening disc SZ 8568
- 1 regrinding disc SZ 8569

System spring unit complete with spring:

- SZ 8010 **SZ 8565.10**
- SZ 8020 **SZ 8565.20**
- SZ 8030 **SZ 8565.30**
- SZ 8040 **SZ 8565.40**

Add to order number

Tube Ø d₁ / D_h x l₁

Add size to order number

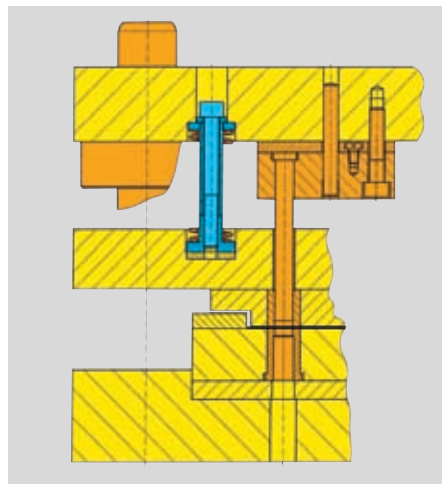
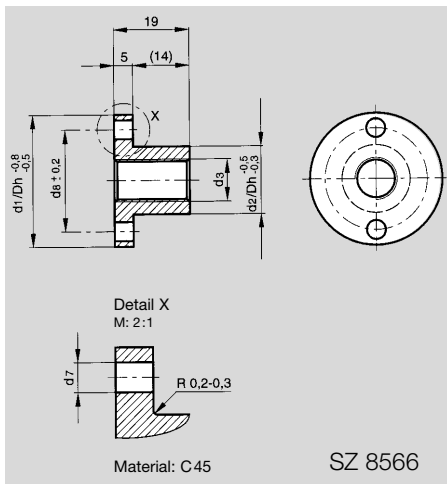
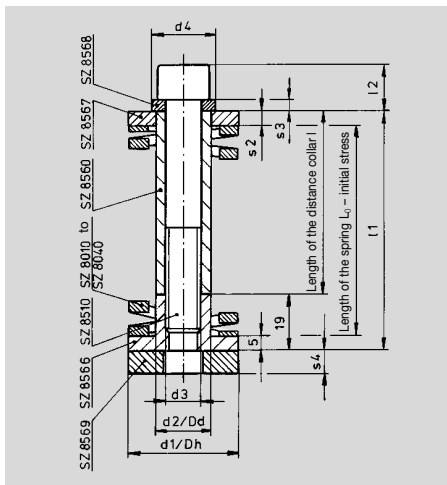
Order number **SZ 8565.** x x

Tube Ø d ₁ /D _h	Rod d ₂ /D _d	d ₃	d ₄	l	l ₁	l ₂	s ₂	s ₃	SZ 8510 included in SZ 8565	SZ 8560 included in SZ 8565	SZ 8566 included in SZ 8565	SZ 8567 included in SZ 8565	SZ 8568 included in SZ 8565	matchable to that SZ 8010-40 ▲ ▲
20	10	M6	13	20	39	9	4	3	06 x 035	10 x 020	20	20	20	20 x 032
				30	49				06 x 045	10 x 030				20 x 044
				50	69				06 x 070	10 x 050				20 x 064
				63	82				06 x 080	10 x 063				20 x 076
25	12,5	M8	16	20	39	11	4	3	08 x 035	12 x 020	25	25	25	25 x 032
				30	49				08 x 045	12 x 030				25 x 044
				50	69				08 x 070	12 x 050				25 x 064
				63	82				08 x 080	12 x 063				25 x 076
				100	119				08 x 120	12 x 100				25 x 115
32	16	M10	19	30	49	13	4	3	10 x 050	16 x 030	32	32	32	32 x 044
				50	69				10 x 070	16 x 050				32 x 064
				63	82				10 x 080	16 x 063				32 x 076
				100	119				10 x 120	16 x 100				32 x 115
40	20	M12	22	50	69	16	5	4	12 x 070	20 x 050	40	40	40	40 x 064
				63	82				12 x 080	20 x 063				40 x 076
				100	119				12 x 120	20 x 100				40 x 115
50	25	M16	28	50	69	20	5	4	16 x 070	25 x 050	50	50	50	50 x 064
				63	82				16 x 080	25 x 063				50 x 076
				100	119				16 x 120	25 x 100				50 x 115

Force stroke table

Spring units SZ 8565.	with system springs		SZ 8010 green (light load)			SZ 8020 blue (medium load)			SZ 8030 red (heavy load)			SZ 8040 yellow (extra heavy load)			
	SZ 8010 initial stress	SZ 8020 mm %	SZ 8030 stress	SZ 8040 working tension	SZ 8010 max. spring traverse	SZ 8020 max. spring traverse	SZ 8030 max. spring traverse	SZ 8040 max. spring traverse	SZ 8010 initial stress	SZ 8020 max. spring traverse	SZ 8030 max. spring traverse	SZ 8040 initial stress	SZ 8010 max. spring traverse	SZ 8020 max. spring traverse	
20 x 039	20 x 032	2	6	90	10,8	576	145	9,2	813	336	7,6	1612	448	6	1792
20 x 049	20 x 044	4	9	120	13,6	528	190	11,4	731	448	9,2	1478	596	7	1639
20 x 069	20 x 064	4	6	80	21,6	512	129	18,4	723	288	15,2	1384	396	12	1584
20 x 082	20 x 076	3	4	48	27,4	486	75	23,6	667	179	19,8	1361	245	16	1552
25 x 039	25 x 032	2	6	160	10,8	1027	236	9,2	1321	594	7,6	2851	748	6	2995
25 x 049	25 x 044	4	9	211	13,6	931	323	11,4	1244	748	9,2	2468	976	7	2684
25 x 069	25 x 064	4	6	140	21,6	901	212	18,4	1187	492	15,2	2361	644	12	2576
25 x 082	25 x 076	3	4	84	27,4	851	129	23,6	1149	297	19,8	2257	392	16	2485
25 x 119	25 x 115	5	4	93	41,0	860	140	35,3	1128	325	29,5	2242	428	23,8	2468
32 x 049	32 x 044	4	9	318	13,6	1399	632	11,4	2433	1296	9,2	4276	1976	7	4668
32 x 069	32 x 064	4	6	212	21,6	1356	396	18,4	2217	848	15,2	4070	1076	12	4307
32 x 082	32 x 076	3	4	132	27,4	1337	241	23,6	2141	516	19,8	3921	655	16	4151
32 x 119	32 x 115	5	4	145	41,0	1334	257	35,3	2058	535	29,5	3691	700	23,8	4032
40 x 069	40 x 064	5	8	365	20,6	1868	700	17,4	3136	1345	14,2	5164	2435	11	7792
40 x 082	40 x 076	4	5	252	26,4	1915	432	22,6	2872	876	18,8	4993	1516	15	7201
40 x 119	40 x 115	6	5	237	40,0	1821	430	34,3	2893	852	28,5	4899	1470	22,8	7056
50 x 069	50 x 064	5	8	780	20,6	3993	1045	17,4	4681	2065	14,2	7929	3545	11	11344
50 x 082	50 x 076	4	5	500	26,4	3800	672	22,6	4468	1356	18,8	7729	2288	15	10868
50 x 119	50 x 115	6	5	486	40,0	3726	636	34,3	4271	1290	28,5	7417	2112	22,8	10137

System spring units SZ 8565

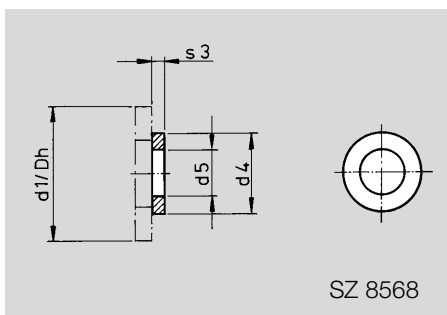
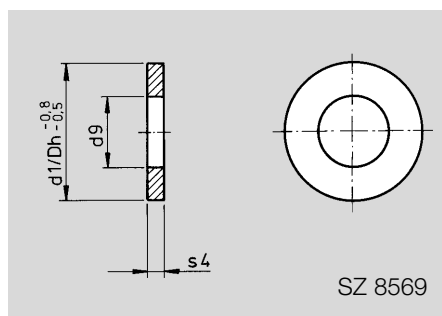
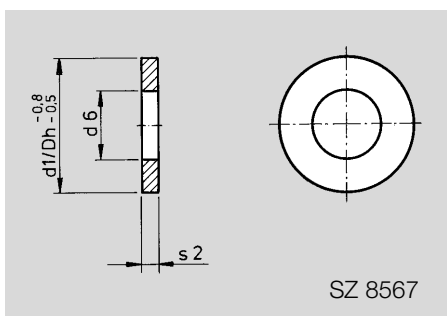


Order example: System spring unit complete, however without spring
SZ 8565.00
Tube $\varnothing d_1 / D_h = 32$ mm,
mounting length $l_1 = 82$ mm
Add **32 x 082**
Order number **SZ 8565.00.32 x 082**

Order example: System spring unit complete, with spring, for example SZ 8040
SZ 8565.40
Tube $\varnothing d_1 / D_h = 32$ mm,
mounting length $l_1 = 82$ mm
Add **32 x 082**
Order number **SZ 8565.40.32 x 082**

Order example for parts:
Thread disc **SZ 8566**
Tube $\varnothing d_1 / D_h = 32$ mm,
Add **32**
Order number **SZ 8566.32**

Matchable: Distance collars SZ 8560
Cheese head screws SZ 8510
System springs SZ 8010
SZ 8020
SZ 8030
SZ 8040
see concerning catalogue page



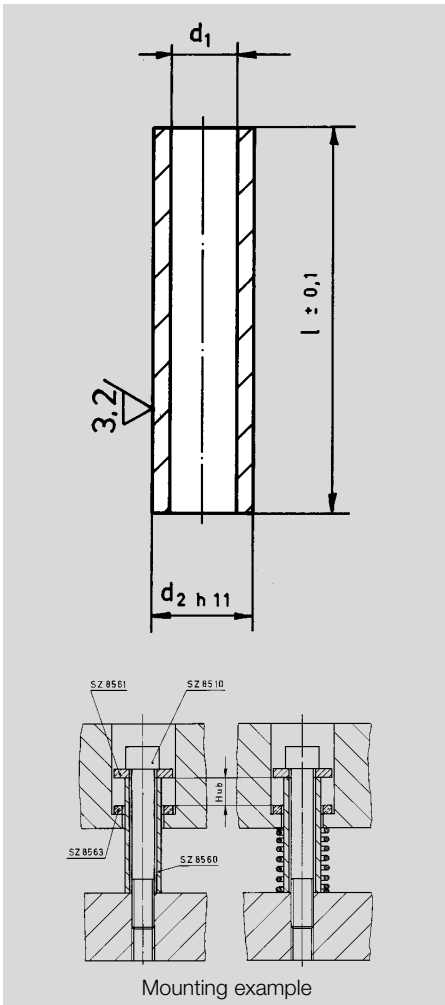
Parts for special lengths

$d_1/Dh -0,8$	$d_2/Dd -0,3$	d_3	d_4	d_5	d_6	d_7	d_8	d_9	s_2	s_3	s_4	\blacktriangle
20	10,0	M 6	13	6,5	10,5	3,2	14	6,5	4	3	8	20
25	12,5	M 8	16	8,5	13,0	4,2	18,5	8,5	4	3	8	25
32	16,0	M10	19	10,5	16,5	4,2	25	10,5	4	3	10	32
40	20,0	M12	23	12,5	20,5	4,2	30	12,5	5	4	10	40
50	25,0	M16	28	16,5	25,5	4,2	40	16,5	5	4	10	50

Add size to order number

Thread disc	Order number SZ 8566.	<input type="checkbox"/>
Mating disc	Order number SZ 8567.	<input type="checkbox"/>
Tightening disc	Order number SZ 8568.	<input type="checkbox"/>
Regrinding disc	Order number SZ 8569.	<input type="checkbox"/>

Distance collars



Add size to order number

Order number **SZ 8560.** x

d ₁	d _{2h11}	l ^{+0.1}	matchable SZ 8561	matchable SZ 8563	Pieces/standard packing	▲			
7	10	20	6,4	11	4	10 x 020			
		30				10 x 030			
		40				10 x 040			
		50				10 x 050			
		63				10 x 063			
		80				10 x 080			
9	12,5	20	8,4	14	4	12 x 020			
		30				12 x 030			
		40				12 x 040			
		50				12 x 050			
		63				12 x 063			
		80				12 x 080			
9	13	100	8,4	14	4	12 x 100			
		20				13 x 020			
		30				13 x 030			
		40				13 x 040			
		50				13 x 050			
		63				13 x 063			
9	13	80	8,4	14	4	13 x 080			
		100				13 x 100			
		11				10,5	17	4	16 x 030
		40							16 x 040
		50							16 x 050
		60							16 x 060
63	16 x 063								
80	16 x 080								
11	16	100	10,5	17	4	16 x 100			
		125				16 x 125			
		160				16 x 160			
		200				16 x 200			
		13				13	21	4	19 x 030
		40							19 x 040
50	19 x 050								
60	19 x 060								
63	19 x 063								
80	19 x 080								
13	19	100	13	21	4	19 x 100			
		125				19 x 125			
		200				19 x 200			
		13				13	21	4	20 x 030
		40							20 x 040
		50							20 x 050
60	20 x 060								
63	20 x 063								
80	20 x 080								
13	20	100	13	21	4	20 x 100			
		125				20 x 125			
		200				20 x 200			
		17				17	26	4	25 x 050
		60							25 x 060
		63							25 x 063
70	25 x 070								
80	25 x 080								
90	25 x 090								
17	25	100	17	26	4	25 x 100			
		125				25 x 125			
		200				25 x 200			
		22				21	31	4	30 x 070
		80							30 x 080
		90							30 x 090
100	30 x 100								
120	30 x 120								
125	30 x 125								
22	30	150	21	31	4	30 x 150			
		200				30 x 200			
		26				25	37	4	36 x 080
		100							36 x 100
		125							36 x 125
		150							36 x 150
200	36 x 200								

Distance collars

Material: 1.0715 (9 S Mn 28 K)
casehardened, hardness 62 – 65 HRC

Order example: Distance collar **SZ 8560**

d₂ = 16 mm, l = 40 mm

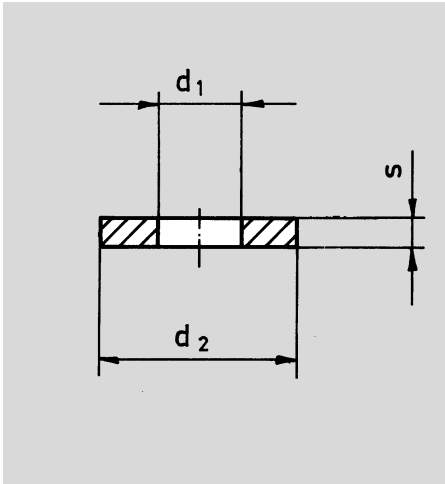
Add **16 x 040**

Order number **SZ 8560.16 x 040**

Special size lengths supplyable on request
minimum purchase quantity Ø10 – Ø16 20 pcs
Ø19 – Ø36 10 pcs

Discs

Damping discs



Discs

Material: 1.0503 (C 45),
hardness 45 – 50 HRC

Order example: Disc **SZ 8561**

$d_1 = 10,5$ mm

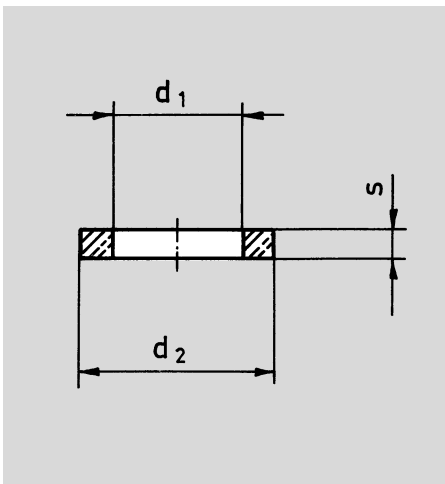
Add **10,5**

Order number **SZ 8561.10,5**

Add
size to
order number

Order number **SZ 8561.**

d_1	d_2	s	Pieces/standard packing	▲
6,4	17	3	4	06,4
8,4	23	4	4	08,4
10,5	26	4	4	10,5
13	30	5	4	13
17	35	6	4	17
21	42	8	4	21
25	46	10	4	25



Damping discs

Material: Polyurethane
on basis Desmodur 15
hardness 90 ± 5 Shore A

Order example: Damping disc **SZ 8563**

$d_1 = 17$ mm

Add **17**

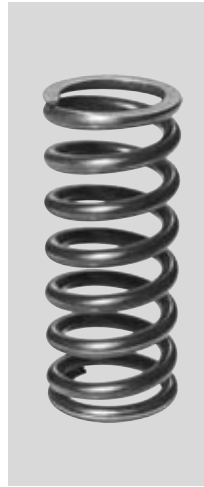
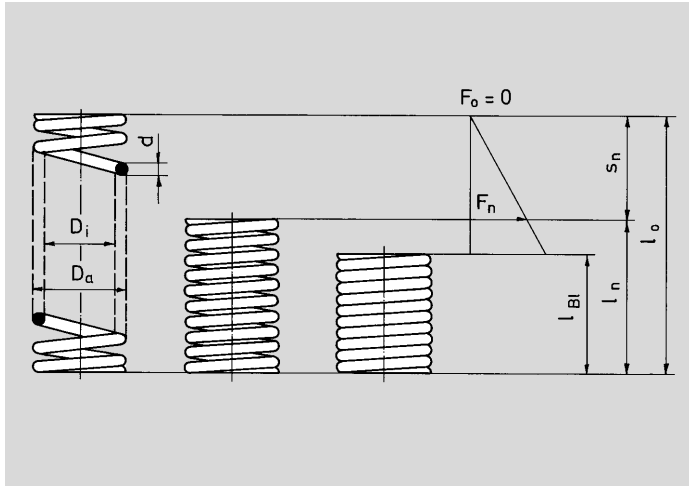
Order number **SZ 8563.17**

Add
size to
order number

Order number **SZ 8563.**

d_1	d_2	s	Pieces/standard packing	▲
11	17	3	4	11
14	23	4	4	14
17	26	4	4	17
21	30	5	4	21
26	35	6	4	26
31	42	6	4	31
37	46	6	4	37

Helical springs



Helical springs with round cross section

Material: Patented drawn spring wire grade C according to DIN 17223

Efficiency rating 2 according to DIN 2095. The springs are initial loaded, 1 winding closed at both ends and ground square.

Indication: For long working life at an oscillatory loading $s_{max} = \text{about } 0,7 s_n$.

Springs with round cross section should be used preferably, because they have the most positive attributes.

Order example: Helical spiral springs with round cross section **SZ 8100**

$D_a = 46 \text{ mm}$, $l_0 = 67 \text{ mm}$

Add **46 x 67**

Order number **SZ 8100.46 x 67**

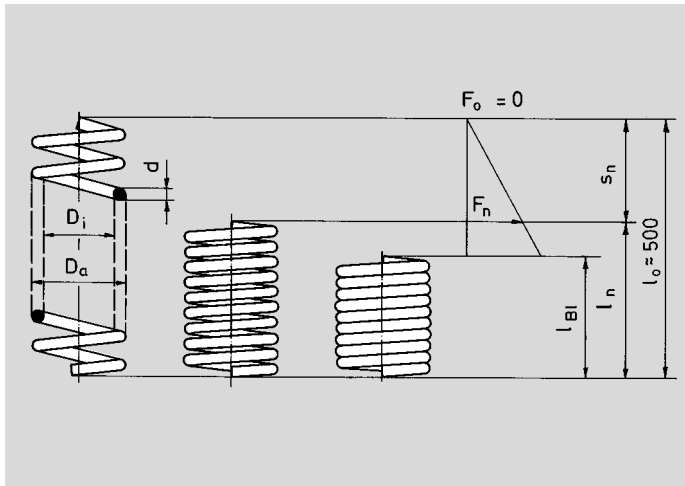
Add size to order number

Order number **SZ 8100.** x

D_a	D_i	d	l_0	l_n	s_n	Spring tension F_n^* (N) $\pm 10\%$	l_{max}	Pieces/standard packing	▲
10	7	1,5	40	23,9	16,1	130	18	50	10 x 40
12	9	1,5	55	25,3	29,7	110	23	50	12 x 55
14	10	2	40	22,4	17,6	210	20,5	50	14 x 40
14	10	2	50	25	25	250	24	50	14 x 50
15	11	2	40	20	20	220	17,5	50	15 x 40
17	12,5	2,25	85	41	44	260	35	30	17 x 85
17,5	11,5	3	45	31	14	490	29	30	17,5 x 45
17,5	11,5	3	50	34	16	480	33	30	17,5 x 50
18	10	4	83	65	18	1330	61,5	20	18 x 83
19	11	4	35	27	8	1340	26	30	19 x 35
19	10	4,5	90	72,4	17,6	1690	70,5	20	19 x 90
19,5	14,5	2,5	35	20	15	200	18,5	30	19,5 x 35
19,5	13,5	3	40	26	14	450	24,5	30	19,5 x 40
20,5	15,5	2,5	95	46,2	48,8	200	37	20	20,5 x 95
21	13	4	40	29	11	1140	28	20	21 x 40
21,5	15,5	3	45	23,6	21,4	540	22,5	20	21,5 x 45
21,5	13,5	4	50	34,4	15,6	1140	32	20	21,5 x 50
25	17	4	24	16,8	7,2	950	15,5	30	25 x 24
27,8	13,8	7	70	59	11	3680	57	10	27,8 x 70
30	22	4	70	36	34	810	34	20	30 x 70
30	17	6,5	150	122	28	2850	108	10	30 x 150
32	20	6	125	93	32	2110	84	10	32 x 125
42	26	8	130	94	36	3830	82	6	42 x 130
42	26	8	200	137,7	62,3	3830	125	6	42 x 200
46	26	10	67	58	9	5640	53	6	46 x 67
47	30	8,5	50	39	11	3630	36	10	47 x 50
53	31	11	200	157	43	6620	145	4	53 x 200
56	40	8	50	36	14	2080	34	10	56 x 50
61	39	11	180	137	43	5100	124	4	61 x 180
84	64	10	200	110	90	3750	75	2	84 x 200

*) Helical spiral springs arranged according to forces see concerning page

Helical springs



Helical springs with round cross section, 500 mm long

Material: Patented drawn spring wire grade C according to DIN 17223

Efficiency rating 2 according to DIN 2095. The springs are initial-loaded.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

Helical springs 500 mm long are suited for production of any spring lengths. After the cutoff of the desired length, close ends of the springs and grind rectangular to the spring axis. Avoid excessive heating during closing!

Order example: Helical springs with round cross section, 500 mm long **SZ 8101**

$D_a = 18$ mm, $d = 4$ mm

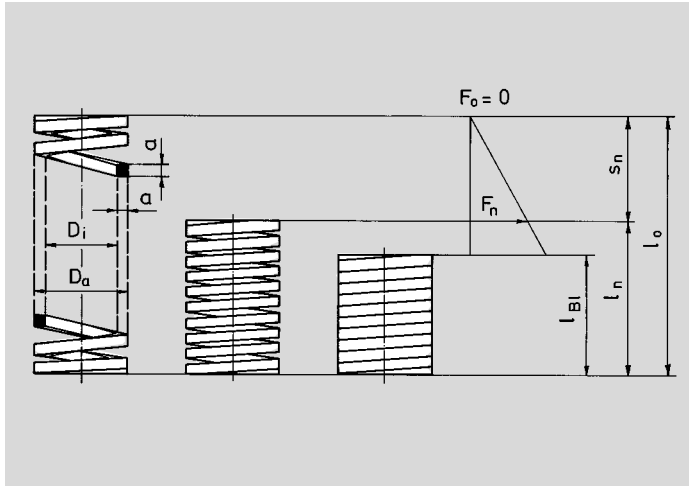
Add **18 x 4**

Order number **SZ 8101.18 x 4**

Add size to order number

Order number **SZ 8101.** x

D_a	D_i	d	l_n	s_n	Spring tension F_n (N)	Pieces/standard packing	▲
10	7	1,5	300	200	130	5	10 x 1,5
12	9	1,5	230	270	110	5	12 x 1,5
14	10	2	280	220	210	5	14 x 2
15	11	2	250	250	220	5	15 x 2
17	12,5	2,25	240	260	260	3	17 x 2,25
17,5	11,5	3	344	156	490	3	17,5 x 3
18	10	4	392	108	1330	3	18 x 4
19	10	4,5	400	100	1690	3	19 x 4,5
19,5	14,5	2,5	286	214	200	3	19,5 x 2,5
19,5	13,5	3	325	175	450	3	19,5 x 3
20,5	15,5	2,5	243	257	200	3	20,5 x 2,5
21	13	4	363	137	1140	3	21 x 4
21,5	15,5	3	262	238	540	3	21,5 x 3
21,5	13,5	4	344	156	1140	3	21,5 x 4
25	17	4	350	150	950	3	25 x 4
27,8	13,8	7	420	80	3680	3	27,8 x 7
30	22	4	257	243	810	3	30 x 4
30	17	6,5	407	93	2850	3	30 x 6,5
32	20	6	372	128	2110	3	32 x 6
42	26	8	362	138	3830	1	42 x 8
46	26	10	433	67	5640	1	46 x 10
47	30	8,5	390	110	3630	1	47 x 8,5
53	31	11	393	107	6620	1	53 x 11
56	40	8	360	140	2080	1	56 x 8
61	39	11	380	120	5100	1	61 x 11



Helical springs with square cross section

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095. The springs are initial-loaded, 1 each winding closed at both ends and ground square.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with square cross section is higher than that of comparable springs with round cross section.

The working life is nevertheless a little lower, because of the unfavourable stress distribution in the cross section.

Order example: Helical spring with square cross section **SZ 8200**

$D_a = 19,5 \text{ mm}, l_0 = 45 \text{ mm}$

Add **19,5 x 45**

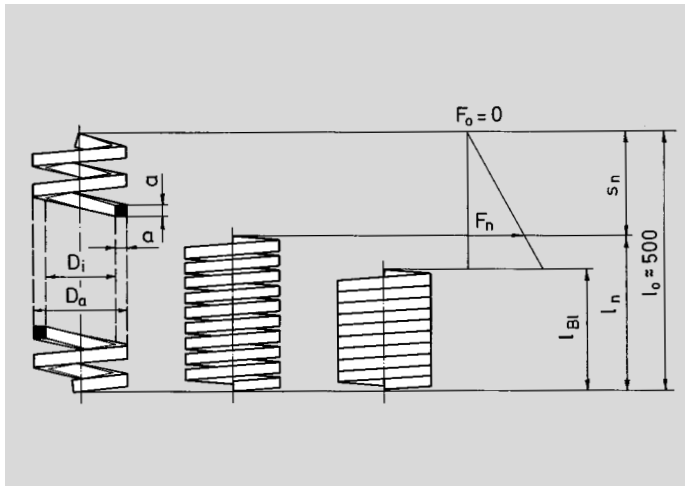
Order number **SZ 8200.19,5 x 45**

Add size to order number

Order number **SZ 8200.** x

D_a	D_i	$a \times a$	l_0	l_n	s_n	Spring tension $F_n^*)$ (N) $\pm 10\%$	l_{Bl}	Pieces/standard packing	▲
10	7	1,5	20	12,6	7,4	170	11,5	50	10 x 20
11,5	7,5	2	20	14,2	5,8	290	13,5	50	11,5 x 20
12	9	1,5	50	23,2	26,8	130	22	30	12 x 50
12,5	7,5	2,5	25	21	4	450	19	40	12,5 x 25
14	9	2,5	50	37,5	12,5	420	33	30	14 x 50
14,5	9,5	2,5	32	21,6	10,4	510	20	30	14,5 x 32
17,5	9,5	4	45	37,8	7,2	1570	35,5	30	17,5 x 45
19	11	4	50	39,4	10,6	1720	36,5	20	19 x 50
19,5	11,5	4	45	35,2	9,8	1570	32,5	20	19,5 x 45
21	13	4	45	34	11	1280	32	20	21 x 45
23	15	4	83	58,4	24,6	1100	55	10	23 x 83
26	14	6	45	40,2	4,8	2950	37	10	26 x 45
28	14	7	98	83,5	14,5	7200	82	6	28 x 98
30	21	4,5	50	32,5	17,5	1240	30,5	10	30 x 50
36	26	5	50	31	19	1340	29	10	36 x 50
42	26	8	72	55,5	16,5	4610	53	4	42 x 72
60	40	10	120	91	29	5010	84	2	60 x 120
70	54	8	60	39	21	1790	36	4	70 x 60

*) Helical springs arranged according to forces see concerning page



Helical springs with square cross section, 500 mm long

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095.
The springs are initial-loaded.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with square cross section is higher than that of comparable springs with round cross section.
The working life is nevertheless a little lower, because of the unfavourable stress distribution in the cross section.

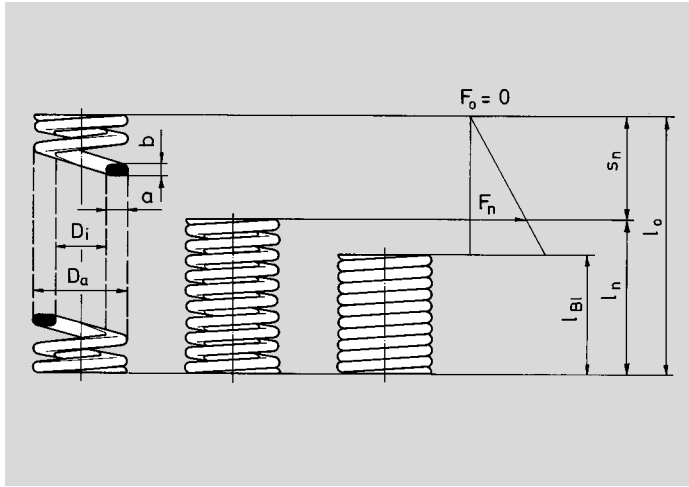
Helical springs 500 mm long are suited to be produced in any spring lengths. After the cutoff of the desired length, lay on ends of the springs and grind rectangular to the spring axis.
Avoid excessive heating during closing!

Order example: Helical springs with square cross section, 500 mm long **SZ 8201**
 $D_a = 19$ mm, $a = 4$ mm
Add **19 x 4**
Order number **SZ 8201.19 x 4**

Add size to order number

Order number **SZ 8201.** x

D_a	D_i	$a \times a$	l_n	s_n	Spring tension F_n (N)	Pieces/standard packing	▲
10	7	1,5	315	185	170	5	10 x 1,5
11,5	7,5	2	355	145	290	5	11,5 x 2
12	9	1,5	232	268	130	5	12 x 1,5
12,5	7,5	2,5	420	80	450	5	12,5 x 2,5
14,5	9,5	2,5	338	162	510	5	14,5 x 2,5
19	11	4	394	106	1720	3	19 x 4
21	13	4	378	122	1280	3	21 x 4
23	15	4	352	148	1100	3	23 x 4
28	14	7	426	74	6400	3	28 x 7
30	21	4,5	325	175	1240	3	30 x 4,5
36	26	5	310	190	1340	3	36 x 5
42	26	8	385	115	4610	1	42 x 8
60	40	10	380	120	5010	1	60 x 10
70	54	8	325	175	1790	1	70 x 8



Helical springs with oval cross section

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095. The springs are initial-loaded, 1 each winding closed at both ends and ground square.
Special treatment: blasted with steel balls.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with oval cross section is higher than that of comparable springs with round section.
The working life is nevertheless a little lower because of the unfavourable stress distribution in the cross section.

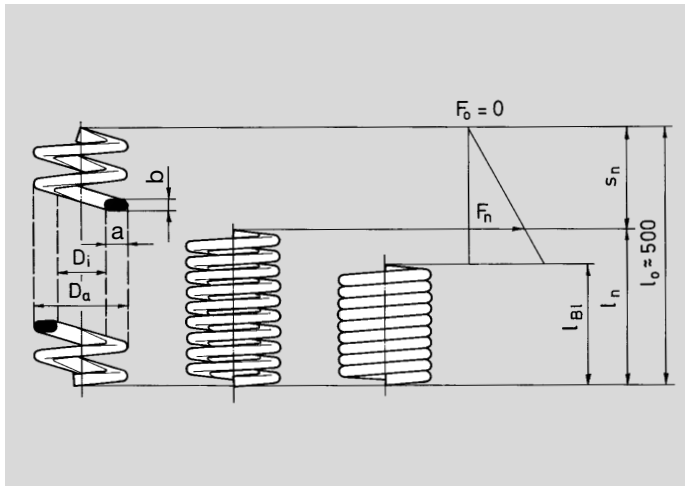
Order example: Helical spring with oval cross section **SZ 8400**
 $D_a = 32$ mm, $l_0 = 69$ mm
Add **32 x 69**
Order number **SZ 8400.32 x 69**

Add size to order number

Order number **SZ 8400.** x

D_a	D_i	$a \times b$	l_0	l_n	s_n	Spring tension F_n^* (N) $\pm 10\%$	l_{BI}	Pieces/standard packing	▲
11	7	2 x 1,25	20	10	10	200	9,5	50	11 x 20
12,5	7,5	2,5 x 1,5	20	13	7	270	12	50	12,5 x 20
13	9	2 x 1,25	50	20	30	150	18,5	50	13 x 50
14	8	3 x 1,6	25	15	10	400	13,5	50	14 x 25
15,5	8,5	3,5 x 2,2	25	17	8	740	15,5	40	15,5 x 25
17	9	4 x 2	50	32	18	690	30	30	17 x 50
17,6	9,6	4 x 2	30	18	12	690	17,5	40	17,6 x 30
25	13	6 x 3	54	35	19	1180	32	20	25 x 54
25	13	6 x 3	65	42	23	1180	36	10	25 x 65
25	13	6 x 3	77	50	27	1180	44	10	25 x 77
25	13	6 x 3	99	64	35	1180	52	10	25 x 99
25	13	6 x 3	123	79	44	1180	68	10	25 x123
32	17	7,5 x 4	69	45	24	2020	43	10	32 x 69
32	17	7,5 x 4	84	55	29	2020	50	10	32 x 84
32	17	7,5 x 4	98	64	34	2020	60	10	32 x 98
32	17	7,5 x 4	127	83	44	2020	74	10	32 x127
38	21	8,5 x 5	67	45	22	2950	44	10	38 x 67
38	21	8,5 x 5	85	57	28	2950	50	6	38 x 85
38	21	8,5 x 5	102	68	34	2950	64	6	38 x102
38	21	8,5 x 5	120	80	40	2950	70	6	38 x120
38	21	8,5 x 5	147	97	50	2950	88	4	38 x147
50	28	11 x 6	100	72	28	3440	60	4	50 x100
50	28	11 x 6	150	105	45	3440	87	4	50 x150
50	28	11 x 6	193	135	58	3440	118	2	50 x193
50	28	11 x 6	230	160	70	3440	130	2	50 x230

*) Helical springs arranged according to forces see concerning page



Helical springs with oval cross section, 500 mm long

Material: Patented drawn spring wire grade C according to DIN 17223.

Tolerances similar to DIN 2095.
The springs are initial-loaded.
Special treatment: blasted with steel balls.

Indication: For long working life at an oscillatory loading $s_{max} = ca. 0,7 s_n$.

The spring tension of springs with oval cross section is higher than that of comparable springs with round section.
The working life is nevertheless a little lower because of the unfavourable stress distribution in the cross section.

Helical springs 500 mm long are suited to be produced in any spring lengths. After the cutoff of the desired length, lay on ends of the springs and grind rectangular to the spring axis.
Avoid excessive heating during closing!

Order example: Helical spring with oval cross section, 500 mm long

SZ 8401

$D_a = 32$ mm, $a = 7,5$ mm, $b = 4$ mm

Add **32 x 7,5 x 4**

Order number **SZ 8401.32 x 7,5 x 4**

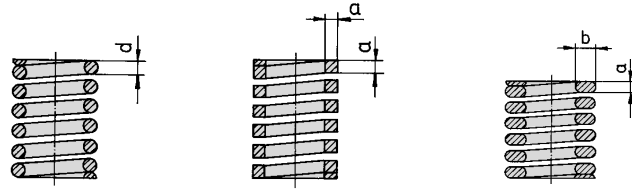
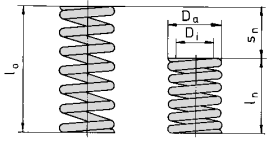
Add size to order number

Order number **SZ 8401.** x x

D_a	D_i	a x b	l_n	s_n	Spring tension F_n (N)	Pieces/standard packing	▲	▲
11	7	2 x 1,25	250	250	200	5	11	x 2 x 1,25
13	9	2 x 1,25	200	300	150	5	13	x 2 x 1,25
14	8	3 x 1,6	300	200	400	5	14	x 3 x 1,6
15,5	8,5	3,5 x 2,2	340	160	740	3	15,5	x 3,5 x 2,2
17	9	4 x 2	320	180	690	3	17	x 4 x 2
25	13	6 x 3	324	176	1180	3	25	x 6 x 3
32	17	7,5 x 4	326	174	2020	3	32	x 7,5 x 4
38	21	8,5 x 5	333	167	2950	3	38	x 8,5 x 5
50	28	11 x 6	350	150	3440	1	50	x 11 x 6

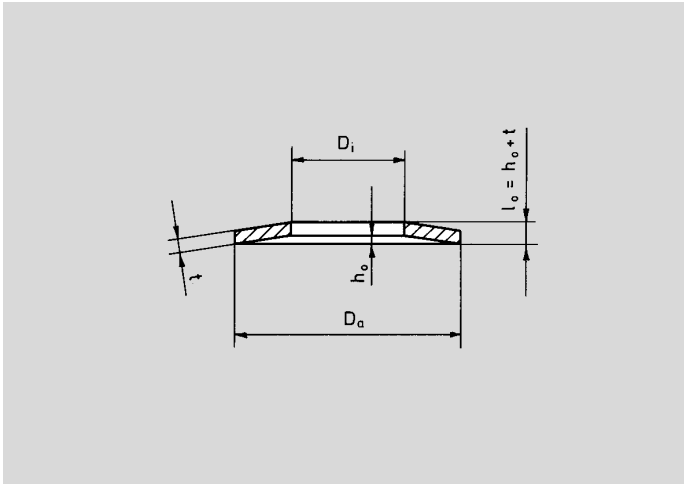
Helical springs

arranged according to forces



	SZ 8100. □ x □		SZ 8200. □ x □		SZ 8400. □ x □						
Spring tension F_n (N)	D_a	D_i	l_0	l_n	s_n	d	▲	$a \times a$	▲	$a \times b$	▲
110	12	9	55	25,3	29,7	1,5	12 x 55	—	—	—	—
130	10	7	40	23,9	16,1	1,5	10 x 40	—	—	—	—
130	12	9	50	23,2	26,8	—	—	1,5 x 1,5	12 x 50	—	—
150	13	9	50	20	30	—	—	—	—	2 x 1,25	13 x 50
170	10	7	20	12,6	7,4	—	—	1,5 x 1,5	10 x 20	—	—
200	11	7	20	10	10	—	—	—	—	2 x 1,25	11 x 20
200	19,5	14,5	35	20	15	2,5	19,5 x 35	—	—	—	—
200	20,5	15,5	95	46,2	48,8	2,5	20,5 x 95	—	—	—	—
210	14	10	40	22,4	17,6	2	14 x 40	—	—	—	—
220	15	11	40	20	20	2	15 x 40	—	—	—	—
250	14	10	50	25	25	2	14 x 50	—	—	—	—
260	17	12,5	85	41	44	2,25	17 x 85	—	—	—	—
270	12,5	7,5	20	13	7	—	—	—	—	2,5 x 1,5	12,5 x 20
290	11,5	7,5	20	14,2	5,8	—	—	2 x 2	11,5 x 20	—	—
400	14	8	25	15	10	—	—	—	—	3 x 1,6	14 x 25
420	14	9	50	37,5	12,5	—	—	2,5 x 2,5	14 x 50	—	—
450	12,5	7,5	25	21	4	—	—	2,5 x 2,5	12,5 x 25	—	—
450	19,5	13,5	40	26	14	3	19,5 x 40	—	—	—	—
480	17,5	11,5	50	34	16	3	17,5 x 50	—	—	—	—
490	17,5	11,5	45	31	14	3	17,5 x 45	—	—	—	—
510	14,5	9,5	32	21,6	10,4	—	—	2,5 x 2,5	14,5 x 32	—	—
540	21,5	15,5	45	23,6	21,4	3	21,5 x 45	—	—	—	—
690	17	9	30	32	18	—	—	—	—	4 x 2	17 x 50
690	17,6	9,6	50	18	12	—	—	—	—	4 x 2	17,6 x 30
740	15,5	8,5	25	17	8	—	—	—	—	3,5 x 2,2	15,5 x 25
810	30	22	70	36	34	4	30 x 70	—	—	—	—
950	25	17	24	16,8	7,2	4	25 x 24	—	—	—	—
1100	23	15	83	58,4	24,6	—	—	4 x 4	23 x 83	—	—
1140	21	13	40	29	11	4	21 x 40	—	—	—	—
1140	21,5	13,5	50	34,4	15,6	4	21,5 x 50	—	—	—	—
1180	25	13	54	35	19	—	—	—	—	6 x 3	25 x 54
1180	25	13	65	42	23	—	—	—	—	6 x 3	25 x 65
1180	25	13	77	50	27	—	—	—	—	6 x 3	25 x 77
1180	25	13	99	64	35	—	—	—	—	6 x 3	25 x 99
1180	25	13	123	79	44	—	—	—	—	6 x 3	25 x 123
1240	30	21	50	32,5	17,5	—	—	4,5 x 4,5	30 x 50	—	—
1280	21	13	45	34	11	—	—	4 x 4	21 x 45	—	—
1330	18	10	83	65	18	4	18 x 83	—	—	—	—
1340	19	11	35	27	8	4	19 x 35	—	—	—	—
1340	36	26	50	31	19	—	—	5 x 5	36 x 50	—	—
1570	17,5	9,5	45	37,8	7,2	—	—	4 x 4	17,5 x 45	—	—
1570	19,5	11,5	45	35,2	9,8	—	—	4 x 4	19,5 x 45	—	—
1690	19	10	90	72,4	17,6	4,5	19 x 90	—	—	—	—
1720	19	11	50	39,4	10,6	—	—	4 x 4	19 x 50	—	—
1790	70	54	60	39	21	—	—	8 x 8	70 x 60	—	—
2020	32	17	69	45	24	—	—	—	—	7,5 x 4	32 x 69
2020	32	17	84	55	29	—	—	—	—	7,5 x 4	32 x 84
2020	32	17	98	64	34	—	—	—	—	7,5 x 4	32 x 98
2020	32	17	127	83	44	—	—	—	—	7,5 x 4	32 x 127
2080	56	40	50	36	14	8	56 x 50	—	—	—	—
2110	32	20	125	93	32	6	32 x 125	—	—	—	—
2850	30	17	150	122	28	6,5	30 x 150	—	—	—	—
2950	26	14	45	40,2	4,8	—	—	6 x 6	26 x 45	—	—
2950	38	21	67	45	22	—	—	—	—	8,5 x 5	38 x 67
2950	38	21	85	57	28	—	—	—	—	8,5 x 5	38 x 85
2950	38	21	102	68	34	—	—	—	—	8,5 x 5	38 x 102
2950	38	21	120	80	40	—	—	—	—	8,5 x 5	38 x 120
2950	38	21	147	97	50	—	—	—	—	8,5 x 5	38 x 147
3440	50	28	100	72	28	—	—	—	—	11 x 6	50 x 100
3440	50	28	150	105	45	—	—	—	—	11 x 6	50 x 150
3440	50	28	193	135	58	—	—	—	—	11 x 6	50 x 193
3440	50	28	230	160	70	—	—	—	—	11 x 6	50 x 230
3630	47	30	50	39	11	8,5	47 x 50	—	—	—	—
3680	27,8	13,8	70	59	11	7	27,8 x 70	—	—	—	—
3750	84	64	200	110	90	10	84 x 200	—	—	—	—
3830	42	26	130	94	36	8	42 x 130	—	—	—	—
3830	42	26	200	137,7	62,3	8	42 x 200	—	—	—	—
4610	42	26	72	55,5	16,5	—	—	8 x 8	42 x 72	—	—
5010	60	40	120	91	29	—	—	10 x 10	60 x 120	—	—
5100	61	39	180	137	43	11	61 x 180	—	—	—	—
5300	28	14	98	83,5	14,5	—	—	7 x 7	28 x 98	—	—
5640	46	26	67	58	9	10	46 x 67	—	—	—	—
6620	53	31	200	157	43	11	53 x 200	—	—	—	—

Disc springs



DIN 2093, column A and B

sizes in parentheses are not according to DIN.

Note:

F = spring tension (N)
a = travel stroke (mm)

Order example: Disc spring **SZ 8300**
D_a = 25 mm, D_i = 12,2 mm, t = 1,5 mm
Add **25 x 12,2 x 1,5**
Order number **SZ 8300.25 x 12,2 x 1,5**

Add size to order number

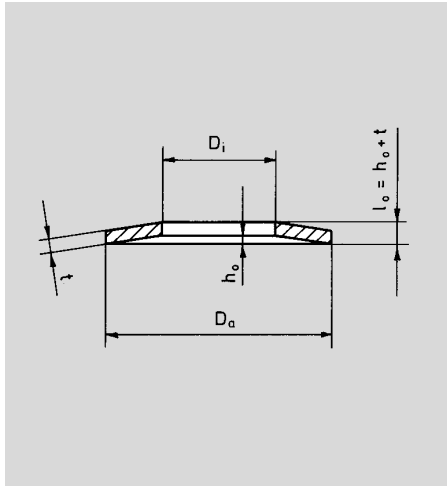
Order number **SZ 8300.** x x

D _a	D _i	t	h ₀	l ₀	s = 0,2 h ₀		s = 0,4 h ₀		s = 0,6 h ₀		s = 0,75 h ₀		Pieces/standard packing	▲	▲
					F *)	s	F *)	s	F *)	s	F *)	s			
8	4,2	0,3	0,25	0,55	42,5	0,05	75,6	0,10	102	0,15	119	0,19	100	08	x 4,2 x 0,3
8	4,2	0,4	0,2	0,6	63,5	0,04	120	0,08	173	0,12	210	0,15	100	08	x 4,2 x 0,4
10	5,2	0,4	0,3	0,7	72,1	0,06	130	0,12	178	0,18	213	0,23	100	10	x 5,2 x 0,4
10	5,2	0,5	0,25	0,75	98,5	0,05	187	0,10	268	0,15	329	0,19	100	10	x 5,2 x 0,5
12,5	6,2	0,5	0,35	0,85	98,3	0,07	180	0,14	248	0,21	291	0,26	100	12,5	x 6,2 x 0,5
12,5	6,2	0,7	0,3	1,0	194	0,06	372	0,12	539	0,18	673	0,23	100	12,5	x 6,2 x 0,7
14	7,2	0,5	0,4	0,9	98,9	0,08	177	0,16	239	0,24	279	0,30	100	14	x 7,2 x 0,5
14	7,2	0,8	0,3	1,1	229	0,06	444	0,12	648	0,18	813	0,23	100	14	x 7,2 x 0,8
15	5,2	0,7	0,4	1,1	174	0,08	326	0,16	461	0,24	555	0,30	100	(15)	x 5,2 x 0,7
16	8,2	0,6	0,45	1,05	141	0,09	255	0,18	349	0,27	412	0,34	100	16	x 8,2 x 0,6
16	8,2	0,9	0,35	1,25	293	0,07	566	0,14	825	0,21	1000	0,26	100	16	x 8,2 x 0,9
18	9,2	0,7	0,5	1,2	191	0,10	348	0,20	480	0,30	572	0,38	100	18	x 9,2 x 0,7
18	9,2	1,0	0,4	1,4	364	0,08	703	0,16	1020	0,24	1250	0,30	100	18	x 9,2 x 1,0
20	10,2	0,8	0,55	1,35	249	0,11	456	0,22	631	0,33	745	0,41	100	20	x 10,2 x 0,8
20	10,2	0,9	0,55	1,45	336	0,11	624	0,22	877	0,33	1040	0,41	100	(20)	x 10,2 x 0,9
20	10,2	1,1	0,45	1,55	443	0,09	854	0,18	1240	0,27	1530	0,34	100	20	x 10,2 x 1,1
22,5	11,2	0,8	0,65	1,45	252	0,13	450	0,26	608	0,39	710	0,49	100	22,5	x 11,2 x 0,8
22,5	11,2	1,25	0,5	1,75	560	0,10	1080	0,20	1570	0,30	1950	0,38	100	22,5	x 11,2 x 1,25
23	12,2	1,25	0,6	1,85	700	0,12	1330	0,24	1920	0,36	2330	0,45	100	(23)	x 12,2 x 1,25
25	12,2	0,9	0,7	1,6	302	0,14	542	0,28	737	0,42	868	0,53	100	25	x 12,2 x 0,9
25	12,2	1,5	0,55	2,05	838	0,11	1630	0,22	2380	0,33	2910	0,41	100	25	x 12,2 x 1,5
28	14,2	1,0	0,8	1,8	392	0,16	702	0,32	949	0,48	1110	0,60	100	28	x 14,2 x 1,0
28	14,2	1,5	0,65	2,15	836	0,13	1600	0,26	2320	0,39	2850	0,49	100	28	x 14,2 x 1,5
31,5	16,3	1,25	0,9	2,15	648	0,18	1180	0,36	1620	0,54	1920	0,68	100	31,5	x 16,3 x 1,25
31,5	16,3	1,75	0,7	2,45	1120	0,14	2170	0,28	3160	0,42	3900	0,53	100	31,5	x 16,3 x 1,75
35,5	18,3	1,25	1,0	2,25	602	0,20	1080	0,40	1460	0,60	1700	0,75	50	35,5	x 18,3 x 1,25
35,5	18,3	2,0	0,8	2,8	1500	0,16	2910	0,32	4230	0,48	5190	0,60	50	35,5	x 18,3 x 2,0
40	20,4	1,5	1,15	2,65	911	0,23	1640	0,46	2240	0,69	2620	0,86	50	40	x 20,4 x 1,5
40	20,4	2,25	0,9	3,15	1890	0,18	3640	0,36	5300	0,54	6540	0,68	50	40	x 20,4 x 2,25
45	22,4	1,75	1,3	3,05	1250	0,26	2260	0,52	3100	0,78	3660	0,98	50	45	x 22,4 x 1,75
45	22,4	2,5	1,0	3,5	2240	0,20	4320	0,40	6290	0,60	7720	0,75	50	45	x 22,4 x 2,5
50	25,4	2,0	1,4	3,4	1600	0,28	2910	0,56	4020	0,84	4760	1,05	50	50	x 25,4 x 2,0
50	25,4	2,5	1,4	3,9	2820	0,28	5300	0,56	7520	0,84	9060	1,05	50	(50)	x 25,4 x 2,5
50	25,4	3,0	1,1	4,1	3430	0,22	6660	0,44	9740	0,66	12000	0,83	50	50	x 25,4 x 3,0
56	28,5	2,0	1,6	3,6	1570	0,32	2810	0,64	3810	0,96	4440	1,20	50	56	x 28,5 x 2,0
56	28,5	3,0	1,3	4,3	3350	0,26	6430	0,52	9320	0,78	11400	0,98	50	56	x 28,5 x 3,0
63	31	2,5	1,75	4,25	2410	0,35	4400	0,70	6080	1,05	7180	1,31	50	63	x 31 x 2,5
63	31	3,5	1,4	4,9	4360	0,28	8420	0,56	12300	0,84	15000	1,05	50	63	x 31 x 3,5

*) Disc springs arranged according to forces see concerning page. Sizes in parentheses are not according to DIN.

Disc springs

arranged according to forces



Explication:

F = Spring tension (N) of a disc spring respectively a group with $s = 0,75 h_o$.
The named force at two or threefold layer arrangement is the theoretically calculated value. The real data differ because of occurring friction losses.

s = Travel stroke of one disc respectively of a group ($0,75 h_o$).

l_{01} = Total height of single disc ($h_o + t$).

l_{02} = Total height of a single group with two-fold layer arrangement ($h_o + 2 \cdot t$).

l_{03} = Total height of a disc group threefold layer arrangement ($h_o + 3 \cdot t$).



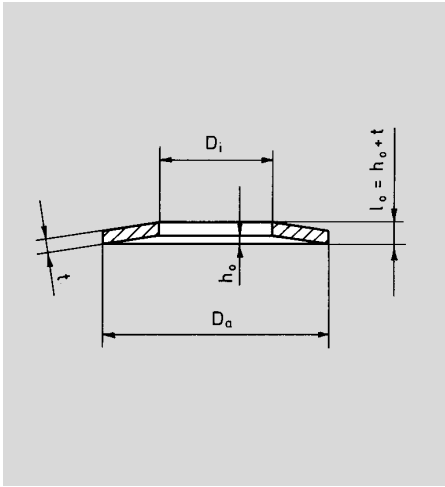
Add size to order number

Order number **SZ 8300.** x x

Spring tension F_n (N)	$s = 0,75 h_o$	D_a	D_i	t	l_{01}	D_a	D_i	t	l_{02}	D_a	D_i	t	l_{03}	▲	▲
119	0,19	8	4,2	0,3	0,55									08	x 4,2 x 0,3
210	0,15	8	4,2	0,4	0,6									08	x 4,2 x 0,4
213	0,23	10	5,2	0,4	0,7									10	x 5,2 x 0,4
238	0,19					8	4,2	0,3	0,85					08	x 4,2 x 0,3
279	0,30	14	7,2	0,5	0,9									14	x 7,2 x 0,5
291	0,26	12,5	6,2	0,5	0,85									12,5	x 6,2 x 0,5
329	0,19	10	5,2	0,5	0,75									10	x 5,2 x 0,5
357	0,19									8	4,2	0,3	1,15	08	x 4,2 x 0,3
412	0,34	16	8,2	0,6	1,05									16	x 8,2 x 0,6
420	0,15					8	4,2	0,4	1,0					08	x 4,2 x 0,4
426	0,23					10	5,2	0,4	1,1					10	x 5,2 x 0,4
555	0,30	15	5,2	0,7	1,1									15	x 5,2 x 0,7
558	0,30					14	7,2	0,5	1,4					14	x 7,2 x 0,5
572	0,38	18	9,2	0,7	1,2									18	x 9,2 x 0,7
582	0,26					12,5	6,2	0,5	1,35					12,5	x 6,2 x 0,5
630	0,15									8	4,2	0,4	1,4	08	x 4,2 x 0,4
639	0,23									10	5,2	0,4	1,5	10	x 5,2 x 0,4
658	0,19					10	5,2	0,5	1,25					10	x 5,2 x 0,5
673	0,23	12,5	6,2	0,7	1,0									12,5	x 6,2 x 0,7
710	0,49	22,5	11,2	0,8	1,45									22,5	x 11,2 x 0,8
745	0,41	20	10,2	0,8	1,35									20	x 10,2 x 0,8
813	0,23	14	7,2	0,8	1,1									14	x 7,2 x 0,8
824	0,34					16	8,2	0,6	1,65					16	x 8,2 x 0,6
837	0,30									14	7,2	0,5	1,9	14	x 7,2 x 0,5
868	0,53	25	12,2	0,9	1,6									25	x 12,2 x 0,9
873	0,26									12,5	6,2	0,5	1,85	12,5	x 6,2 x 0,5
987	0,19									10	5,2	0,5	1,75	10	x 5,2 x 0,5
1000	0,26	16	8,2	0,9	1,25									16	x 8,2 x 0,9
1040	0,41	20	10,2	0,9	1,45									20	x 10,2 x 0,9
1110	0,30					15	5,2	0,7	1,8					15	x 5,2 x 0,7
1110	0,60	28	14,2	1,0	1,8									28	x 14,2 x 1,0
1144	0,38					18	9,2	0,7	1,9					18	x 9,2 x 0,7
1236	0,34									16	8,2	0,6	2,25	16	x 8,2 x 0,6
1250	0,30	18	9,2	1,0	1,4									18	x 9,2 x 1,0
1346	0,23					12,5	6,2	0,7	1,7					12,5	x 6,2 x 0,7
1420	0,49					22,5	11,2	0,8	2,25					22,5	x 11,2 x 0,8
1490	0,41					20	10,2	0,8	2,15					20	x 10,2 x 0,8
1530	0,34	20	10,2	1,1	1,55									20	x 10,2 x 1,1

Disc springs

arranged according to forces



Explication:

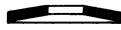
F = Spring tension (N) of a disc spring respectively a group with $s = 0,75 h_0$.
The named force at two or threefold layer arrangement is the theoretically calculated value. The real data differ because of occurring friction losses.

s = Travel stroke of one disc respectively of a group ($0,75 h_0$).

l_{01} = Total height of single disc ($h_0 + t$).

l_{02} = Total height of a single group with two-fold layer arrangement ($h_0 + 2 \cdot t$).

l_{03} = Total height of a disc group threefold layer arrangement ($h_0 + 3 \cdot t$).



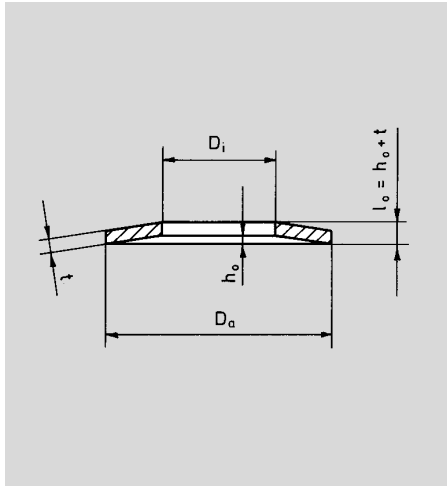
Add size to order number

Order number **SZ 8300.** x x

Spring tension F_n (N)	$s = 0,75 h_0$	D_a	D_i	t	l_{01}	D_a	D_i	t	l_{02}	D_a	D_i	t	l_{03}	▲	▲	
1626	0,23					14	7,2	0,8	1,9					14	x	7,2 x 0,8
1665	0,30									15	5,2	0,7	2,5	15	x	5,2 x 0,7
1700	0,75	35,5	18,3	1,25	2,25									35,5	x	18,3 x 1,25
1716	0,38									18	9,2	0,7	2,6	18	x	9,2 x 0,7
1736	0,53					25	12,2	0,9	2,5					25	x	12,2 x 0,9
1920	0,68	31,5	16,3	1,25	2,15									31,5	x	16,3 x 1,25
1950	0,38	22,5	11,2	1,25	1,75									22,5	x	11,2 x 1,25
2000	0,26					16	8,2	0,9	2,15					16	x	8,2 x 0,9
2019	0,23									12,5	6,2	0,7	2,4	12,5	x	6,2 x 0,7
2080	0,41					20	10,2	0,9	2,35					20	x	10,2 x 0,9
2130	0,49									22,5	11,2	0,8	3,05	22,5	x	11,2 x 0,8
2220	0,60					28	14,2	1,0	2,8					28	x	14,2 x 1,0
2235	0,41									20	10,2	0,8	2,95	20	x	10,2 x 0,8
2330	0,45	23	12,2	1,25	1,85									23	x	12,2 x 1,25
2439	0,23									14	7,2	0,8	2,7	14	x	7,2 x 0,8
2500	0,30					18	9,2	1,0	2,4					18	x	9,2 x 1,0
2604	0,53									25	12,2	0,9	3,4	25	x	12,2 x 0,9
2620	0,86	40	20,4	1,5	2,65									40	x	20,4 x 1,5
2850	0,49	28	14,2	1,5	2,15									28	x	14,2 x 1,5
2910	0,41	25	12,2	1,5	2,05									25	x	12,2 x 1,5
3000	0,26									16	8,2	0,9	3,05	16	x	8,2 x 0,9
3060	0,34					20	10,2	1,1	2,65					20	x	10,2 x 1,1
3120	0,41									20	10,2	0,9	3,25	20	x	10,2 x 0,9
3330	0,60									28	14,2	1,0	3,8	28	x	14,2 x 1,0
3400	0,75													35,5	x	18,3 x 1,25
3660	0,98	45	22,4	1,75	3,05									45	x	22,4 x 1,75
3750	0,30									18	9,2	1,0	3,4	18	x	9,2 x 1,0
3840	0,68					31,5	16,3	1,25	3,4					31,5	x	16,3 x 1,25
3900	0,38					22,5	11,2	1,25	3,0					22,5	x	11,2 x 1,25
3900	0,53	31,5	16,3	1,75	2,45									31,5	x	16,3 x 1,75
4440	1,20	56	28,5	2,0	3,6									56	x	28,5 x 2,0
4590	0,34									20	10,2	1,1	3,75	20	x	10,2 x 1,1
4660	0,45					23	12,2	1,25	3,1					23	x	12,2 x 1,25
4760	1,05	50	25,4	2,0	3,4									50	x	25,4 x 2,0
5100	0,75									35,5	18,3	1,25	4,75	35,5	x	18,3 x 1,25
5190	0,60	35,5	18,3	2,0	2,8									35,5	x	18,3 x 2,0
5240	0,86					40	20,4	1,5	4,15					40	x	20,4 x 1,5
5700	0,49					28	14,2	1,5	3,65					28	x	14,2 x 1,5

Disc springs

arranged according to forces



Explication:

F = Spring tension (N) of a disc spring respectively a group with $s = 0,75 h_0$.
The named force at two or threefold layer arrangement is the theoretically calculated value. The real data differ because of occurring friction losses.

s = Travel stroke of one disc respectively of a group ($0,75 h_0$).

l_{01} = Total height of single disc ($h_0 + t$).

l_{02} = Total height of a single group with two-fold layer arrangement ($h_0 + 2 \cdot t$).

l_{03} = Total height of a disc group threefold layer arrangement ($h_0 + 3 \cdot t$).



Add size to order number

Order number **SZ 8300**. x x

Spring tension F_n (N)	$s = 0,75 h_0$	D_a	D_i	t	l_{01}	D_a	D_i	t	l_{02}	D_a	D_i	t	l_{03}	▲	▲
5760	0,68									31,5	16,3	1,25	4,65	31,5 x 16,3 x 1,25	
5820	0,41					25	12,2	1,5	3,55					25 x 12,2 x 1,5	
5850	0,38									22,5	11,2	1,25	4,25	22,5 x 11,2 x 1,25	
6540	0,68	40	20,4	2,25	3,15									40 x 20,4 x 2,25	
6990	0,45									23	12,2	1,25	4,35	23 x 12,2 x 1,25	
7180	1,31	63	31	2,5	4,25									63 x 31 x 2,5	
7320	0,98					45	22,4	1,75	4,8					45 x 22,4 x 1,75	
7720	0,75	45	22,4	2,5	3,5									45 x 22,4 x 2,5	
7800	0,53					31,5	16,3	1,75	4,2					31,5 x 16,3 x 1,75	
7860	0,86									40	20,4	1,5	5,65	40 x 20,4 x 1,5	
8550	0,49									28	14,2	1,5	5,15	28 x 14,2 x 1,5	
8730	0,41									25	12,2	1,5	5,05	25 x 12,2 x 1,5	
8880	1,20					56	28,5	2,0	5,6					56 x 28,5 x 2,0	
9060	1,05	50	25,4	2,5	3,9									50 x 25,4 x 2,5	
9520	1,05					50	25,4	2,0	5,4					50 x 25,4 x 2,0	
10380	0,60					35,5	18,3	2,0	4,8					35,5 x 18,3 x 2,0	
10980	0,98									45	22,4	1,75	6,55	45 x 22,4 x 1,75	
11400	0,98	56	28,5	3,0	4,3									56 x 28,5 x 3,0	
11700	0,53									31,5	16,3	1,75	5,95	31,5 x 16,3 x 1,75	
12000	0,83	50	25,4	3,0	4,1									50 x 25,4 x 3,0	
13080	0,68					40	20,4	2,25	5,4					40 x 20,4 x 2,25	
13320	1,20									56	28,5	2,0	7,6	56 x 28,5 x 2,0	
14280	1,05									50	25,4	2,0	7,4	50 x 25,4 x 2,0	
14360	1,31					63	31	2,5	6,75					63 x 31 x 2,5	
15000	1,05	63	31	3,5	4,9									63 x 31 x 3,5	
15440	0,75					45	22,4	2,5	6,0					45 x 22,4 x 2,5	
15570	0,60									35,5	18,3	2,0	6,8	35,5 x 18,3 x 2,0	
18120	1,05					50	25,4	2,5	6,4					50 x 25,4 x 2,5	
19620	0,68									40	20,4	2,25	7,65	40 x 20,4 x 2,25	
21540	1,31									63	31	2,5	9,25	63 x 31 x 2,5	
22800	0,98					56	28,5	3,0	7,3					56 x 28,5 x 3,0	
23160	0,75									45	22,4	2,5	8,5	45 x 22,4 x 2,5	
24000	0,83					50	25,4	3,0	7,1					50 x 25,4 x 3,0	
27180	1,05									50	25,4	2,5	8,9	50 x 25,4 x 2,5	
30000	1,05					63	31	3,5	8,4					63 x 31 x 3,5	
34200	0,98									56	28,5	3,0	10,3	56 x 28,5 x 3,0	
36000	0,83									50	25,4	3,0	10,1	50 x 25,4 x 3,0	
45000	1,05									63	31	3,5	11,9	63 x 31 x 3,5	

Three-Piece Stripper Bolt Unit SZ 8580



Three-Piece Stripper Bolt Unit

The three-piece stripper bolt unit is used as a holding piece, spring unit, fitting bolt or a distance collar unit.

Design:

Distance collar: Material 9 S Mn 28K
Case-hardened 62 – 65 HRC
Outside diameter ground

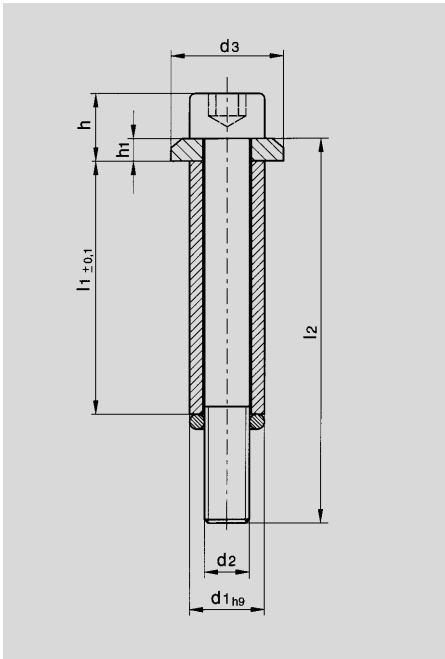
Tip:

The three-piece stripper bolt unit is mounted with an o-ring at delivery. Please remove it before installing.

Order example: Three-piece stripper bolt unit complete **SZ 8580**
 $d_1 = 12$ mm, $l_1 = 50$ mm
Add **12 x 050**
Order number **SZ 8580.12 x 050**

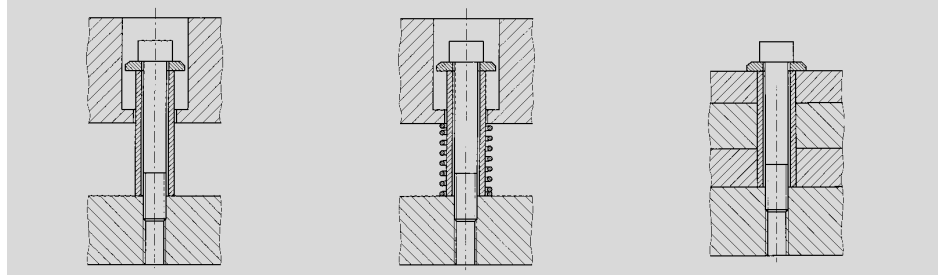
Add size to order number

Order number **SZ 8580.** x



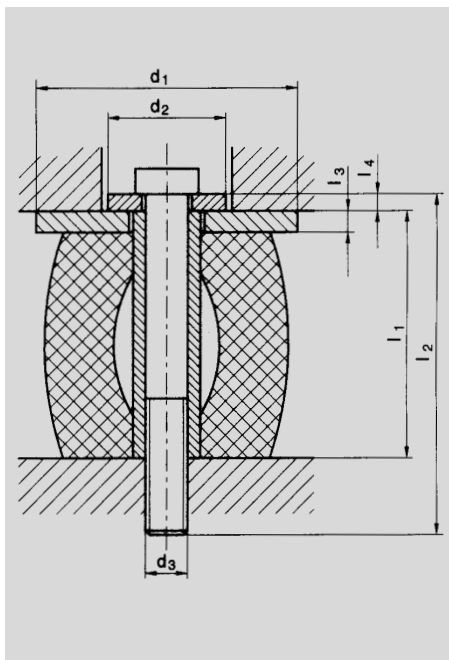
d_1	d_2	d_3	l_1	l_2	h	h_1	▲
10	M6	15	20	35	10	4	10 x 020
			30	45			10 x 030
			40	60			10 x 040
			50	70			10 x 050
			63	80			10 x 063
			80	100			10 x 080
12	M8	19	20	35	13	5	12 x 020
			30	45			12 x 030
			40	60			12 x 040
			50	70			12 x 050
			63	80			12 x 063
			80	100			12 x 080
16	M10	23	30	50	15,5	5,5	16 x 030
			40	60			16 x 040
			50	70			16 x 050
			63	80			16 x 063
			80	100			16 x 080
			100	120			16 x 100
20	M12	27	30	50	19	7	20 x 030
			40	60			20 x 040
			50	70			20 x 050
			63	90			20 x 063
			80	100			20 x 080
			100	120			20 x 100
25	M16	34	50	80	23	7	25 x 050
			63	90			25 x 063
			80	110			25 x 080
			100	130			25 x 100
			125	150			25 x 125

Examples of use



Spring Unit SZ 8526, SZ 8527

for Elastomer Springs



Elastomer spring unit complete

The elastomer spring units can be used for any compression distance / stroke. The spring travel including pre-load is max. 25% to 35% of L_0 of the elastomer spring in use.

The elastomer spring unit complete consists of:

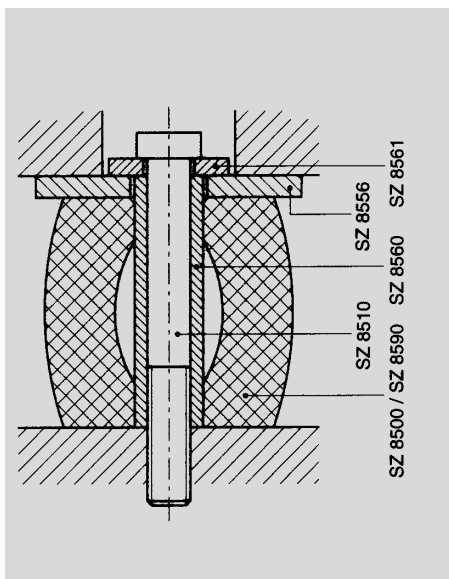
- Elastomer spring SZ 8500 or SZ 8590
- Spring washer SZ 8556
- Disc SZ 8561
- Distance collar SZ 8560
- Cheese head screw SZ 8510

Order example: Elastomer spring unit with rubber spring SZ 8500

$d_1 = 50\text{ mm}$, $l_1 = 63\text{ mm}$

Add: **050 x 063**

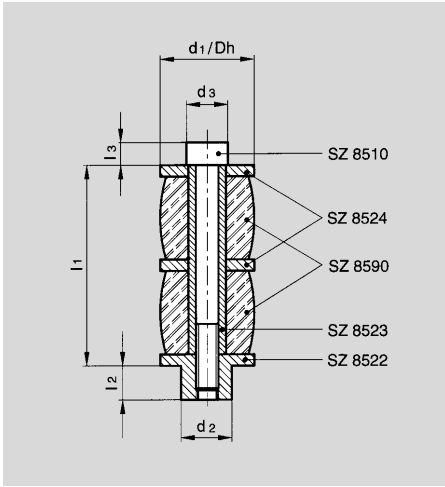
Order number **SZ 8526.050 x 063**



Add size to order number

									Add size to order number
with rubber spring SZ 8500									Order number SZ 8526. x
with polyurethane spring SZ 8590									Order number SZ 8527. x
d_1	d_2	d_3	l_1	l_2	l_3	l_4	Elast. spring	▲	
30	17	M6	20	30	5	3	025 x 020	030 x 020	
30	17	M6	30	40	5	3	025 x 032	030 x 032	
30	17	M6	40	50	5	3	025 x 040	030 x 040	
40	23	M8	30	50	5	4	032 x 032	040 x 032	
40	23	M8	40	60	5	4	032 x 040	040 x 040	
40	23	M8	50	70	5	4	032 x 050	040 x 050	
40	23	M8	63	80	5	4	032 x 063	040 x 063	
50	23	M8	30	50	5	4	040 x 032	050 x 032	
50	23	M8	40	60	5	4	040 x 040	050 x 040	
50	23	M8	50	70	5	4	040 x 050	050 x 050	
50	23	M8	63	80	5	4	040 x 063	050 x 063	
50	23	M8	80	100	5	4	040 x 080	050 x 080	
60	26	M10	30	50	6	4	050 x 032	060 x 032	
60	26	M10	40	60	6	4	050 x 040	060 x 040	
60	26	M10	50	70	6	4	050 x 050	060 x 050	
60	26	M10	63	80	6	4	050 x 063	060 x 063	
60	26	M10	80	100	6	4	050 x 080	060 x 080	
60	26	M10	100	120	6	4	050 x 100	060 x 100	
80	26	M10	30	50	6	4	063 x 032	080 x 032	
80	26	M10	40	60	6	4	063 x 040	080 x 040	
80	26	M10	50	70	6	4	063 x 050	080 x 050	
80	26	M10	63	80	6	4	063 x 063	080 x 063	
80	26	M10	80	100	6	4	063 x 080	080 x 080	
80	26	M10	100	120	6	4	063 x 100	080 x 100	
80	26	M10	125	140	6	4	063 x 125	080 x 125	
100	30	M12	30	50	8	5	080 x 032	100 x 032	
100	30	M12	40	60	8	5	080 x 040	100 x 040	
100	30	M12	50	70	8	5	080 x 050	100 x 050	
100	30	M12	63	80	8	5	080 x 063	100 x 063	
100	30	M12	80	100	8	5	080 x 080	100 x 080	
100	30	M12	100	120	8	5	080 x 100	100 x 100	
100	30	M12	125	140	8	5	080 x 125	100 x 125	
120	30	M12	30	50	8	5	100 x 032	120 x 032	
120	30	M12	40	60	8	5	100 x 040	120 x 040	
120	30	M12	50	70	8	5	100 x 050	120 x 050	
120	30	M12	63	80	8	5	100 x 063	120 x 063	
120	30	M12	80	100	8	5	100 x 080	120 x 080	
120	30	M12	100	120	8	5	100 x 100	120 x 100	
120	30	M12	125	140	8	5	100 x 125	120 x 125	

Elastomer Spring Units



Elastomer units complete, pre-tensed

The spring units can be used for any compression distance. The spring travel including pre-tension is maximally 25% of L_0 of the elastomer springs SZ 8590 in use. The spring force is visible on the Force/Travel diagram of SZ 8590.

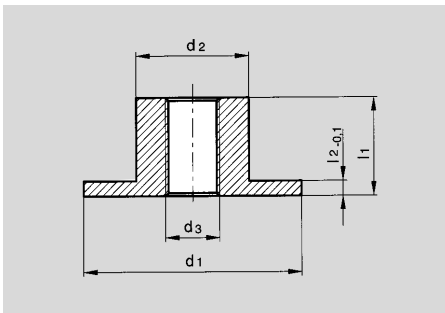
Order example: Spring unit complete, pre-tensed, **SZ 8520**.
Diameter 40 mm
Installation height 83 mm
Add **40 x 083**
Order number **SZ 8520 x 40 x 083**

Add size to order number

Order number **SZ 8520**. x

Tube Ø						SZ 8510 included in SZ 8520	SZ 8522 included in SZ 8520	SZ 8523 included in SZ 8520	SZ 8524 included in SZ 8520	SZ 8590 included in SZ 8520	▲
d_1/D_h	d_2	d_3	l_1	l_2	l_3						
25	13	10	53	9	6	06 x 060	25	08 x 050	25	020 x 025	25 x 053
			67			06 x 080	25	08 x 064	25	020 x 032	25 x 067
32	16	13	53	11	8	08 x 060	32	10 x 050	32	025 x 025	32 x 053
			67			08 x 080	32	10 x 064	32	025 x 032	32 x 067
			83			08 x 090	32	10 x 080	32	025 x 040	32 x 083
40	20	16	67	14	10	10 x 080	40	13 x 064	40	032 x 032	40 x 067
			83			10 x 090	40	13 x 080	40	032 x 040	40 x 083
			103			10 x 110	40	13 x 100	40	032 x 050	40 x 103
50	25	16	86	14	10	10 x 090	50	13 x 082	50	040 x 040	50 x 086
			106			10 x 120	50	13 x 102	50	040 x 050	50 x 106
			132			10 x 140	50	13 x 128	50	040 x 063	50 x 132

Single components of spring units

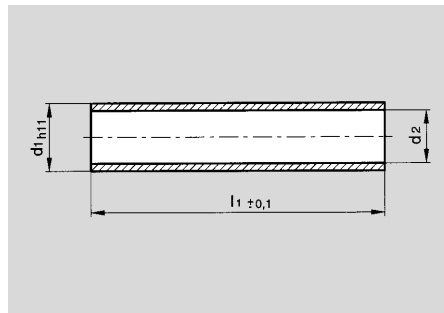


Holding socket

Add size to order number

Order number **SZ 8522**.

d_1	d_2	d_3	l_1	$l_{2-0,1}$	▲
25	13	M6	12	3	25
32	16	M8	14	3	32
40	20	M10	17	3	40
50	25	M10	18	4	50

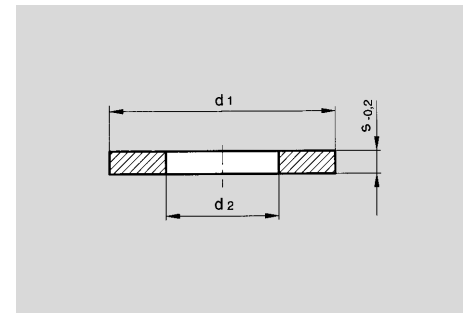


Distance tube

Add size to order number

Order number **SZ 8523**. x

d_1	d_2	l	▲
8,0	6,5	50	08 x 050
		64	08 x 064
		80	10 x 080
10,0	8,5	50	10 x 050
		64	10 x 064
		80	10 x 080
		64	13 x 064
		80	13 x 080
13,0	11,0	82	13 x 082
		100	13 x 100
		102	13 x 102
		128	13 x 128



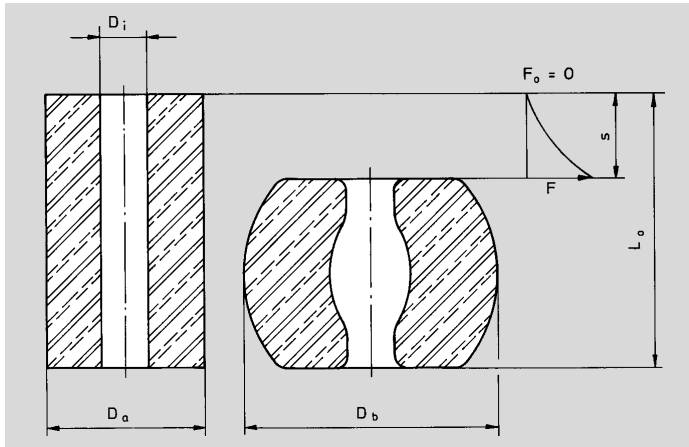
Disc

Add size to order number

Order number **SZ 8524**.

d_1	d_2	$s_{-0,2}$	▲
25	8,0	3	25
32	10,0	3	32
40	13,0	3	40
50	13,0	4	50

Elastomer springs



Rubber springs

DIN ISO 10 069

Material: Chloroprene-elastomer (CR)
hardness 70 ± 3 Shore A

Admissible travel stroke $s_{max} = 0,35 L_0$
Settling inclination 3 – 5 % von L_0
Rubber springs are qualified for large travel strokes.
Heat resistance up to + 80 °C
short-time up to 120 °C.

Add size to order number

Order example: Rubber spring SZ 8500

$D_a = 32$ mm, $L_0 = 40$ mm

Add **032 x 040**

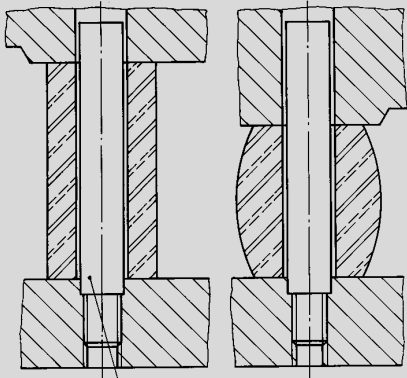
Order number **SZ 8500.032 x 040**

						Order number SZ 8500. <input type="text"/> x <input type="text"/>
D_a	D_i	L_0	D_b	D_1	Pieces/standard packing	▲
16	6,5	12	22	28	10	016 x 012
		16			10	016 x 016
		20			10	016 x 020
		25			10	016 x 025
20	8,5	16	27	32	10	020 x 016
		20			10	020 x 020
		25			10	020 x 025
		32			10	020 x 032
25	10,5	20	34	36	5	025 x 020
		25			5	025 x 025
		32			5	025 x 032
		40			5	025 x 040
32	13,5	32	43	45	5	032 x 032
		40			5	032 x 040
		50			5	032 x 050
		63			5	032 x 063
40	13,5	32	54	56	3	040 x 032
		40			3	040 x 040
		50			3	040 x 050
		63			3	040 x 063
		80			3	040 x 080
50	17	32	68	71	3	050 x 032
		40			3	050 x 040
		50			3	050 x 050
		63			2	050 x 063
		80			2	050 x 080
		100	2	050 x 100		
63	17	32	85	90	2	063 x 032
		40			2	063 x 040
		50			2	063 x 050
		63			2	063 x 063
		80			1	063 x 080
		100			1	063 x 100
125	1	063 x 125				
80	21	32	108	112	1	080 x 032
		40			1	080 x 040
		50			1	080 x 050
		63			1	080 x 063
		80			1	080 x 080
		100			1	080 x 100
125	1	080 x 125				
100	21	32	135	140	1	100 x 032
		40			1	100 x 040
		50			1	100 x 050
		63			1	100 x 063
		80			1	100 x 080
		100			1	100 x 100
125	1	100 x 125				
125	27	32	169	180	1	125 x 032
		40			1	125 x 040
		50			1	125 x 050
		63			1	125 x 063
		80			1	125 x 080
		100			1	125 x 100
		125			1	125 x 125
		160			1	125 x 160

Elastomer springs

Mounting examples

Force – stroke diagrams for rubber springs SZ 8500



Guide bolt
SZ 8555
Single layer arrangement

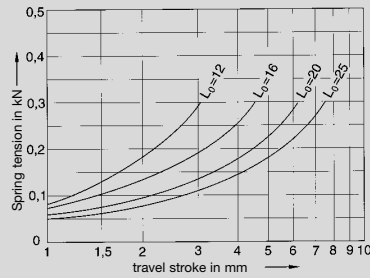


Fig. 1. Spring CR 16

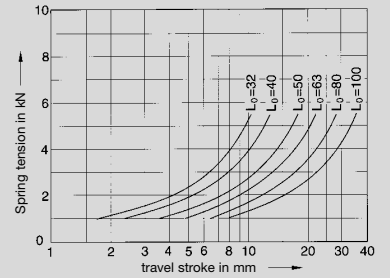


Fig. 6. Spring CR 50

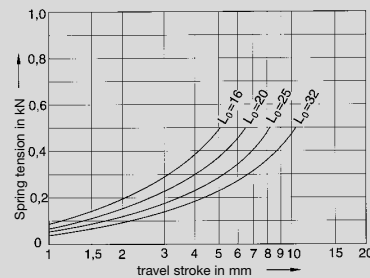


Fig. 2. Spring CR 20

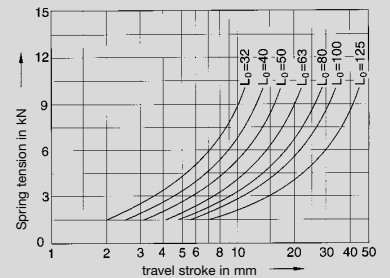
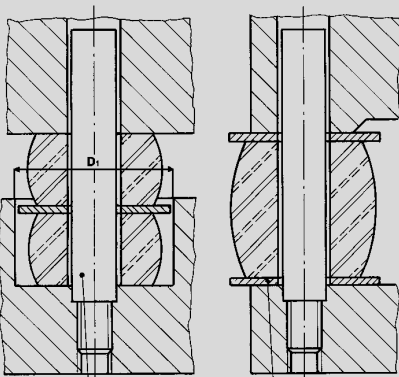


Fig. 7. Spring CR 63

Double layer arrangement Single layer arrangement



Guide bolt
SZ 8555 Spring washer
SZ 8556

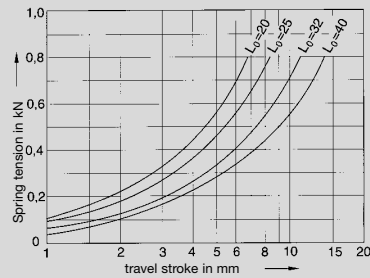


Fig. 3. Spring CR 25

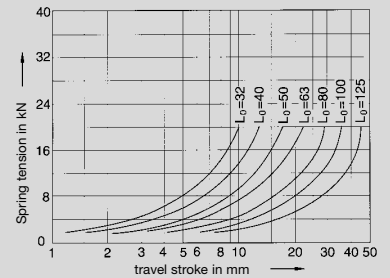


Fig. 8. Spring CR 80

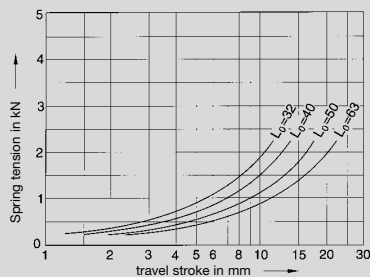


Fig. 4. Spring CR 32

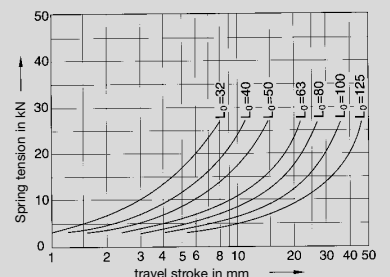


Fig. 9. Spring CR 100

Mounting examples

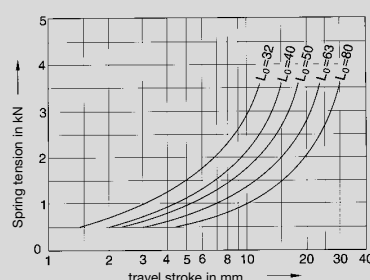


Fig. 5. Spring CR 40

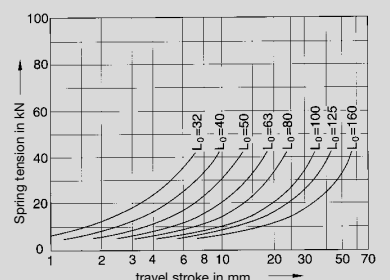
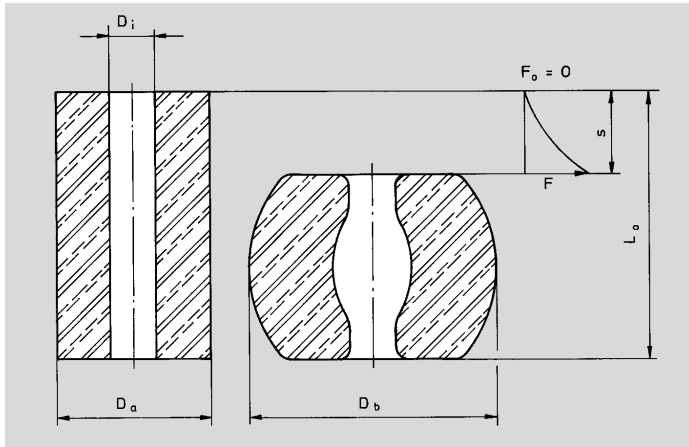


Fig. 10. Spring CR 125

Elastomer springs



Polyurethane spring

DIN ISO 10 069

Material: Vulkollan
polyurethane-elastomer (PUR)
hardness 90 ± 5 Shore A

Admissible travel stroke $s_{max} = 0,25 L_0$
Settling inclination 8 – 10 % von L_0
Polyurethane springs are qualified for strong spring powers.
Heat resistance up to + 80 °C
short-time up to +120 °C.

Add
size to
order number

Order example: Polyurethane spring **SZ 8590**

$D_a = 50$ mm, $L_0 = 63$ mm

Add **050 x 063**

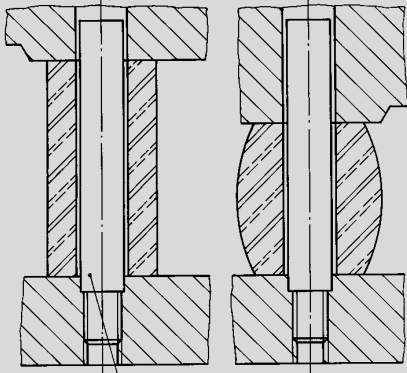
Order number **SZ 8590.050 x 063**

						Order number SZ 8590.	<input type="checkbox"/> x <input type="checkbox"/>
D_a	D_i	L_0	D_b	D_1	Pieces/standard packing	▲	
16	6,5	12	20	28	10		016 x 012
		16			10		016 x 016
		20			10		016 x 020
		25			10		016 x 025
20	8,5	16	25	32	10		020 x 016
		20			10		020 x 020
		25			10		020 x 025
		32			10		020 x 032
25	10,5	20	31	36	5		025 x 020
		25			5		025 x 025
		32			5		025 x 032
		40			5		025 x 040
32	13,5	32	40	45	5		032 x 032
		40			5		032 x 040
		50			5		032 x 050
		63			5		032 x 063
40	13,5	32	50	56	3		040 x 032
		40			3		040 x 040
		50			3		040 x 050
		63			3		040 x 063
		80			3		040 x 080
50	17	32	63	71	3		050 x 032
		40			3		050 x 040
		50			3		050 x 050
		63			2		050 x 063
		80			2		050 x 080
		100			2		050 x 100
63	17	32	79	90	2		063 x 032
		40			2		063 x 040
		50			2		063 x 050
		63			2		063 x 063
		80			1		063 x 080
		100			1		063 x 100
		125			1		063 x 125
80	21	32	100	112	1		080 x 032
		40			1		080 x 040
		50			1		080 x 050
		63			1		080 x 063
		80			1		080 x 080
		100			1		080 x 100
		125			1		080 x 125
100	21	32	125	140	1		100 x 032
		40			1		100 x 040
		50			1		100 x 050
		63			1		100 x 063
		80			1		100 x 080
		100			1		100 x 100
		125			1		100 x 125
125	27	32	156	180	1		125 x 032
		40			1		125 x 040
		50			1		125 x 050
		63			1		125 x 063
		80			1		125 x 080
		100			1		125 x 100
		125			1		125 x 125
		160			1		125 x 160

Elastomer springs

Mounting examples

Force – stroke diagrams for rubber springs SZ 8590



Guide bolt
SZ 8555
Single layer arrangement

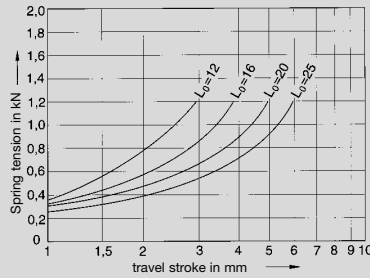


Fig. 1. Spring PUR 16

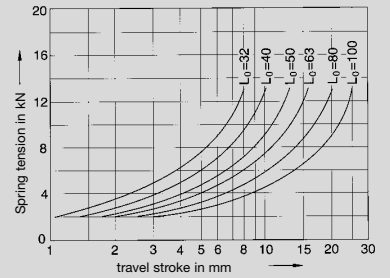


Fig. 6. Spring PUR 50

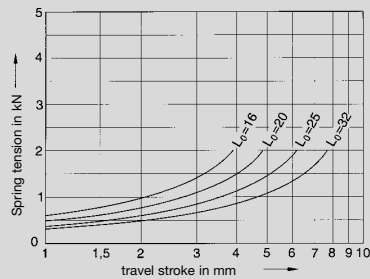


Fig. 2. Spring PUR 20

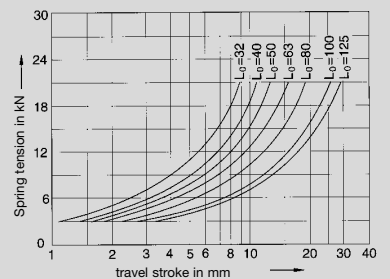
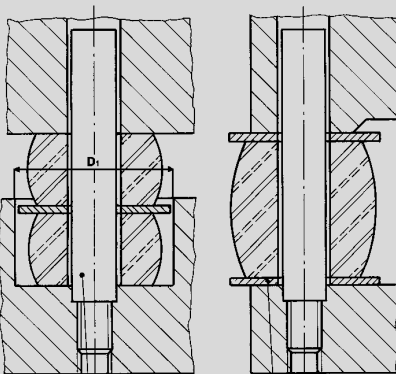


Fig. 7. Spring PUR 63

Double layer arrangement Single layer arrangement



Guide bolt
SZ 8555
Spring washer
SZ 8556

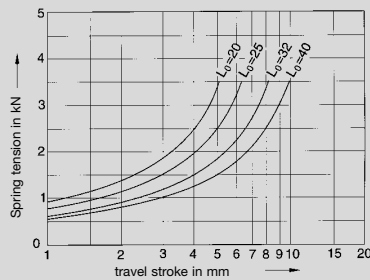


Fig. 3. Spring PUR 25

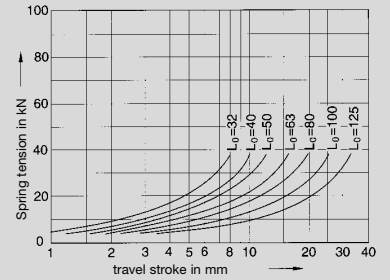


Fig. 8. Spring PUR 80

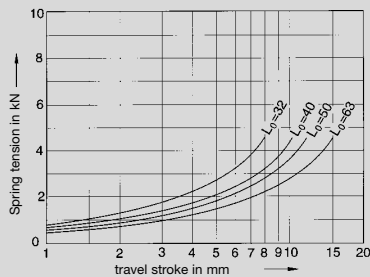


Fig. 4. Spring PUR 32

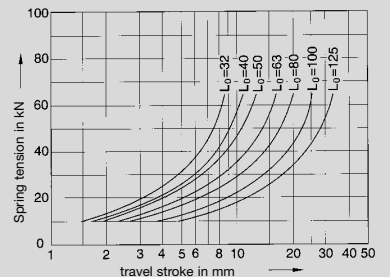


Fig. 9. Spring PUR 100

Mounting examples

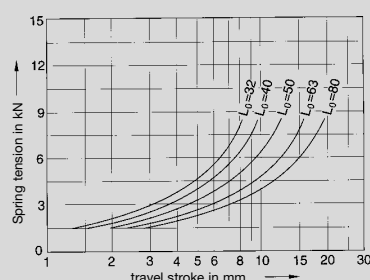


Fig. 5. Spring PUR 40

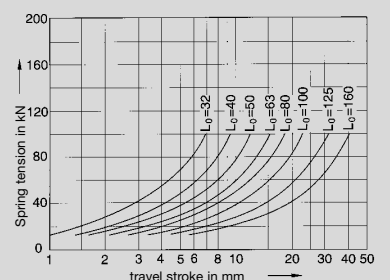
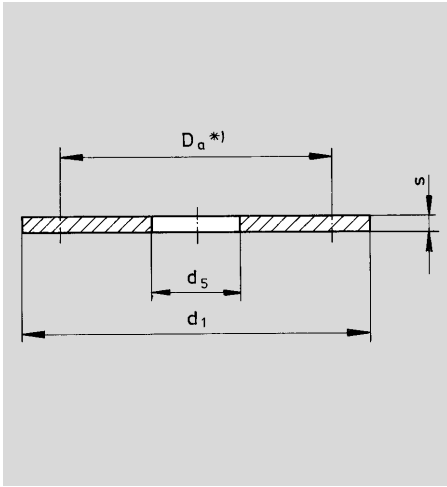


Fig. 10. Spring PUR 125

Spring washers

for rubber springs and polyurethane springs



Flat spring washer
DIN ISO 10 069

Material: brass

Order example: Flat spring washer **SZ 8556**
for rubber and plastic springs
 $D_a = 20$ mm
Add **020**
Order number **SZ 8556.020**

Add
size to
order number

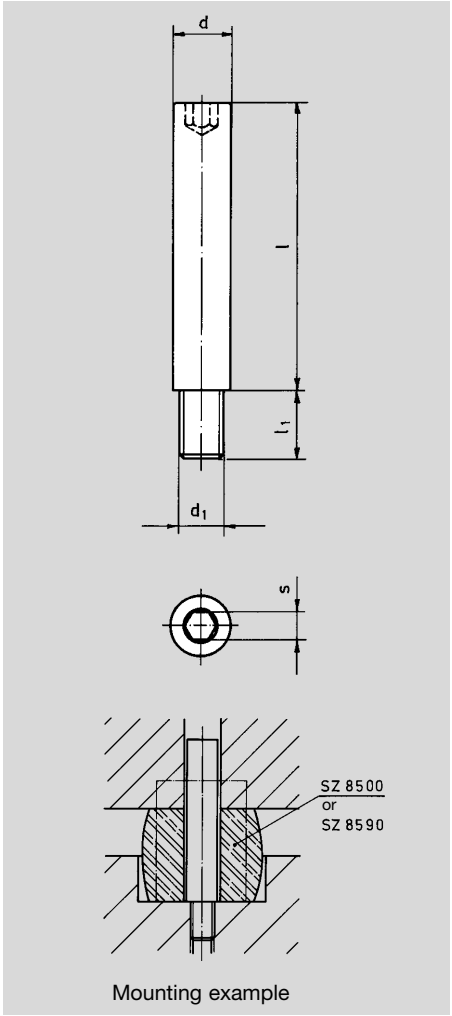
Order number **SZ 8556.**

$D_a^{*)}$	d_1	d_s	s	▲
16	20	6,5	4	016
20	25	8,5	4	020
25	30	10,5	5	025
32	40	13,5	5	032
40	50	13,5	5	040
50	60	16,5	6	050
63	80	16,5	6	063
80	100	20,5	8	080
100	120	20,5	8	100
125	150	26,0	8	125

*) D_a = spring diameter

Guide bolts

for rubber and polyurethane springs



DIN ISO 10 069

Material: Ruggedness grade 8.8

Order example: Guide bolt for rubber springs and polyurethane springs

SZ 8555

d = 10 mm, l = 32 mm

Add **10 x 032**

Order number **SZ 8555.10 x 032**

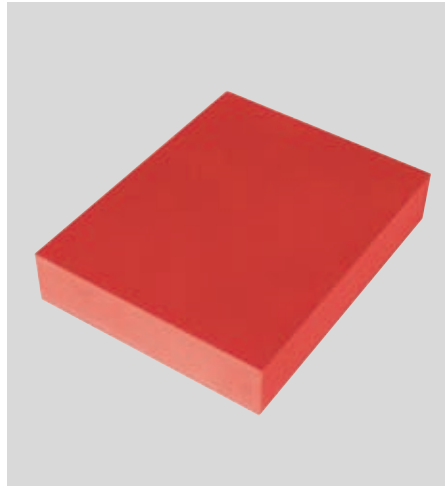
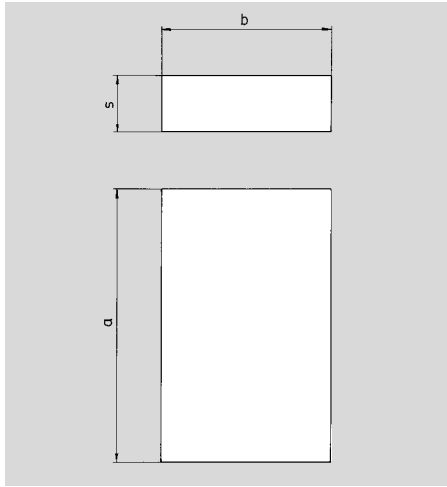
Add size to order number
Order number **SZ 8555.** x

d _{h11}	d ₁	l	l ₁	s	Pieces/standard packing ▲	
6	M4	20	6	3	10	06 x 020
		25			10	06 x 025
		32			10	06 x 032
8	M6	20	9	4	10	08 x 020
		25			10	08 x 025
		32			10	08 x 032
		40			10	08 x 040
		50			10	08 x 050
10	M8	20	15	5	10	10 x 020
		25			10	10 x 025
		32			5	10 x 032
		40			5	10 x 040
		50			5	10 x 050
		63			5	10 x 063
13	M10	32	15	6	5	13 x 032
		40			5	13 x 040
		50			5	13 x 050
		63			5	13 x 063
		80			5	13 x 080
		95			5	13 x 095

Add size to order number
Order number **SZ 8555.** x

d _{h11}	d ₁	l	l ₁	s	Pieces/standard packing ▲	
16	M12	32	18	8	5	16 x 032
		40			5	16 x 040
		50			5	16 x 050
		63			5	16 x 063
		80			2	16 x 080
		95			2	16 x 095
20	M16	118			2	16 x 118
		140			2	16 x 140
		50	25	10	2	20 x 050
		63			2	20 x 063
		80			2	20 x 080
		95			2	20 x 095
25	M20	118			2	20 x 118
		140			2	20 x 140
		180			2	20 x 180
		50	30	14	2	25 x 050
		63			2	25 x 063
		80			2	25 x 080
95			2	25 x 095		
118			2	25 x 118		
140			2	25 x 140		
180			2	25 x 180		

Polyurethane plates



Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A

Order example: Polyurethane plate **SZ 5190**
a x b = 150 x 100 mm, s = 50mm
Add **150 x 100 x 50**
Order number **SZ 5190 .150 x 100 x 50**

Add size to order number

Order number **SZ 5190.** x x

a	b	s	▲	▲
75	75	25	075 x 075 x 25	
		50	075 x 075 x 50	
		75	075 x 075 x 75	
100	75	12,5	100 x 075 x 12,5	
		25	100 x 075 x 25	
		50	100 x 075 x 50	
150	75	12,5	150 x 075 x 12,5	
		25	150 x 075 x 25	
		50	150 x 075 x 50	
100	100	12,5	100 x 100 x 12,5	
		25	100 x 100 x 25	
		50	100 x 100 x 50	
125	100	12,5	125 x 100 x 12,5	
		25	125 x 100 x 25	
		50	125 x 100 x 50	
150	100	12,5	150 x 100 x 12,5	
		25	150 x 100 x 25	
		50	150 x 100 x 50	
200	100	12,5	200 x 100 x 12,5	
		25	200 x 100 x 25	
		50	200 x 100 x 50	
125	125	12,5	125 x 125 x 12,5	
		25	125 x 125 x 25	
		50	125 x 125 x 50	
150	125	12,5	150 x 125 x 12,5	
		25	150 x 125 x 25	
		50	150 x 125 x 50	

Add size to order number

Order number **SZ 5190.** x x

a	b	s	▲	▲
200	125	12,5	200 x 125 x 12,5	
		25	200 x 125 x 25	
		50	200 x 125 x 50	
		75	200 x 125 x 75	
250	125	12,5	250 x 125 x 12,5	
		25	250 x 125 x 25	
		50	250 x 125 x 50	
		75	250 x 125 x 75	
150	150	12,5	150 x 150 x 12,5	
		25	150 x 150 x 25	
		50	150 x 150 x 50	
		75	150 x 150 x 75	
200	150	12,5	200 x 150 x 12,5	
		25	200 x 150 x 25	
		50	200 x 150 x 50	
		75	200 x 150 x 75	
250	150	12,5	250 x 150 x 12,5	
		25	250 x 150 x 25	
		50	250 x 150 x 50	
		75	250 x 150 x 75	
300	150	12,5	300 x 150 x 12,5	
		25	300 x 150 x 25	
		50	300 x 150 x 50	
		75	300 x 150 x 75	
200	200	12,5	200 x 200 x 12,5	
		25	200 x 200 x 25	
		50	200 x 200 x 50	
		75	200 x 200 x 75	
250	200	12,5	250 x 200 x 12,5	
		25	250 x 200 x 25	
		50	250 x 200 x 50	
		75	250 x 200 x 75	
300	200	12,5	300 x 200 x 12,5	
		25	300 x 200 x 25	
		50	300 x 200 x 50	
		75	300 x 200 x 75	

Add size to order number

Order number **SZ 5190.** x x

a	b	s	▲	▲
400	200	12,5	400 x 200 x 12,5	
		25	400 x 200 x 25	
		50	400 x 200 x 50	
		75	400 x 200 x 75	
250	250	12,5	250 x 250 x 12,5	
		25	250 x 250 x 25	
		50	250 x 250 x 50	
		75	250 x 250 x 75	
300	250	12,5	300 x 250 x 12,5	
		25	300 x 250 x 25	
		50	300 x 250 x 50	
		75	300 x 250 x 75	
400	250	12,5	400 x 250 x 12,5	
		25	400 x 250 x 25	
		50	400 x 250 x 50	
		75	400 x 250 x 75	
500	250	12,5	500 x 250 x 12,5	
		25	500 x 250 x 25	
		50	500 x 250 x 50	
		75	500 x 250 x 75	
300	300	12,5	300 x 300 x 12,5	
		25	300 x 300 x 25	
		50	300 x 300 x 50	
		75	300 x 300 x 75	
400	300	12,5	400 x 300 x 12,5	
		25	400 x 300 x 25	
		50	400 x 300 x 50	
		75	400 x 300 x 75	
500	300	12,5	500 x 300 x 12,5	
		25	500 x 300 x 25	
		50	500 x 300 x 50	
		75	500 x 300 x 75	
600	300	12,5	600 x 300 x 12,5	
		25	600 x 300 x 25	
		50	600 x 300 x 50	
		75	600 x 300 x 75	



Hollow plastic tubes

Material: Vulkollan
polyurethane-elastomer (PUR)
on Desmodur 15 base

Raw material for special length springs,
dampening washers, assembly parts and
prototypes.

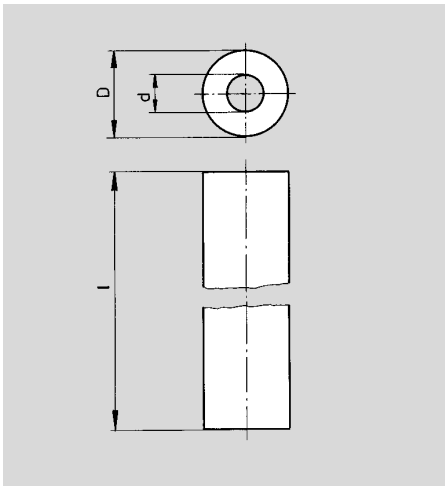
Available in strengths of
80 ± 5 Shore A and
90 ± 5 Shore A

Order example: Hollow plastic tube
strength 80, shore A, **SZ 5381**
D = 50 mm, l = 400 mm
Add **050 x 400**
Order number **SZ 5381.050 x 400**

Application tip

Resistant to: oil (lubricant oil), grease, alcohol,
benzene, ozone.

Partially resistant to: water lye, acids.
Please verify duration, temperature and/or
concentration before use.



SZ 5381

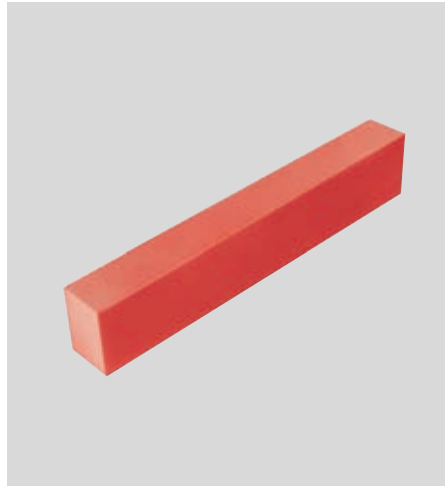
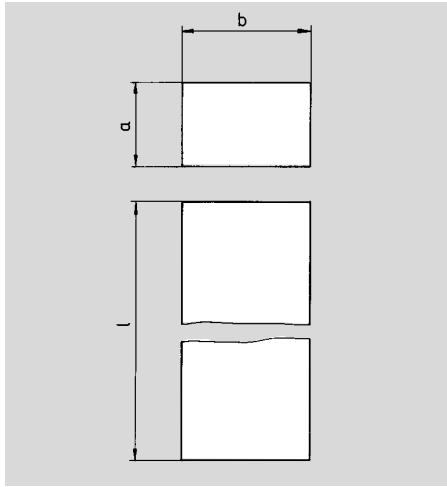
Permissible spring compression $s_{max} = 35\%$
spring sag 5 – 7 %
temperature range -20 °C to + 80 °C
temporarily -40 °C to +120 °C.

SZ 5391

Permissible spring compression $s_{max} = 30\%$
spring sag 6 – 8 %
temperature range -20 °C to + 80 °C
temporarily -40 °C to +120 °C.

			hardness	80 ± 5 Shore A	Add size order number	hardness	90 ± 5 Shore A	Add size to order number
			Order number SZ 5381. <input type="text"/> x <input type="text"/>			Order number SZ 5391. <input type="text"/> x <input type="text"/>		
D	d	l	▲			▲		
16	6,5	300	016 x 300			016 x 300		
20	8,5	300	020 x 300			020 x 300		
25	10,5	300	025 x 300			025 x 300		
32	13,5	300	032 x 300			032 x 300		
40	13,5	300	040 x 300			040 x 300		
50	17,0	400	050 x 400			050 x 400		
63	17,0	400	063 x 400			063 x 400		
80	21,0	400	080 x 400			080 x 400		
100	21,0	300	100 x 300			100 x 300		
125	27,0	300	125 x 300			125 x 300		

Polyurethane rods



Polyurethane rods rectangular

Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A

Order example: Polyurethane rod rectangular
SZ 5290
a x b = 50 x 75 mm, l = 100 mm
Add **50 x 75 x 100**
Order number **SZ 5290.50 x 75 x 100**

Add
size to
order number

Add
size to
order number

Add
size to
order number

Order number **SZ 5290.** x x

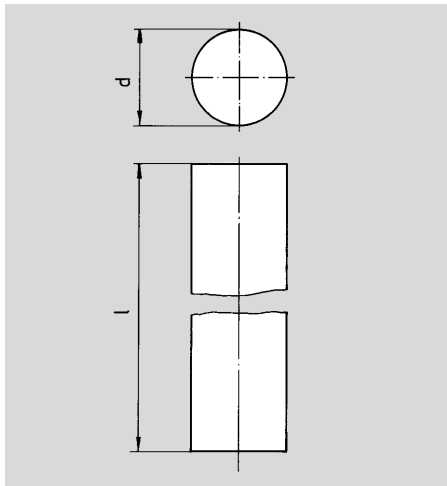
Order number **SZ 5290.** x x

Order number **SZ 5290.** x x

a x b	l	▲	▲
25 x 25	300	25 x 25	x 300
	600	25 x 25	x 600
	1200	25 x 25	x 1200
25 x 37,5	200	25 x 37,5	x 200
	300	25 x 37,5	x 300
	600	25 x 37,5	x 600
	1200	25 x 37,5	x 1200

a x b	l	▲	▲
50 x 50	100	50 x 50	x 100
	200	50 x 50	x 200
	300	50 x 50	x 300
	600	50 x 50	x 600
	1200	50 x 50	x 1200
50 x 75	100	50 x 75	x 100
	200	50 x 75	x 200
	300	50 x 75	x 300
	600	50 x 75	x 600
	1200	50 x 75	x 1200

a x b	l	▲	▲
75 x 75	100	75 x 75	x 100
	200	75 x 75	x 200
	300	75 x 75	x 300
	600	75 x 75	x 600
75 x 100	100	75 x 100	x 100
	200	75 x 100	x 200
	300	75 x 100	x 300
	600	75 x 100	x 600



Polyurethane rods round

Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A

Order example: Polyurethane rod round
SZ 5390
d = 50 mm, l = 100 mm
Add **50 x 100**
Order number **SZ 5390.50 x 100**

Add
size to
order number

Add
size to
order number

Add
size to
order number

Order number **SZ 5390.** x

Order number **SZ 5390.** x

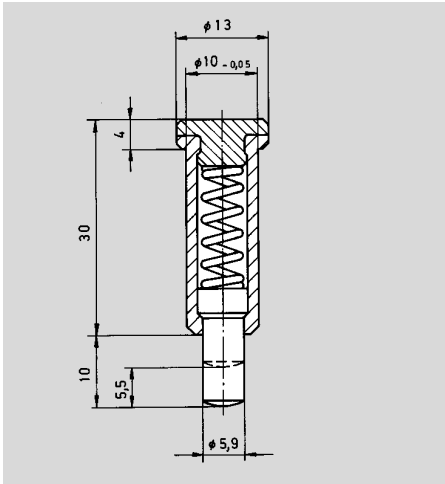
Order number **SZ 5390.** x

d	l	▲
25	200	25 x 200
	300	25 x 300
32	100	32 x 100
	200	32 x 200
	300	32 x 300

d	l	▲
50	63	50 x 063
	80	50 x 080
	100	50 x 100
	160	50 x 160
	200	50 x 200
	300	50 x 300

d	l	▲
75	80	75 x 080
	100	75 x 100
	160	75 x 160
	200	75 x 200
	300	75 x 300

Thrust pieces



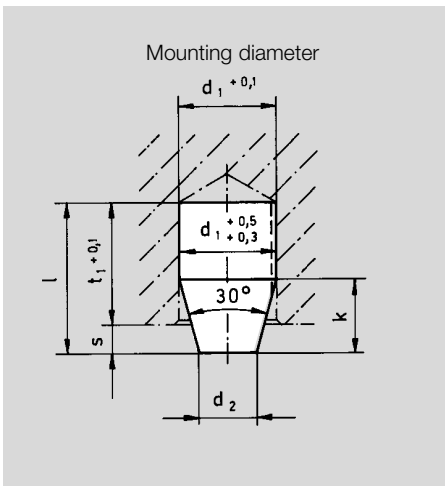
Cushioned thrust pieces

Material: Free cutting steel
ball hardened

Thrust
start ~ 45 N
finish ~ 100 N

Mounting in mounting bore holes 10 H7

Order example: Cushioned thrust piece
SZ 8135
mounting diameter 10 mm
Add **10**
Order number **SZ 8135.10**



Polyurethane thrust piece

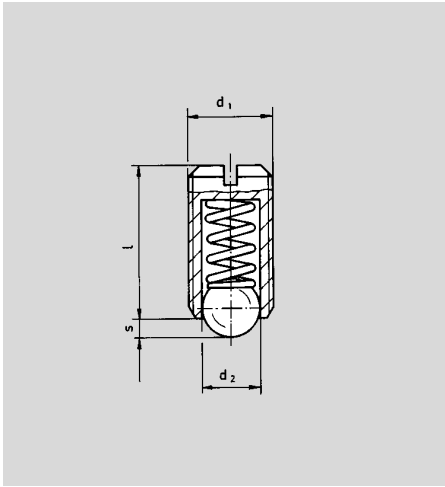
Material: Vulkollan
polyurethane-elastomer (PUR)
on base Desmodur 15
hardness 90 ± 5 Shore A
mounting in mounting bore holes $d_1 \pm 0,1$

Order example: Polyurethane thrust piece
SZ 8460
 $d_1 = 16$ mm
Add **16**
Order number **SZ 8460.16**

Add
size to
order number

Order number **SZ 8460.□**

$d_1^{+0,5}_{+0,3}$	d_2	l	k	$t_1^{+0,1}$	Compressive force (N)	at s	Pieces/standard packing	▲
6	3,6	9,5	4,5	8	150	1,5	20	06
10	6	15,5	7,5	13	350	2,5	20	10
16	9,5	25	12	21	1500	4	10	16



Cushioned thrust pieces

Material: Free cutting steel
ball hardened

Order example: Cushioned thrust piece

SZ 8130

d₁ = M 10

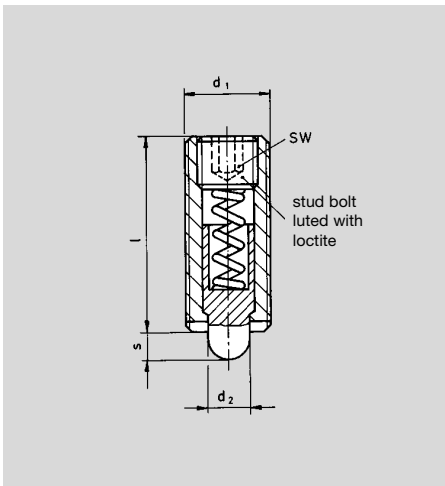
Add **10**

Order number **SZ 8130.10**

Add
size to
order number

Order number **SZ 8130.**

d ₁	d ₂	l	s	Thrust (N) start ~	Thrust (N) finish ~	Pieces/standard packing	▲
M3	1,5	7	0,5	2,2	3	50	03
M4	2,5	9	0,8	6	12	50	04
M5	3	12	0,9	7	13	50	05
M6	3,5	14	1	9	15	50	06
M8	5	16	1,5	20	35	50	08
M10	6	19	2	25	45	50	10
M12	8	22	2,5	35	60	25	12
M16	10	24	3,5	65	110	25	16



Cushioned thrust pieces

Material: Free cutting steel
thrust bolt hardened

Order example: Cushioned thrust piece

SZ 8131

d₁ = M 8

Add **08**

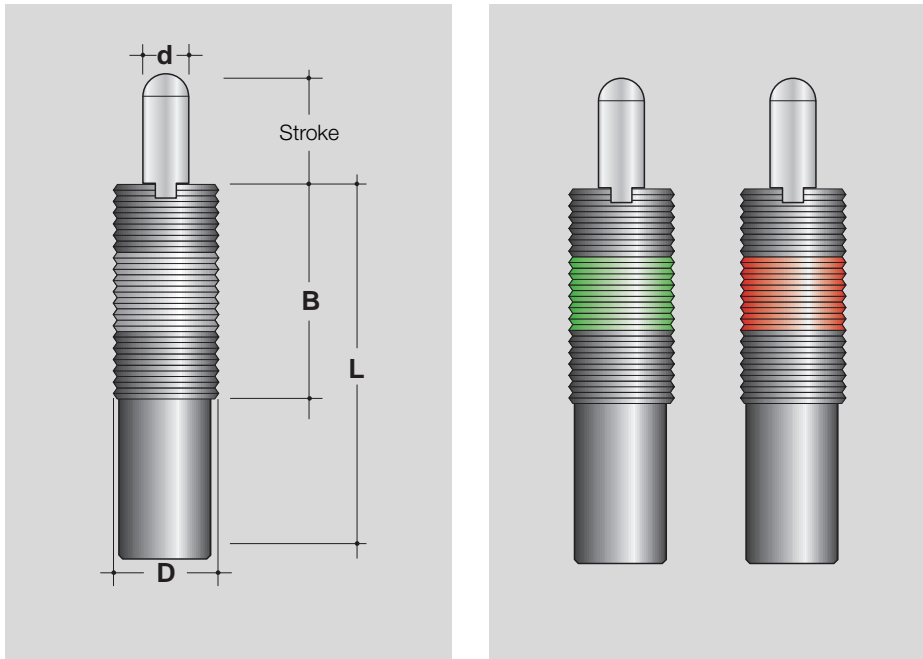
Order number **SZ 8131.08**

Add
size to
order number

Order number **SZ 8131.**

d ₁	d ₂	l	s	SW	Thrust (N) start ~	Thrust (N) finish ~	Pieces/standard packing	▲
M3	1	12	1	0,7	1,7	3,5	25	03
M4	1,5	15	1,5	1,3	5	15	25	04
M5	2,4	18	2,3	1,5	7	20	25	05
M6	2,7	20	2,5	2	7	20	25	06
M8	3,5	22	3	2,5	9	35	10	08
M10	4	22	3	3	9	35	10	10
M12	6	28	4	4	15	55	10	12
M16	7,5	32	5	5	45	100	10	16

Spring-mounted pressure devices mechanic



Application:

Pressure devices are mainly used in production of tool, equipment and machines as pressure pins, for holding parts down or ejecting parts, or for absorbing vibration.

Installation note:

Screwing the spring-mounted pressure devices in and out should only be done with the correct size special key SZ 8160. The coloured thread marking also serves to ensure threading.

Add
size to
order number

Order number SZ 8140. <input type="checkbox"/> x <input type="checkbox"/>							
D mm	Stroke mm	L mm	B mm	d mm	Initial pressure daN	Final pressure daN	▲
M 12	10	43	35	5,5	0,4	2	12 x 010
M 16	10	60	35	7,5	1,3	4	16 x 010
	15	60	16 x 015				
	20	80	16 x 020				
	30	125	16 x 030				
	40	150	16 x 040				
M 24	15	60	45	10	2,0	10	16 x 050
							24 x 015

Spring-mounted pressure device, light series

Colour coding: green

Order example: Spring-mounted pressure device, light series **SZ 8140**

D = M12, Stroke 10 mm

Add **12 x 010**

Order number **SZ 8140.12 x 010**

Add
size to
order number

Order number SZ 8145. <input type="checkbox"/> x <input type="checkbox"/>							
D mm	Stroke mm	L mm	B mm	d mm	Initial pressure daN	Final pressure daN	▲
M 12	10	43	35	5,5	0,7	4	12 x 010
M 16	10	60	35	7,5	2,7	8	16 x 010
	15	60	16 x 015				
	20	80	16 x 020				
	30	125	16 x 030				
	40	150	16 x 040				
M 24	15	60	45	10	4,0	20	16 x 050
							24 x 015

Spring-mounted pressure device, heavy series

Colour coding: red

Order example: Spring-mounted pressure device, heavy series **SZ 8145**

D = M16, Stroke 30 mm

Add **12 x 030**

Order number **SZ 8145.16 x 030**

Accessories

- Carrying units
- Magnets
- Cylindrical pins
- Barrier grids
- Precision gauge and foil strips
- Saw blades
- Casting resins, mould resins
- Jointing compounds, adhesives, lubricants
- Lubricants like high efficiency oil and grease
- Screws and threaded pins with hexagonal recessed holes
- Receiving-chucks
- Clamping sockets
- Wobblers

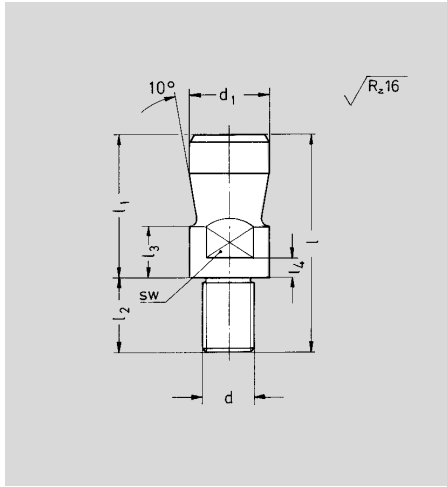


Accessories

STEINEL®
NORMALIEN

SZ 4035 page 6.02	SZ 4080 page 6.02	SZ 4125 page 6.03	SZ 4129 page 6.03	SZ 4160 page 6.04	SZ 4161 page 6.04
SZ 4380 page 6.05	SZ 4385 page 6.05	SZ 4390 page 6.06	SZ 4391 page 6.06.1	SZ 4366 page 6.07	SZ 4351 page 6.08
SZ 4361 page 6.08	SZ 4371 page 6.09	SZ 4432 page 6.10	SZ 4434 page 6.10	SZ 4512 page 6.11	SZ 4513 page 6.11
SZ 4516 page 6.12	SZ 8530 page 6.12	SZ 9335 page 6.13	SZ 9336/7 page 6.13	SZ 8510/15 S. 6.14	SZ 8512 page 6.15
SZ 7900 page 6.16	SZ 7905 page 6.17	SZ 9503 page 6.18	SZ 9511 page 6.19	SZ 9515 page 6.19	SZ 9850 page 6.20
SZ 9851 page 6.20	SZ 9853 page 6.20	SZ 9006 page 6.20	SZ 9005 page 6.20	SZ 9010 page 6.21	SZ 9012 page 6.21
SZ 9013 page 6.21	SZ 9020 page 6.21	SZ 9014 page 6.21	SZ 9740 page 6.22	SZ 9741 page 6.23	SZ 9742 page 6.23

Clamping sockets



Order example:

Clamping sockets **SZ 4035**

d = M 42 x 3, d₁ = 65 mm

Add **42 x 65**

Order number **SZ 4035.42 x 65**



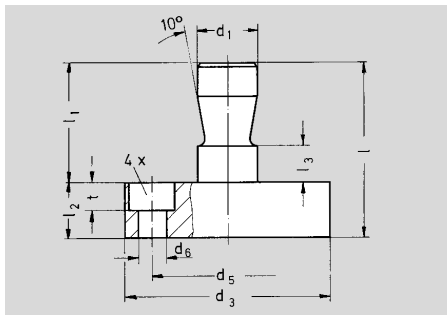
Clamping sockets DIN ISO 10 242

Material: 1.0503 (C 45)

Clamping sockets with thread are used for tightening the assembly of the die set upper plate with the press plunger. The plug diameters are in accordance with the standardized press plunger bore-holes. They are suitable to all Steinel die sets with thread in the upper plate.

Order number **SZ 4035.** x

d	d _{1f9}	l	l ₁	l ₂	l ₃	l ₄	SW	▲
M 16 x 1,5	20	58	40	18	12	4	17	16 x 20
M 16 x 1,5	25	68	45	23	16	6	21	16 x 25
M 20 x 1,5	25	68	45	23	16	6	21	20 x 25
M 20 x 1,5	32	79	56	23	16	6	27	20 x 32
M 24 x 1,5	32	79	56	23	16	6	27	24 x 32
M 24 x 1,5	40	93	70	23	26	12	36	24 x 40
M 27 x 2	40	93	70	23	26	12	36	27 x 40
M 30 x 2	40	93	70	23	26	12	36	30 x 40
M 30 x 2	50	108	80	28	26	12	41	30 x 50
M 42 x 3	65	128	100	28	26	12	55	42 x 65



Order example:

Clamping sockets with flange **SZ 4080**

d₁ = 20, d₃ = 68 mm

Add **20 x 068**

Order number **SZ 4080.20 x 068**



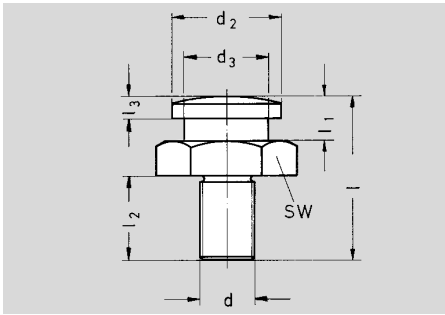
Clamping sockets DIN 9859/ISO 10242

Material: 1.0503 (C 45)

Clamping sockets with flange are screwed onto the die set upper plate and result more favourable guide rates with a large stroke, due to the use of longer guide pillars.

Order number **SZ 4080.** x

d _{1f9}	d ₃	d ₅	d ₆	l	l ₁	l ₂	l ₃	t	▲
20	68	50	9	58	40	18	12	9	20 x 068
25	83	65	9	63	45	18	16	9	25 x 083
32	98	80	9	79	56	23	16	9	32 x 098
40	123	105	9	93	70	23	26	9	40 x 123



Wobbler with thread

Material: 1.0503 (C 45)

Wobblers with thread suitable to all Steinel die sets with thread in the upper plate. Suitable receiving-chucks: SZ 4160 and SZ 4161.

Order number **SZ 4125.** □ x □

Order example:

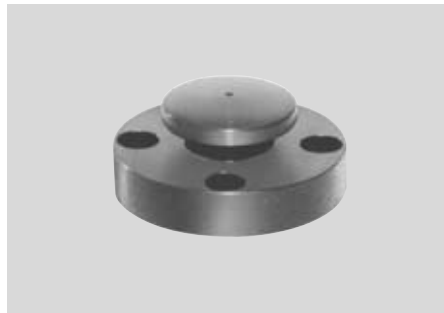
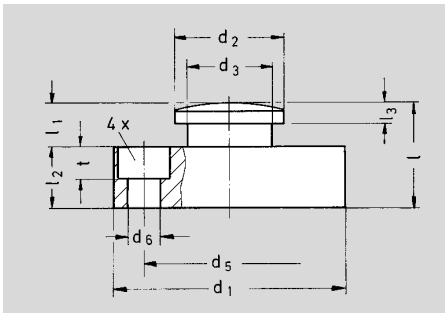
Wobbler with thread **SZ 4125**

d = M 30 x 2, d₂ = 48 mm

Add **30 x 48**

Order number **SZ 4125.30 x 48**

d	d ₂	d ₃	l	l ₁	l ₂	l ₃	SW	▲
M 16 x 1,5	32	25	48	13	25	6,5	36	16 x 32
M 20 x 1,5	48	32	65	19	34	9,5	50	20 x 48
M 24 x 1,5	48	32	69	19	38	9,5	50	24 x 48
M 30 x 2	48	32	75	19	42	9,5	60	30 x 48



Wobbler with flange

Material: 1.0503 (C 45)

Wobblers with flange will be screwed onto the die set upper plate. Suitable receiving-chucks: SZ 4160 and SZ 4161.

Order number **SZ 4129.** □ x □

Order example:

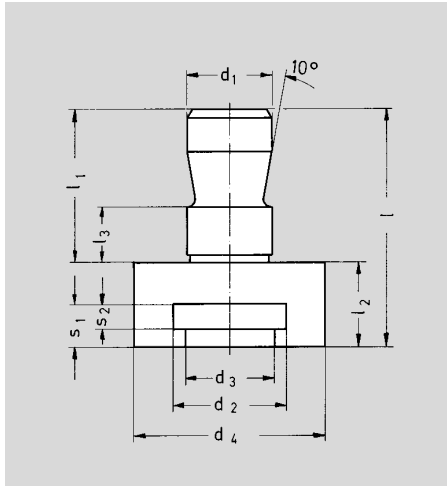
Wobbler with flange **SZ 4129**

d₁ = 68, d₂ = 32 mm

Add **068 x 32**

Order number **SZ 4129.068 x 32**

d ₁	d ₂	d ₃	d ₅	d ₆	l ₁	l ₂	l ₃	t	▲
68	32	25	50	9	13	18	6,5	9	068 x 32
83	48	32	65	9	19	18	9,5	9	083 x 48
98	48	32	80	9	19	23	9,5	9	098 x 48
123	48	32	105	9	19	23	9,5	9	123 x 48



Receiving-chucks for wobblers

Material: 1.0503 (C 45)

The receiving-chuck is used together with a wobbler for a loose assembly of the die set upper plate with the press plunger. The plug diameters are in accordance with the standardized press plunger bore-holes. They are suitable to all Steinel wobblers.

Order number **SZ 4160.** x

Order example:

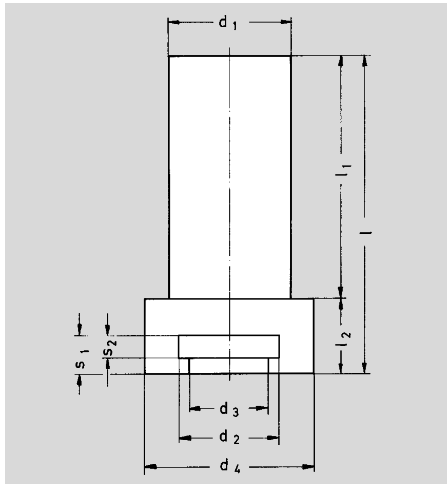
Receiving-chucks for wobblers **SZ 4160**

$d_1 = 32$, $d_2 = 49$ mm

Add **32 x 49**

Order number **SZ 4160.32 x 49**

$d_{1\text{f9}}$	d_2	d_3	d_4	l	l_1	l_2	l_3	s_1	s_2	▲
25	33	26	56	70	45	25	16	13	7	25 x 33
32	49	33	80	86	56	30	16	19	10	32 x 49
40	49	33	80	100	70	30	26	19	10	40 x 49



Unworked receiving-chucks

Material: 1.0503 (C 45)

Unworked receiving-chucks are provided with center bore-holes and can be re-turned on a turning lathe to any plug diameter. They are suitable to all Steinel wobblers.

Order number **SZ 4161.** x

Order example:

Unworked receiving-chucks **SZ 4161**

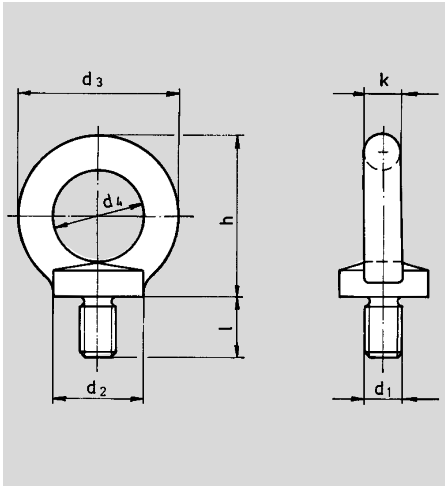
$d_1 = 40$, $d_2 = 33$ mm

Add **40 x 33**

Order number **SZ 4161.40 x 33**

d_1	d_2	d_3	d_4	l	l_1	l_2	s_1	s_2	▲
40	33	26	56	105	80	25	13	7	40 x 33
50	49	33	80	120	90	30	19	10	50 x 49
60	49	33	80	130	100	30	19	10	60 x 49

Carrying elements



Eye bolts

DIN 580

Material: Steel 1.0401 (C 15)

Order example: Eye bolt **SZ 4380**

$d_1 = M 12$

Add **12**

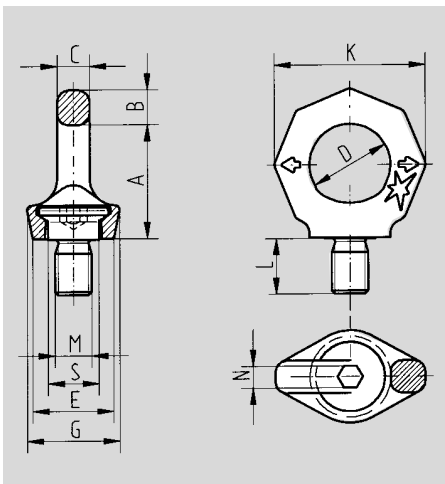
Order number **SZ 4380.12**

Use of the eye bolts aside are not permitted (only vertically)

Add size to order number

Order number **SZ 4380.**

d_1	Carrying force in axial direction (N)	d_2	d_3	d_4	l	h	k	▲
M 8	1400	20	36	20	13	36	8	08
M 10	2300	25	45	25	17	45	10	10
M 12	3400	30	54	30	20,5	53	12	12
M 16	7000	35	63	35	27	62	14	16
M 20	12000	40	72	40	30	71	16	20
M 24	18000	50	90	50	36	90	20	24



Eye ring, rotatable

With key, hexagon shape

Material: 1.6541 forged, high-tensile quenched and tempered. 100% electromagnetic inspection for cracks per DIN 5691, EN 1677

Characteristic: Distinct load capacity specification for the unfavourable load F area, which is not allowed with DIN 580.

Note: The eye ring is rotatable only when tightly screwed in.

Order example: Eye ring, rotatable

SZ 4385

M = M12

Add **12**

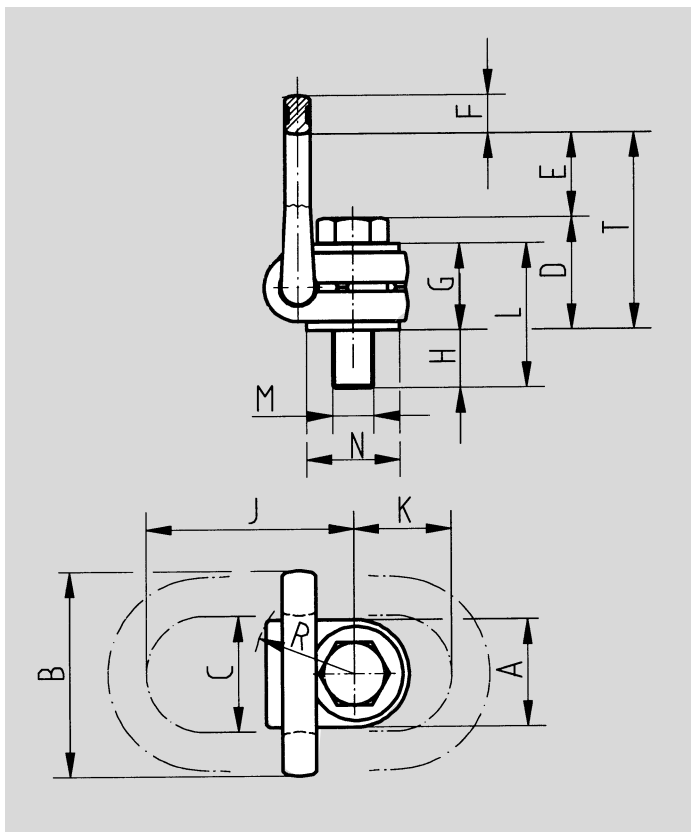
Order number: **SZ 4385.12**

Add size to order number

Eye ring, rotatable Order number **SZ 4385.**

M	Carrying load											▲
	in kg	A	B	C	D	E	G	K	L	N	S	
M 8	400	34	11	8,5	25	25	28	47	12	6	16	08
M 10	400	34	11	8,5	25	25	28	47	15	6	15	10
M 12	750	42	13	10	30	30	34	56	18	8	18	12
M 16	1500	49	15	14	35	35	40	65	24	10	22	16
M 20	2300	57	17	16	40	40	50	75	30	12	27,5	20
M 24	3200	69	21	19	48	48	60	90	36	14	33	24
M 30	4500	86	26	24	60	60	75	112	45	17	41,5	30

Side-load Hoist Ring SZ 4390



Side-load hoist ring

Note: The side-load hoist ring is rotatable from all directions, collapsible and always adjusts itself to the direction of the load. It carries the full load in every mounting position. The included screw is held secure within the hoist ring, has a minimum strength of a 8.8 and is 100% inspected for cracks.

Order example: Side-load hoist ring **SZ 4390**

M = M16

Add **16**

Order number **SZ 4390.16**

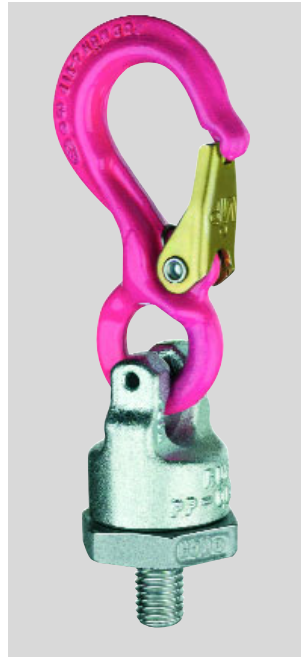
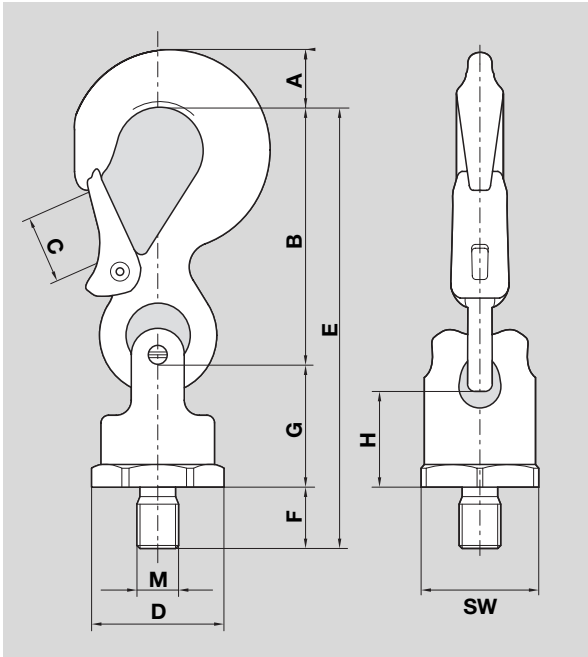
Add
size to
order number

Side-load hoist ring

Order number **SZ 4390.**

M	Load capacity in t	A	B	C	D	E	F	G	H	J	K	L	N	R	T	▲
M 8	0,3	30	54	34	35	40	10	29	11	75	45	40	32	32	75	08
M 10	0,63	30	54	34	36	39	10	29	16	75	45	45	32	32	75	10
M 12	1	32	54	34	37	38	10	29	21	75	45	50	32	32	75	12
M 16	1,5	33	56	36	46	39	13,5	36	24	86	45	60	38	38	85	16
M 20	2,5	50	82	54	55	55	16,5	43	32	116	61	75	50	48	110	20
M 24	4	50	82	54	58	66	16,5	43	37	116	61	80	50	48	125	24
M 30	5	60	103	65	80	67	22,5	61	49	151	80	110	60	67	147	30

Load Hook SZ 4391



Rotating load hook

Special features:

- Running in two sets of ball bearings for jolt-free tilting, rotating and turning.
- Suitable for all separate lifting accessories – whether hooks, loops or slings.
- No protruding hook tip.
- Forged, hardened & tempered safety latch catching inhook tip – this safeguards against lateral bending.
- Triple coiled, stainless steel double torsion spring.
- Thickened hook tip against improper use.

Order example: Load hook SZ 4391

M = 16

Add 16

Order number **SZ 4391.16**

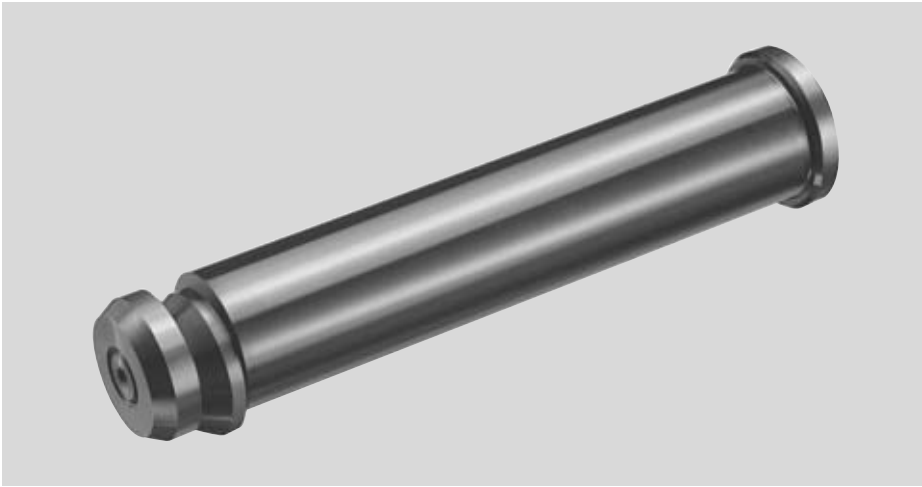
Add size to order number

Order number **SZ 4391.**

M	Load capacity in t	A	B	C	D	E	F	G	H	SW	▲
M 12	0,63	13	75	18	40	116	18	41	34	36	12
M 16	1,5	20	97	25	46	147	25	50	40	41	16
M 20	2,5	28	126	30	61	187	30	61	50	55	20
M 24	4,0	36	150	35	78	227	36	77	62	70	24
M 30	5,0	37	174	40	95	267	45	93	77	85	30
M 36	8,0	49	208	48	100	310	54	102	84	89	36

Carrying bolt SZ 4366

with safety ring



Carrying bolt with safety ring

VDI 3366

Material: Steel 1.0503 bzw. 1.7227

Areas of application: Press tools with cast carrying inserts

Note:

The bolts must always be inserted from the outside to the middle of the tool, some exceptions possible. Note the safety area on both outsides of the casting and the assembly area on one side. Do not leave any carrying bolts in the upper part of the tools during production. Remove them beforehand, in order to prevent any accidents.

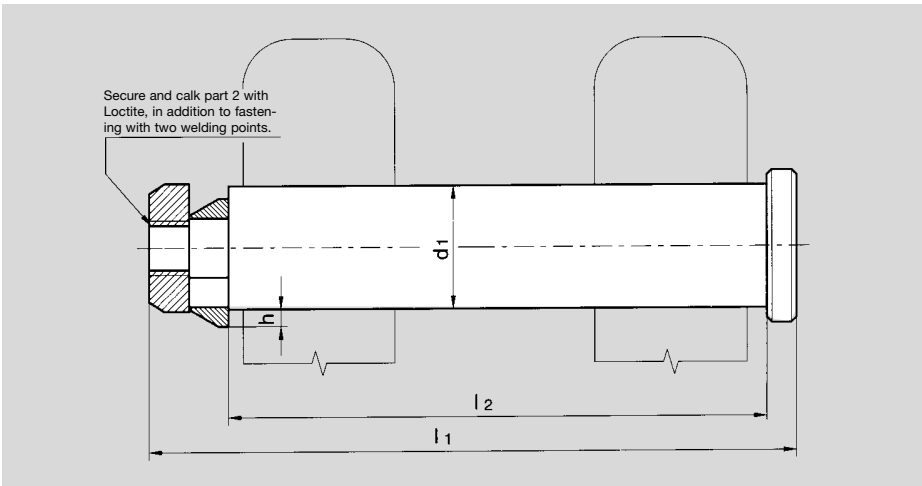
The maximum load capacity d_1 is measured, so that two bolts are used to carry the tool.

Order example: Carrying bolt with safety ring
SZ 4366

$d_1 = 40$ mm

Add **4**

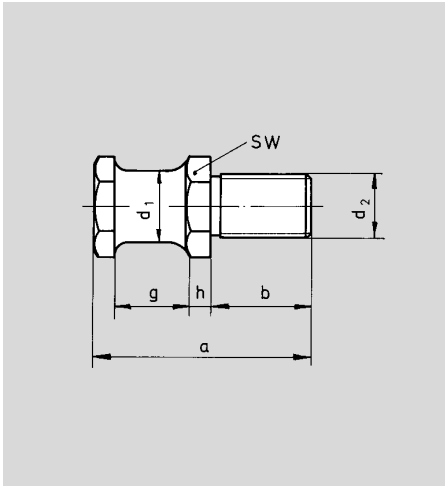
Order number **SZ 4366.4**



Add
size to
order number

Order number **SZ 4366.**

d_1	Tool weight (2 bolts)	Carrying weight/force (per bolt)	l_1	l_2	h	▲
32	6400 daN	3200 daN	175	145	4,0	3
40	10000 daN	5000 daN	225	188	6,0	4
50	16000 daN	8000 daN	273	230	6,0	5
63	25000 daN	12500 daN	347	295	7,5	6
76	63000 daN	31500 daN	422	360	8,0	7



Carrying screws

VDI 3366

Material: Steel 1.0503 (C 45)
Attachment onto the workpiece laterally by screwing in.

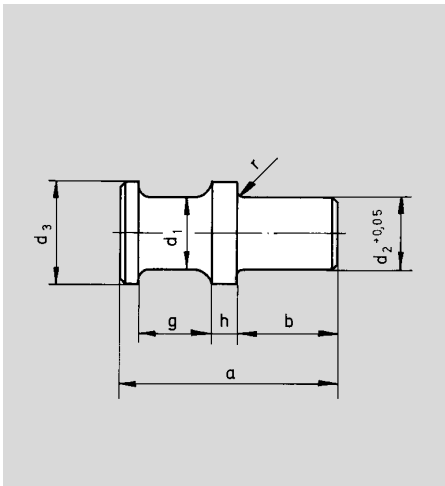
Note: Provide for 4 carrying screws, one carrying screw for half a tool weight.

Order example: Carrying screw **SZ 4351**
d₁ = 32 mm
Add **32**
Order number **SZ 4351.32**

Add size to order number

Order number **SZ 4351.**

d ₁	Carrying force (N)	a	b	d ₂	g	h	SW	▲
16	3200	58	28	M 16	20	5	24	16
20	5000	68	34	M 20	22	6	30	20
25	10000	78	38	M 24	25	8	36	25
32	15000	95	45	M 30	32	10	41	32
40	25000	118	56	M 36	40	12	50	40



Carrying bolts

Material: Steel 1.0503 (C 45)
Attachment onto the workpiece laterally by knock-in with tight fit and additional welding.

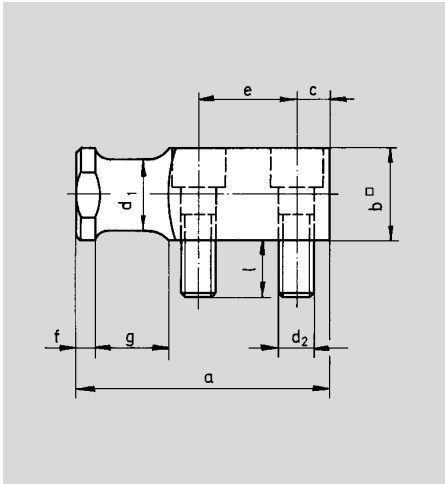
Note: Provide for 4 carrying bolts, one carrying bolt for half a tool weight.

Order example: Carrying bolt **SZ 4361**
d₁ = 25 mm
Add **25**
Order number **SZ 4361.25**

Add size to order number

Order number **SZ 4361.**

d ₁	Carrying force (N)	a	b	d ₂ ^{+0,05}	d ₃	g	h	r	▲
25	12500	80	38	25	36	25	9	2	25
32	20000	100	45	32	45	32	13	2	32
40	32000	120	56	40	56	40	14	2	40



Lifting lugs with screws

VDI 3366

Material: Steel 1.0503 (C 45)
Attachment onto the workpiece from top by 2 screws with hexagonal recessed holes (included in the delivery volume).

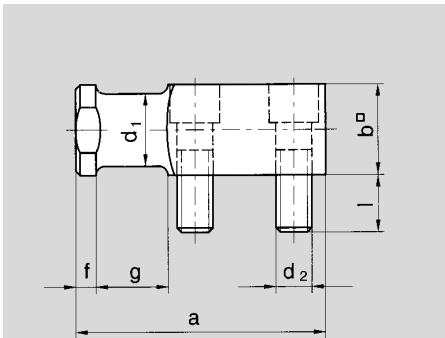
Note: Provide for 4 lifter lugs, one lifter lug for half a tool weight.

Order example: Lifting lug **SZ 4371**

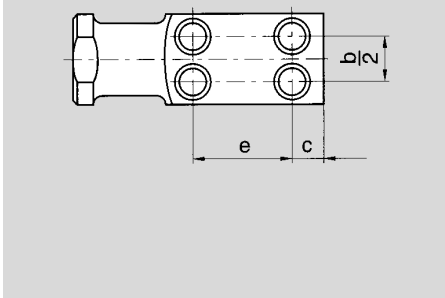
$d_1 = 40$ mm

Add **40**

Order number **SZ 4371.40**



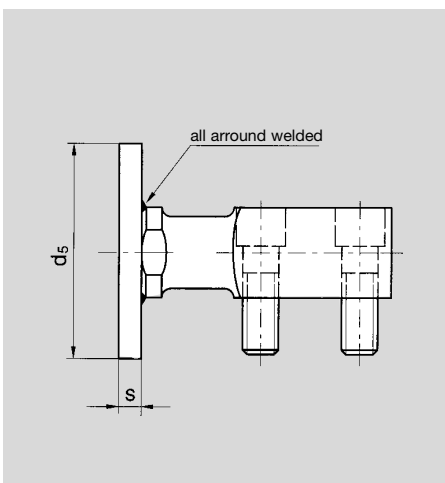
Support pivot ab $d_1 = 63$ mm, has 4 clamping bolts (see also figure below)



Add size to order number

Order number **SZ 4371.**

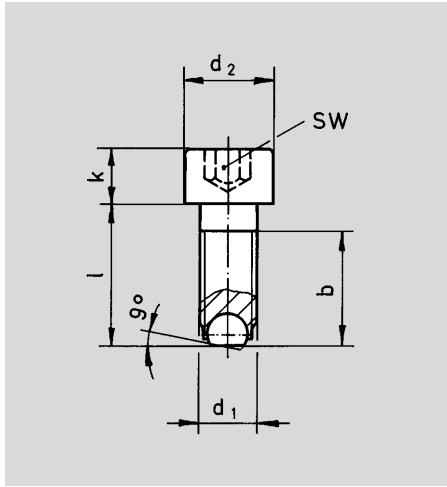
d_1	Carrying force (N)	a	b	c	d_2	e	f	g	l	▲
16	3200	80	20	10	M 8 x 25	34	6	20	14	16
20	6300	90	25	10	M 10 x 30	37	8	25	16	20
25	12500	100	35	12	M 12 x 40	38	8	30	18	25
32	20000	120	40	16	M 16 x 45	46	10	32	22,5	32
40	32000	140	50	18	M 20 x 60	54	10	40	31,5	40
50	50000	160	60	22	M 24 x 70	59	12	45	35,5	50
63	80000	200	80	20	M 20 x 100	78	12	50	41,5	63
80	125000	250	100	25	M 24 x 120	100	15	65	45,5	80
100	200000	300	120	30	M 30 x 140	125	15	80	52	100



Lifting lug with disc

Price and delivery upon request

Please state dimensions d_s and s



Ball pressure screws with cylindrical head and hexagonal recess

Material: Screw grade of firmness 12.9, ball hardened

Ball flattened and run movable up to 9°. By that, surfaces, which are not plane parallel, can be tensed or supported.

Order example: Ball pressure screws with cylindrical head and hexagonal recess **SZ 4432**
d₁ = M 8, l = 50 mm
Add **08 x 50**
Order number **SZ 4432.08 x 50**

Add size to order number
Order number **SZ 4432.** x

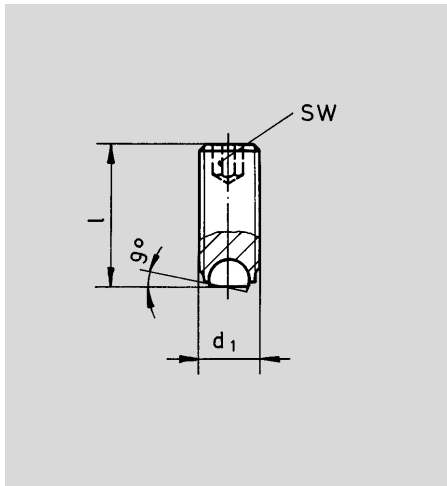
Add size to order number
Order number **SZ 4432.** x

Add size to order number
Order number **SZ 4432.** x

d ₁	l	b	d ₂	k	Ball diam.	SW	▲
M 6	20	17	10	6	4	5	06 x 20
	30	27					06 x 30
	40	24					06 x 40
M 8	20	16,5	13	8	5,5	6	08 x 20
	35	31,5					08 x 35
	50	28					08 x 50

d ₁	l	b	d ₂	k	Ball diam.	SW	▲
M 10	25	20,5	16	10	7	8	10 x 25
	40	35,5					10 x 40
	60	32					10 x 60
M 12	30	25	18	12	8,5	10	12 x 30
	50	36					12 x 50
	80	36					12 x 80

d ₁	l	b	d ₂	k	Ball diam.	SW	▲
M 16	40	34	24	16	12	14	16 x 40
	60	44					16 x 60
	80	44					16 x 80



Ball pressure screws without head and hexagonal recess

Material: Screw grade of firmness 12.9, ball hardened

Ball flattened and run movable up to 9°. By that, surfaces, which are not plane parallel, can be tensed or supported.

Order example: Ball pressure screws without head and hexagonal recess **SZ 4434**
d₁ = M 10, l = 25 mm
Add **10 x 25**
Order number **SZ 4434.10 x 25**

Add size to order number
Order number **SZ 4434.** x

Add size to order number
Order number **SZ 4434.** x

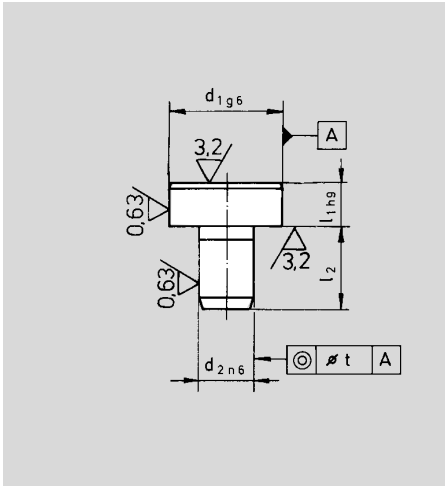
Add size to order number
Order number **SZ 4434.** x

d ₁	l	Ball diameter	SW	▲
M 6	10	4	3	06 x 10
	16			06 x 16
	25			06 x 25
M 8	12	5,5	4	08 x 12
	20			08 x 20
	30			08 x 30

d ₁	l	Ball diameter	SW	▲
M 10	16	7	5	10 x 16
	25			10 x 25
	35			10 x 35
M 12	20	8,5	6	12 x 20
	30			12 x 30
	40			12 x 40

d ₁	l	Ball diameter	SW	▲
M 16	25	12	8	16 x 25
	35			16 x 35
	50			16 x 50

Receiving and supporting bolts



Supporting bolts rigid

DIN 6321, Form A

Material: Tool steel hardened
hardness HRC 56 ± 2
mounting into mounting bore-hole ISO H7

Order example: Supporting bolt rigid
SZ 4512

$d_1 = 10 \text{ mm}$, $l_1 = 6 \text{ mm}$

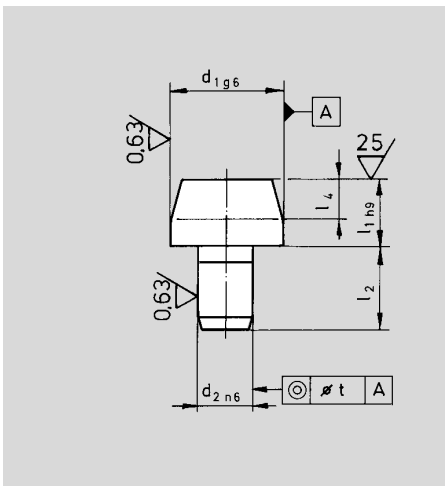
Add **10 x 06**

Order number **SZ 4512.10 x 06**

Add
size to
order number

Order number **SZ 4512.** x

d_{1g6}	l_{1h9}	d_{2n6}	l_2	t	▲
6	5	4	6	0,02	06 x 05
10	6	6	9	0,02	10 x 06
16	8	8	12	0,04	16 x 08
25	10	12	18	0,04	25 x 10



Receiving bolts cylindrical

DIN 6321, Form B

Material: Tool steel hardened
hardness HRC 56 ± 2
mounting into mounting bore-hole ISO H7

Order example: Receiving bolt cylindrical
SZ 4513

$d_1 = 16 \text{ mm}$, $l_1 = 22 \text{ mm}$

Add **16 x 22**

Order number **SZ 4513.16 x 22**

Add
size to
order number

Order number **SZ 4513.** x

d_{1g6}	l_1	d_{2n6}	l_2	l_4	t	▲
6	7 12	4	6	4	0,02	06 x 07 06 x 12
8	10 16	6	9	6	0,02	08 x 10 08 x 16
10	10 18	6	9	6	0,02	10 x 10 10 x 18

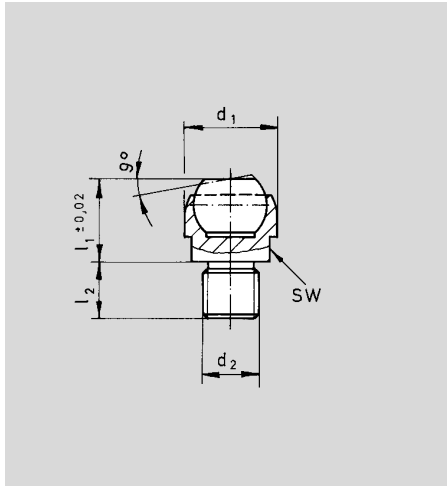
Add
size to
order number

Order number **SZ 4513.** x

d_{1g6}	l_1	d_{2n6}	l_2	l_4	t	▲
12	10 18	6	9	6	0,02	12 x 10 12 x 18
16	13 22	8	12	8	0,04	16 x 13 16 x 22
20	15 25	12	18	9	0,04	20 x 15 20 x 25
25	15 25	12	18	9	0,04	25 x 15 25 x 25

Supporting bolts

Threaded pins



Supporting bolts swinging with external thread

Mounting body tempered, ball hardened, flattened and up to 9° run movable. By that, surfaces, which are not plane parallel, can be tensed or supported.

Order example: Supporting bolt swinging **SZ 4516**

$d_1 = 20 \text{ mm}$, $d_2 = \text{M } 12$

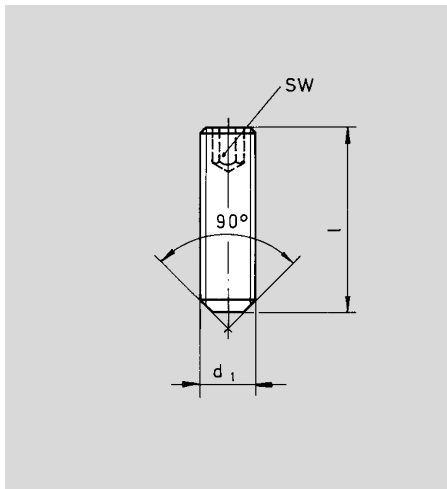
Add **20 x 12**

Order number **SZ 4516.20 x 12**

Add size to order number

Order number **SZ 4516.** x

d_1	d_2	$l_1 \pm 0.02$	l_2	Ball-diameter	SW	▲
13	M 8	13	8	10	11	13 x 08
20	M 12	18	12	16	18	20 x 12
30	M 16	27	16	25	27	30 x 16



Threaded pins with hexagonal recess

DIN 913, ISO 4026

Material: Grade of firmness 45 H (14.9)

Order example: Threaded pins with hexagonal recess **SZ 8530**

$d_1 = \text{M } 6$, $l = 16 \text{ mm}$

Add **06 x 16**

Order number **SZ 8530.06 x 16**

Add size to order number

Order number **SZ 8530.** x

Add size to order number

Order number **SZ 8530.** x

d_1	l	SW	Pieces/standard packing	▲
M 3	8	1,5	100	03 x 08
	10		100	03 x 10
	12		100	03 x 12
M 4	8	2	100	04 x 08
	10		100	04 x 10
	12		100	04 x 12
	16		100	04 x 16
M 5	8	2,5	100	05 x 08
	10		100	05 x 10
	12		100	05 x 12
	16		100	05 x 16
	20		100	05 x 20
25	100	05 x 25		

Add size to order number

Order number **SZ 8530.** x

d_1	l	SW	Pieces/standard packing	▲
M 6	8	3	100	06 x 08
	10		100	06 x 10
	12		100	06 x 12
	16		100	06 x 16
	20		100	06 x 20
M 8	25	4	100	06 x 25
	30		100	06 x 30
	10		50	08 x 10
	12		50	08 x 12
	16		50	08 x 16
M 12	20	6	50	08 x 20
	25		50	08 x 25
	30		50	08 x 30
	35		50	08 x 35
	40		50	08 x 40
50	25	08 x 50		

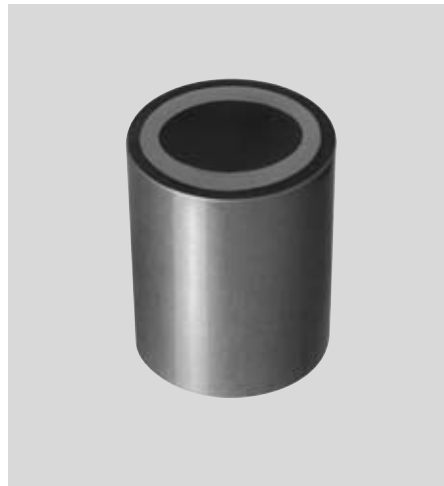
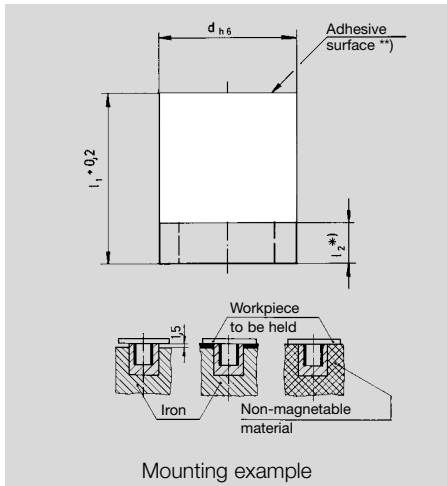
Add size to order number

Order number **SZ 8530.** x

d_1	l	SW	Pieces/standard packing	▲
M 10	12	5	50	10 x 12
	16		50	10 x 16
	20		50	10 x 20
	25		50	10 x 25
	30		50	10 x 30
M 12	35	6	50	10 x 35
	40		50	10 x 40
	16		25	12 x 16
	20		25	12 x 20
	25		25	12 x 25
M 16	30	8	25	12 x 30
	35		25	12 x 35
	40		25	12 x 40
	50		25	12 x 50

Holding magnets

round and flat



Holding magnets round

Screened system
Application temperature up to 450° C

Mounting hints: Round holding magnets SZ 9335 are pressed, shrunk or glued into the mounting bore-holes. How to do the mounting is shown in the illustration.

Order example: Holding magnets round
SZ 9335
d = 6 mm
Add **06**
Order number **SZ 9335.06**

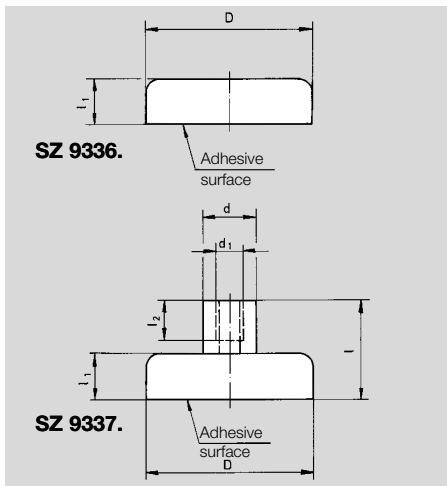
*) The holding magnets can be shortened by the measure l_2 without any reduction of the adhesion.

**) The adhesive surface should not be decreased by more than 2 mm, otherwise the adhesion would be strongly reduced.

d_{h6}	$l_1 \pm 0.2$	l_2^*	Minimum adhesion (N)	
6	10	2	1	06
8	12	3	2,5	08
10	16	6	5	10
13	18	7	8	13
16	20	5	15	16
20	25	6	35	20
25	30	5	80	25
32	35	3	150	32

Add size to order number

Order number **SZ 9335.**



Holding magnets flat

Surface galvanized, screened system,
application temperature up to 100° C

Mounting hints: Flat holding magnets are pressed or glued into the mounting bore-holes, SZ 9337 screwed on.

Order example: Holding magnets flat **SZ 9336**
D = 13 mm
Add **13**
Order number **SZ 9336.13**

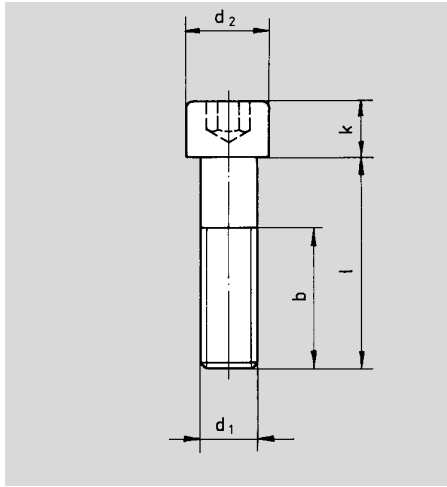
Add size to order number

Order number **SZ 9336.**

Order number **SZ 9337.**

D	d	d ₁	l	l ₁	l ₂	Minimum adhesion (N)	▲
10 ^{±0,15}	6	M 3	11,5	4,5 ^{±0,1}	5	3	10
13 ^{±0,15}	6	M 3	11,5	4,5 ^{±0,1}	5	5	13
16 ^{±0,15}	6	M 3	11,5	4,5 ^{±0,1}	5	10	16
20 ^{±0,15}	6	M 3	13	6 ^{±0,1}	5	25	20
25 ^{±0,15}	8	M 4	15	7 ^{±0,1}	6	40	25
32 ^{±0,2}	8	M 4	15	7 ^{±0,15}	6	70	32
40 ^{±0,2}	10	M 5	18	8 ^{±0,15}	8	100	40
50 ^{±0,2}	12	M 6	22	10 ^{±0,15}	10	180	50

Cheese head screws



Cheese head screws with hexagonal recess

DIN EN ISO 4762

Material: Grade of firmness 8.8
partially also deliverable in grade of firmness 12.9
Order number **SZ 8515**

Order example: Cheese head screws with hexagonal recess **SZ 8510**
d₁ = M 10, l = 80 mm
Add **10 x 080**
Order number **SZ 8510.10 x 080**

Add size to order number

Order number **SZ 8510.** x

Add size to order number

Order number **SZ 8510.** x

Add size to order number

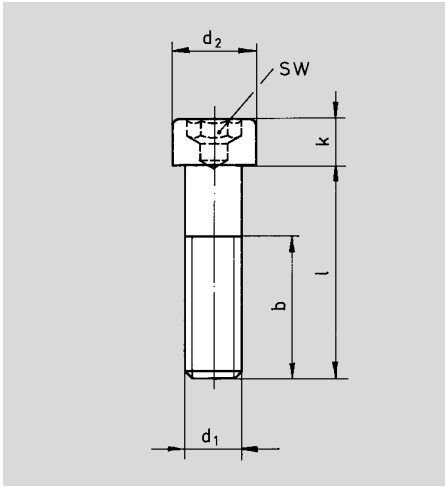
Order number **SZ 8510.** x

d ₁	l	b	d ₂	k	SW	Pieces/standard packing ▲	
M 4	6	4	7	4	3	50	04 x 006
	8	6				50	04 x 008
	10	8				50	04 x 010
	12	10				50	04 x 012
	16	14				50	04 x 016
	20	18				50	04 x 020
	25	23				50	04 x 025
30	20				50	04 x 030	
M 5	8	6	8,5	5	4	50	05 x 008
	10	8				50	05 x 010
	12	10				50	05 x 012
	16	14				50	05 x 016
	20	18				50	05 x 020
	25	23				50	05 x 025
	30	22				50	05 x 030
	35	22				50	05 x 035
	40	22				50	05 x 040
	45	22				50	05 x 045
50	22				50	05 x 050	
M 6	10	7	10	6	5	50	06 x 010
	12	9				50	06 x 012
	16	13				50	06 x 016
	20	17				50	06 x 020
	25	22				50	06 x 025
	30	27				50	06 x 030
	35	24				50	06 x 035
	40	24				50	06 x 040
	45	24				50	06 x 045
	50	24				50	06 x 050
	60	24				50	06 x 060
	70	24				50	06 x 070
	80	24				50	06 x 080

d ₁	l	b	d ₂	k	SW	Pieces/standard packing ▲	
M 8	12	8	13	8	6	25	08 x 012
	16	12				25	08 x 016
	20	16				25	08 x 020
	25	21				25	08 x 025
	30	26				25	08 x 030
	35	31				25	08 x 035
	40	28				25	08 x 040
	45	28				25	08 x 045
	50	28				25	08 x 050
	60	28				25	08 x 060
	70	28				25	08 x 070
	80	28				25	08 x 080
M 10	90	28				25	08 x 090
	100	28				25	08 x 100
	110	28				25	08 x 110
	120	28				25	08 x 120
	16	11	16	10	8	25	10 x 016
	20	15				25	10 x 020
	25	20				25	10 x 025
	30	25				25	10 x 030
	35	30				25	10 x 035
	40	35				25	10 x 040
	45	32				25	10 x 045
	50	32				25	10 x 050
60	32				25	10 x 060	
70	32				25	10 x 070	
80	32				25	10 x 080	
90	32				25	10 x 090	
100	32				25	10 x 100	
110	32				25	10 x 110	
120	32				25	10 x 120	
130	32				25	10 x 130	
140	32				25	10 x 140	
150	32				25	10 x 150	
160	32				25	10 x 160	

d ₁	l	b	d ₂	k	SW	Pieces/standard packing ▲	
M 12	20	14	18	12	10	10	12 x 020
	25	19				10	12 x 025
	30	24				10	12 x 030
	35	29				10	12 x 035
	40	34				10	12 x 040
	45	39				10	12 x 045
	50	44				10	12 x 050
	60	36				10	12 x 060
	70	36				10	12 x 070
	80	36				10	12 x 080
	90	36				10	12 x 090
	100	36				10	12 x 100
M 16	110	36				10	12 x 110
	120	36				10	12 x 120
	130	36				10	12 x 130
	140	36				10	12 x 140
	150	36				10	12 x 150
	160	36				10	12 x 160
	30	24	24	16	14	10	16 x 030
	35	29				10	16 x 035
	40	34				10	16 x 040
	45	39				10	16 x 045
	50	44				10	16 x 050
	60	54				10	16 x 060
70	44				10	16 x 070	
80	44				10	16 x 080	
90	44				10	16 x 090	
100	44				10	16 x 100	
110	44				10	16 x 110	
120	44				10	16 x 120	
130	44				10	16 x 130	
140	44				10	16 x 140	
150	44				10	16 x 150	
160	44				10	16 x 160	
M 20	50	42	30	20	17	10	20 x 050
	60	52				10	20 x 060
	70	62				10	20 x 070
	80	52				10	20 x 080

Cheese head screws



Cheese head screws with hexagonal recess and low head

DIN 6912

Material: Grade of firmness 8.8

Order example: Cheese head screws with hexagonal recess and low head **SZ 8512**

$d_1 = M 8, l = 45 \text{ mm}$

Add **08 x 045**

Order number **SZ 8512.08 x 045**

Add size to order number

Order number **SZ 8512.** x

d_1	l	b	d_2	k	SW	Pieces/standard packing	▲
M 6	12	9	10	4	5	50	06 x 012
	16	13				50	06 x 016
	20	17				50	06 x 020
	25	18				50	06 x 025
	30	18				50	06 x 030
	35	18				50	06 x 035
	40	18				50	06 x 040
	45	18				50	06 x 045
	50	18				50	06 x 050
	55	18				50	06 x 055
	60	18				50	06 x 060
	65	18				50	06 x 065
	70	18				50	06 x 070
	75	18				50	06 x 075
80	18				50	06 x 080	
90	18				50	06 x 090	
100	18				50	06 x 100	
110	18				50	06 x 110	
120	18				50	06 x 120	
M 8	12	8	13	5	6	50	08 x 012
	16	12				50	08 x 016
	20	16				50	08 x 020
	25	21				50	08 x 025
	30	22				50	08 x 030
	35	22				50	08 x 035
	40	22				50	08 x 040
	45	22				25	08 x 045
	50	22				25	08 x 050
	55	22				25	08 x 055

Add size to order number

Order number **SZ 8512.** x

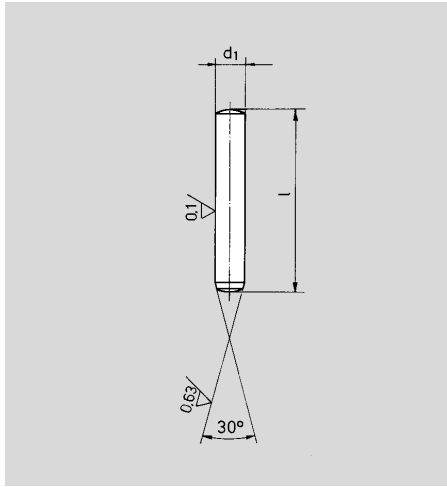
d_1	l	b	d_2	k	SW	Pieces/standard packing	▲	
M 8	60	22	13	5	6	25	08 x 060	
	65	22				25	08 x 065	
	70	22				25	08 x 070	
	75	22				25	08 x 075	
	80	22				25	08 x 080	
	90	22				25	08 x 090	
	100	22				25	08 x 100	
	110	22				25	08 x 110	
	120	22				25	08 x 120	
	M 10	16	11	16	6,5	8	25	10 x 016
		20	15				25	10 x 020
		25	20				25	10 x 025
30		25				25	10 x 030	
35		26				25	10 x 035	
40		26				25	10 x 040	
45		26				25	10 x 045	
50		26				25	10 x 050	
55		26				25	10 x 055	
60		26				25	10 x 060	
65		26				25	10 x 065	
70		26				25	10 x 070	
75		26				25	10 x 075	
80		26				25	10 x 080	
90	26				25	10 x 090		
100	26				25	10 x 100		
110	26				25	10 x 110		
120	26				25	10 x 120		
150	32				25	10 x 150		

Add size to order number

Order number **SZ 8512.** x

d_1	l	b	d_2	k	SW	Pieces/standard packing	▲
M 12	20	14	18	7,5	10	10	12 x 020
	25	19				10	12 x 025
	30	24				10	12 x 030
	35	29				10	12 x 035
	40	30				10	12 x 040
	45	30				10	12 x 045
	50	30				10	12 x 050
	55	30				10	12 x 055
	60	30				10	12 x 060
	65	30				10	12 x 065
	70	30				10	12 x 070
	75	30				10	12 x 075
	80	30				10	12 x 080
	90	30				10	12 x 090
100	30				10	12 x 100	
110	30				10	12 x 110	
120	30				10	12 x 120	
130	36				10	12 x 130	
140	36				10	12 x 140	
180	36				10	12 x 180	
200	36				10	12 x 200	

Precision cylindrical pins



Precision cylindrical pins

Structural dimensions according to DIN EN ISO 8734

Material: Chrome vanadium alloyed tool steel, hardness HRC 60 ± 2

Precision workmanship ground and lapped, ISO m 5, spherical cap and chamfer polished

Order example: Precision cylindrical pin **SZ 7900**

$d_1 = 2 \text{ mm}, l = 16 \text{ mm}$

Add **020 x 016**

Order number **SZ 7900.020 x 016**

Add size to order number

Order number **SZ 7900.** x

Add size to order number

Order number **SZ 7900.** x

Add size to order number

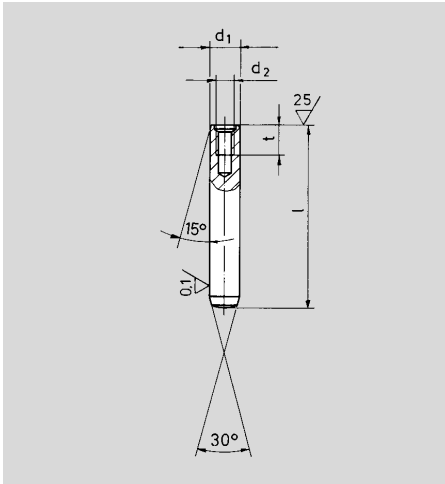
Order number **SZ 7900.** x

d_{1m5}	l	Pieces/standard packing	▲
1,5	5	50	015 x 005
	6	50	015 x 006
	8	50	015 x 008
	10	50	015 x 010
	12	50	015 x 012
	14	50	015 x 014
	16	50	015 x 016
2	6	50	020 x 006
	8	50	020 x 008
	10	50	020 x 010
	12	50	020 x 012
	14	50	020 x 014
	16	50	020 x 016
	18	50	020 x 018
	20	50	020 x 020
	24	50	020 x 024
	28	50	020 x 028
	32	50	020 x 032
2,5	8	50	025 x 008
	10	50	025 x 010
	12	50	025 x 012
	14	50	025 x 014
	16	50	025 x 016
	18	50	025 x 018
	20	50	025 x 020
	24	50	025 x 024
3	8	50	030 x 008
	10	50	030 x 010
	12	50	030 x 012
	14	50	030 x 014
	16	50	030 x 016
	18	50	030 x 018
	20	50	030 x 020
	24	50	030 x 024
	28	50	030 x 028
	32	50	030 x 032
	36	50	030 x 036
	40	50	030 x 040
	4	10	25
12		25	040 x 012
14		25	040 x 014
16		25	040 x 016
18		25	040 x 018
20		25	040 x 020
24		25	040 x 024
28		25	040 x 028
32		25	040 x 032

d_{1m5}	l	Pieces/standard packing	▲	
4	36	25	040 x 036	
	40	25	040 x 040	
	45	25	040 x 045	
	50	25	040 x 050	
	5	10	25	050 x 010
12		25	050 x 012	
14		25	050 x 014	
16		25	050 x 016	
18		25	050 x 018	
20		25	050 x 020	
24		25	050 x 024	
28		25	050 x 028	
6	32	25	050 x 032	
	36	25	050 x 036	
	40	25	050 x 040	
	45	25	050 x 045	
	50	25	050 x 050	
	55	25	050 x 055	
	60	25	050 x 060	
	8	14	25	060 x 014
		16	25	060 x 016
		18	25	060 x 018
		20	25	060 x 020
24		25	060 x 024	
28		25	060 x 028	
32		25	060 x 032	
36		25	060 x 036	
40		25	060 x 040	
45		25	060 x 045	
8	50	25	060 x 050	
	55	25	060 x 055	
	60	25	060 x 060	
	70	25	060 x 070	
	80	25	060 x 080	
	8	18	25	080 x 018
		20	25	080 x 020
		24	25	080 x 024
		28	25	080 x 028
		32	25	080 x 032
		36	25	080 x 036
		40	25	080 x 040
		45	25	080 x 045
		50	25	080 x 050
55		25	080 x 055	
8	60	25	080 x 060	
	70	25	080 x 070	
	80	25	080 x 080	
	90	25	080 x 090	
	100	25	080 x 100	

d_{1m5}	l	Pieces/standard packing	▲	
10	20	10	100 x 020	
	24	10	100 x 024	
	28	10	100 x 028	
	32	10	100 x 032	
	36	10	100 x 036	
	40	10	100 x 040	
	45	10	100 x 045	
	50	10	100 x 050	
	55	10	100 x 055	
	60	10	100 x 060	
	70	10	100 x 070	
12	80	10	100 x 080	
	90	10	100 x 090	
	100	10	100 x 100	
	12	24	10	120 x 024
		28	10	120 x 028
		32	10	120 x 032
		36	10	120 x 036
		40	10	120 x 040
		45	10	120 x 045
		50	10	120 x 050
		55	10	120 x 055
60		10	120 x 060	
70		10	120 x 070	
14	80	10	120 x 080	
	90	10	120 x 090	
	100	10	120 x 100	
	14	36	10	140 x 036
		40	10	140 x 040
		45	10	140 x 045
		50	10	140 x 050
		55	10	140 x 055
		60	10	140 x 060
		70	10	140 x 070
80		10	140 x 080	
90		10	140 x 090	
100		10	140 x 100	
16	40	10	160 x 040	
	50	10	160 x 050	
	60	10	160 x 060	
	70	10	160 x 070	
	80	10	160 x 080	
	90	10	160 x 090	
	100	10	160 x 100	

Precision cylindrical pins



Precision cylindrical pins with inside thread

Structural dimensions according to DIN EN ISO 8735

Material: High grade chrome – alloyed casehardening steel, casehardened, hardness HRC 60 ± 2

Precision workmanship ground and lapped, ISO m 5, with air escape surface

Use with blind-end bores, if the drive-out of the pin from the rear side is not possible.

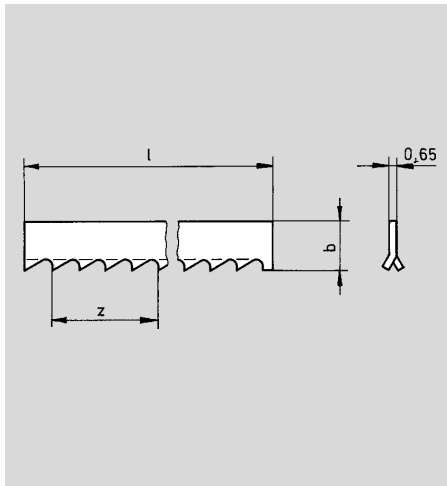
Order example: Precision cylindrical pin with inside thread **SZ 7905**
d₁ = 8 mm, l = 32 mm
Add **08 x 032**
Order number **SZ 7905.08 x 032**

Add size to order number

Order number **SZ 7905.** x

d _{1m5}	d ₂	l	t	Pieces/standard packing	▲
6	M 4	24	6	25	06 x 024
		32		25	06 x 032
		40		25	06 x 040
		50		25	06 x 050
8	M 5	28	8	25	08 x 028
		32		25	08 x 032
		40		25	08 x 040
		50		25	08 x 050
		60		25	08 x 060
		80		25	08 x 080
10	M 6	32	10	10	10 x 032
		40		10	10 x 040
		50		10	10 x 050
		60		10	10 x 060
		80		10	10 x 080
12	M 6	32	10	10	12 x 032
		40		10	12 x 040
		50		10	12 x 050
		60		10	12 x 060
		80		10	12 x 080
		100		10	12 x 100
14	M 8	50	12	10	14 x 050
		60		10	14 x 060
		80		10	14 x 080
		100		10	14 x 100
16	M 8	60	12	10	16 x 060
		80		10	16 x 080
		100		10	16 x 100

Sawing strips



Sawing strips in boxes
30 m of length

Material: High-alloy Swedish steel

Order example: Sawing strip **SZ 9503**
6 teeth each cm, b = 8 mm
Add **608**
Order number **SZ 9503.608**

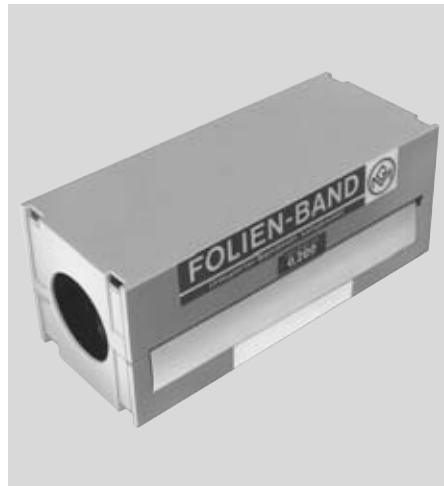
				Add size to order number
Order number SZ 9503.				<input type="checkbox"/>
Number of teeth each cm	Number of teeth each inch	b mm	▲	
4	10	4	404	
		6	406	
		8	408	
		10	410	
6	14	3	603	
		4	604	
		6	606	
		8	608	
		10	610	

				Add size to order number
Order number SZ 9503.				<input type="checkbox"/>
Number of teeth each cm	Number of teeth each inch	b mm	▲	
9	22	4	904	
		6	906	
		8	908	
		10	910	

Standard values for numbers of teeth (z/cm) and cutting speeds v in m/min

Material	Thickness							
	2mm		2 – 10 mm		10 – 25 mm		> 25 mm	
	z/cm	m/min	z/cm	m/min	z/cm	m/min	z/cm	m/min
Steel up to 420 N/mm ²	9	55	6	50	4	40	4	35
Steel up to 700 N/mm ²	9	45	6	40	6	35	4	30
Steel up to 1200 N/mm ²	9	30	9	25	6	18	4	15
C-steel	9	70	6	60	4	50	4	40
Alloyed tool steel	9	35	6	30	4	25	4	20
High speed steel	9	30	6	25	4	20	4	18
Rust-free steel	9	20	6	18	6	15	4	14
Cast steel, grey cast iron	–	–	6	40	4	35	4	30
Bronze hard	9	50	6	40	6	35	4	30
Bronze soft	9	120	6	100	4	80	4	60
Brass	9	600	6	500	4	400	4	250
Copper	6	200	6	150	4	100	4	80
Aluminium alloy	6	600	4	450	4	300	4	200
Hard paper, synthetic resins	4	800	4	600	4	500	4	400

Precision gauge strips



Foil strips in the plastic box
made of steel and brass

Order example: Foil strips made of brass
SZ 9512
Foil thickness 0,025 mm
Add **025**
Order number **SZ 9512.025**

Brass Ms 63	Order number SZ 9513
Workshop assortment 150 x 1200 mm in thickness	
0,025	
0,050	
0,075	
0,100 mm	

Steel, rust-free	150 x 1200 mm	Order number SZ 9511. <input type="checkbox"/>
Brass Ms 63	150 x 2500 mm	Order number SZ 9512. <input type="checkbox"/>
Steel, non-alloy	150 x 2500 mm	Order number SZ 9514. <input type="checkbox"/>

Add
size to
order number

Foil thickness (mm)	▲
0,025	025
0,050	050
0,075	075
0,100	100
0,150	150
0,200	200
0,250	250



Precision gauge strips in the pile box

Made of best cold-rolled and hardened tracer gauge strip steel
Surface polished
Extremely plane with tightest thickness tolerances

Order example: Precision gauge strip
width 12,7 mm **SZ 9515.12,7**
thickness 0,03 mm
Add **003**
Order number **SZ 9515.12,7 x 003**

Add
size to
order number

Order number **SZ 9515.12,7 x**

Thickness	Width	Length (m)	▲
0,01	12,7	2	001
0,02	12,7	2	002
0,03	12,7	2	003
0,04	12,7	2	004
0,05	12,7	2	005
0,10	12,7	2	010
0,20	12,7	2	020
0,30	12,7	2	030



High-performance oil

Characteristics:

The high-performance oil with molybdenum-disulphide (MoS₂)-additive is especially well suited for highly stressed narrow running fits due to its viscosity and composition. The viscosity additive acts anti-attributioning creating a bearing armouring having excellent emergency running properties.

Fields of application:

Lubrication of die sets, guides, etc.

in a canister 5 l

Order number **SZ 9850**



400 ml in a spray can

Order number **SZ 9851**



High-performance oil (Slidingway oil No. 1)

Characteristics:

Modern demulsifying sliding way oil with excellent anti-stick and slip properties to lubricate metal and plastic sliding guides, sliding ways with solid lubrication as well as ball and roller guides. It is also suitable as a universal oil to lubricate machine tools.

Fields of application:

Lubrication of die sets, sliding guides etc.

in a canister 5 l

Order number **SZ 9853**



High-performance grease

Characteristics:

- Performance optimized long time lubrication grease
- Highest anti-corrosion protection
- Best water resistance
- -30° degrees Celsius to +120° degrees Celsius

in a 400 g cartridge

Order number **SZ 9006**

in a bucket 15,0 kg

Order number **SZ 9006.15**

Suitable grease gun: SZ 9810



Roller bearing grease

Special lubricant for high demands

Characteristics:

- Superior wearing protection
- Good temperature stability up to 140 °C (284 °F)
- Excellent water and medium stability
- Good corrosion prevention
- Very good age stability

Fields of application:

Lubrication of ball and roller guides

in a 400 g cartridge

Order number **SZ 9005**

Suitable grease gun: SZ 9810

Fat solvent, anti-corrosion oil, slushing oil, tracing paint



Fat solvent

300 ml in the spray can
Order number **SZ 9010**

The solvent from the spray can easily softens oil and fat coats and removes them. Parts which are to be cast en bloc, glued or sprayed with tracing paint should be cleaned with fat solvent from the spray can. The adhesive force of the compound is thereby essentially increased.

Combustible!
Filled with safety fuel gas



Anti-corrosion oil

300 ml in the spray can
Order number **SZ 9012**

For untightening struck or corroded screws, nuts, interference fits etc. Effective lubrication of chains, locks, hinges etc. Little surface tension, therefore quick and deep penetration into even utmost narrow joints and fits. High lubricating effect, sustained corrosion protection.

Filled with safety fuel gas.



Slushing oil

300 ml in the spray can
Order number **SZ 9013**

Active agent for corrosion protection with sustaining its effect for several months by releasing gases penetrate into hollow bodies, bores, taps etc. where there is difficult access protecting iron and steel parts having direct contact.

Filled with safety fuel gas.



Tracing paint

300 ml in the spray can
Order number **SZ 9020**

It couldn't be done any faster! Just spray on – already tracing. Paint will dry without peeling off. Even and permanent paint film. Also for marking workpieces, work cycles and packages very well suited.

Filled with safety fuel gas.



Multifunctions spray WD-40

400 ml in the spray can
Order number **SZ 9014**

The five basic functions

- Displaces Moisture
- Protects
- Penetrates
- Lubricates
- Cleans

Anaerobic bonding agents for plastics

Anaerobic bonding agents for plastics are distributed onto the mounting parts in a liquid state. They stay liquid as long as oxygen has got access. Not before the parts are mounted but with the occlusion of oxygen and metal contact the chemical transformation is started from the liquid state into a tough substance formed by linear molecule chains.

Due to its effective capillarity this plastic material fills out even smallest interspaces. It cramps fast in the surface roughness of the parts that are to be linked together. The jointing gap is so filled completely out. Due to this 100% surface contact an interlocking compound is formed which is shock and vibration-proof.

Constructional outlay of a compound

A jointing and bonding compound should always be laid out in a way that only pulling, pressing and shearing forces occur – not however peel-off forces.

A high L/D ratio (Length/Diameter) grants a good tensional distribution in the bonding gap.

Gap filling

Bull noses and basils sized sufficiently big enable an even dissipation of the product upon mounting jointing parts. In case of press-fits and of bigger sizes always moisten both surfaces thinly and evenly with the concerning LOCTITE product.

Moisten the bore of blind holes in such a way to prevent the compressed air from driving the liquid bonding agent away upon mounting.

Joining different materials

When joining different materials (for example steel bolts in an alu-housing) with operating temperatures over 50 °C the various coefficients of thermal expansion must be taken into consideration. Aluminium expands for instance twice as much as steel does.

Compatibility with other materials

The materials used most (metals, sintered materials, ceramics and glass) are chemically not changed by the liquid bonding agents for plastics.

The hardened layer stays chemically neutral.

The following plastic materials can be affected and show reactions after a longer period of time: vinyl, ABS-products, polysulphone, PVC, polycarbonate, polystyrene, SAN-products and lacquered surfaces.

Solubility

The liquid anaerobic LOCTITE products are soluble in trichlorethylene and in many other chlorinated hydrocarbons.

Chemical constancy

The fully hardened LOCTITE products show a very good stability with regard to oil, benzene, organic solvents and coolants.

The greater the sturdiness is of a special type of bonding agent the greater is the chemical constancy.

Storing time

With room temperature the LOCTITE products are storable for at least 1 year. The content of air in the bottles is necessary in order to prevent a hardening before use. Screws, metal parts or brushes must not be dipped into the bottle. Soiled LOCTITE must not be poured back into the bottle. The activator must not be mixed with LOCTITE products to prevent any hardening.



Aktivator 7649

A hardening accelerator for anaerobic products loctite 542, 603 and 270. Reduces time required for hardening. Simple use: spray on, and let dry – and then apply the loctite product.

Colour: light yellow
contains: acetone
flammable
storage duration: 1 year

500 ml pump bottle

Order number **SZ 9740**



Gluing of flat surfaces LOCTITE 496

A glue for the gluing of difficult components such as steel plates, bearings, and ceramics respectively, and among each other.

glue gap max. 0.1 mm
preferably 0.05 mm

Hardening time

Hard to the touch with Activator 7649 20–40 sek
Final hardness ≈12 hrs

Colour: colourless
100 ml in plastic bottle
shelf life: 1 year

Order number **SZ 9741**



Axle-Hub connection bearing glue LOCTITE 603

For tension-free, enduring fastening of parts with radial and axial pressure, such as bearings, bushings, axles, pins, rotors, gear wheels, rings, tires and sinterbearings. The extrusion force of press fits increases by approximately 100% and more. Fitting rust and leakage are avoided. Thin liquid, only very difficult to break fastening.

glue gap max. 0.15 mm
preferably 0.05 mm

Hardening time

hard to the touch 10–30 min.
Functional hardness 30–60 min.
Final hardness ≈ 6 hrs

Colour: green
50 ml in plastic bottle
shelf life: 1 year

Order number **SZ 9742**



Fastening of screws very difficult to break fastening, LOCTITE 270

A highly viscous glue for the connection of bearings, bushings, spacer bolts, for the securing and simultaneous sealing of stud bolts and screws. Highly resistant to vibrations and pressure. Decidedly higher fitting area between two parts.

Reliable sealing of hydraulic and pneumatic cables as well as other highly used pipes. High resistance to pressure and lye solutions; only difficult to break fastening.

glue gap max. 0.15 mm
preferably 0.05 mm
thread up to M 20

Hardening time

Hard to the touch 10–30 min.
Functional hardness 1–3 hrs
Final hardness 3–6 hrs

Colour: green
50 ml in plastic bottle

Order number **SZ 9743**



Joint fastening medium tight LOCTITE 542

Medium tight connection for hydraulic and pneumatic cables for the securing of parts, that will need to be able to be removed/loosened with normal tools. LOCTITE 542 seals screw threads against the standard hydraulic fluids. It is nixothopic, and does not run. To be used for hydraulic and pneumatic fittings, so well as pipe coils up to R 1/2".

Easily broken connection
max. glue gap 0.12 mm

Hardening time

Hard to the touch 10–30 min.
Final hardness ≈ 3 hrs

Colour: brown
50 ml in plastic bottle

Order number **SZ 9717**



Fastglue gel LOCTITE 454

A drip and run-free glue for gluing metal, plastics, wood, paper, rubber, leather, etc. It can be used to glue substances with rough surfaces.

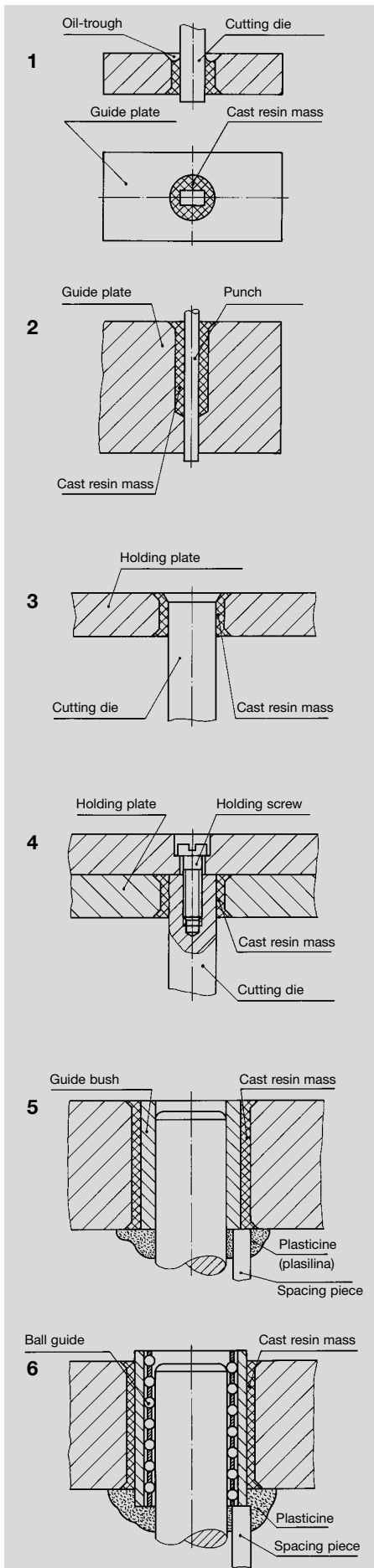
glue gap 0.20 mm
preferably 0.05 mm

Hardening time

Hard to the touch 5–20 sek
Final hardness 12 hrs

Colour: colourless
20 g in plastic tube

Order number **SZ 9744**



Introduction

The usage of cast resin mass in the blanking tool engineering has essentially facilitated the creation of breaking-throughs for profiled dies but also the fixing of cutting dies and guides. By the use of casting resin in a great reduction of the manufacture and repair costs, a valuable saving of skilled workers' hours, in certain cases even quality and tool life improvements have been obtained. The casting of resin to certain parts of cutting and punching dies is applied with good success to:

- dies with slide play in guide plates
- interchangeable dies with holding plates
- fixed dies in holding plates
- fixed guide bushes in die sets
- dies in ejectors
- die-plate inserts

The epoxy casting resin system ARALDIT CW 2418 with the activator Hy 5162 (has reactions) developed for this special usage has an enormous adhesion, excellent sliding properties, a high resistance to pressure, is relatively fluid and admits small casting gaps. It can be cast and hardened in room temperature. Dwindling is very little and negligible.

The resin enriched in factory with filler can be cast in layers of 1 – 10 mm. It is very reactive and hardens very well even in thin layers.

Preparation of tools parts

The epoxy casting resin system ARALDIT CW 2418 adheres very well on all materials, especially well on metals. Therefore all tool parts which are to stay moveable after the casting as f. e. dies must be pretreated with the separating agent QZ 5111 (SZ 9704). By some polishing of the pretreated surfaces with a woolen cloth the separating effect and surface quality of the cast resin moulding material can be improved. Multiple applications of the separating agent QZ 5111 (SZ 9704) result in a greater sliding play.

Interchangeable tool parts and dies must absolutely be aligned plane-parallel and must possess the surface roughness "fine".

The breaking throughs in the guide and die plates just like resin cast fixed dies, guide bushes and die-plate inserts must be free from grease and should be roughened. With grooves, bores or pins the connection of the cast resin material and the metal can still be improved.

Examples for the casting

1st Cutting dies with sliding play in the guide-plates.

The breaking-through in the guide-plate is delineated from the ready cutting plate and is bored about 1 – 3 mm bigger or sawed out. The sawed out resp. drilled fraction surfaces must be degreased. The contact surfaces of the two plates must be sprayed with the separating agent QZ 5111 (SZ 9704) or be provided with a wax paper interlining to prevent a mutual gluing together; then the contact surfaces are clamped to each other. The die coated with the separating agent is to put into the fraction, centered in the cutting plate and held by magnetic angles in vertical position. Then the casting is done and after the past resin mass has become hard the final cutting play between die and the cutting plate fraction is arranged.

In case of profiled dies the mould rupture in the guide plate can be substituted by a bore by casting Araldit CW 2418 into the rupture (1).

In case of thin cutting dies which must be rather long for reasons of stability the guide plate must be cast out (2).

2nd Cutting dies having a firm seat holding plates.

The casting is done by the same principle as with the guide plates. The position of the cutting die is determined by the cutting, the guiding, stripper or ejector plate in conformity to the tool type. As the die must sit firmly in the holding plate the punch head must be roughened and degreased. Picture (3) shows a cast cutting die with conical head.

With mould dies it is useful to provide the holding portion with grooves and to lay out the fraction conically in the holding plate. In certain cases it is necessary to lessen the stripping forces by additional holding screws (4). The cast resin mass only serves then for fixing the position of the die.

3rd Interchangeable cutting dies in holding plates.

If cast-in cutting dies for upkeep or repair should be interchangeable in the holding plate it must be noted that the die head must be applied with a separating agent and that the breaking-through is roughened and degreased.

4th Guide bushes with firm seats in die-sets.

Cast-in-die-sets having their firm seat in the top of the die-set have the advantage that there happens to be no narrowing due to the press-fit, and that the guidance diameter must not be honed a second time.

Furthermore costly fineboring, lapping works and taking the finishing cut need not be done, and the quality is thereby not lessened.

The position bore for the guide bush in the top part should be 3 to 6 mm bigger than the outside diameter of the guide bush. Bore and outside surface of the bush must be roughened and degreased.

The top part is moved over the guide bushes seated on the columns of the lower part, is aligned on a parallel base and charged. The cast gap must be sealed from bottom with plasticine (Plastilina), the guide bush must be supported by additional spacers (5). A cast out ball guide bush is depicted in (6).

Casting resin

Steel-filled black free-flowing epoxy cast resin system for coat thickness up to 10 mm adapted to the needs of the tool manufacture.

Fields of application

Cast-in of dies and cast-out of guides with blanking tools, foundries and contour milling models, general mould making, tools for sheet metal conversion.

Processing methods

Full mould casting
Front casting (conditionally suited only)

Characteristics

Black, fluid casting resin
Hardening in room temperature
Little sedimentation
Excellent pouring capability
Layers in thicknesses up to approx. 10 mm can be cast in one work cycle
Hard surfaces relatively resistant to abrasion with good sliding properties
Cutting properties good

Product description Araldite CW 2418

Modified epoxy resin containing filling materials
Supplied type: black thixotrope paste
Viscosity at 25 °C: 130.000 – 180.000 mPa.s
Density: 2,7 g/cm³
Flash point (Pensky-Martens): 200 °C
Storability at 18 – 25 °C: 1 year

Activator Hy 5162 (reactive)

Formulated polyamino-activator for layers in thicknesses up to 10 mm at max., especially designed for cutting die guides.

Supplied type: clear, light yellow liquid
Viscosity at 25 °C: 30–70 mPa.s
Density : 1.0 g/cm²
Flash point (Pensky-Martens): 108 °C
Storability at 18 – 25 °C: 1 year

Proportion of mixture

100 parts by weight of resin Araldite CW 2418
15 parts by weight Activator Hy 5162

Procedure

The resin must be stirred well in spite of its little sedimentation tendency, before making use of it. Then the apt activator can be added and must be mixed thoroughly. If fine contours are to be formed of it, before pouring either a special surface coat of the resin or a thin layer of the casting resin/activator mixture must be applied on the mould surface by using a short-bristled brush. The resin/activator mixture must continuously be cast along the mould wall or along a spatula into the deepest location of the mould. By a slow and even pouring occlusions of air can be avoided to a great extent.

Storability

Araldite CW 2418 and Activator Hy 5162 must be stored at 18 – 25 °C, must always stay well closed and be kept in dry circumference, if possible in original packages. Under these conditions the storability conforms to the times designated in the product description.

Industrial hygiene

As with many chemicals it is necessary to act in accordance with the recommendations for industrial hygiene also with regard to the handling of epoxy resins and activators.



3 cans of resin CW 2418 à 1.000 kg 3.000 kg
3 cans of activator Hy 5162 à 0.150 kg 0.450 kg
Order number **SZ 9703**

1 can of resin CW 2418 13.500 kg
1 can of activator Hy 5162 2.000 kg
Order number **SZ 9703.04**

10 tubes of resin CW 2418 à 0.100 kg 1.000 kg
10 tubes of activator Hy 5162 à 0.015 kg 0.150 kg
without a tube fork
Order number **SZ 9716**

1 tube of resin CW 2418 100 g
1 tube of activator Hy 5162 15 g
without a tube fork
Order number **SZ 9718**

1 tube fork
Order number **SZ 9730**

Separating fluid QZ 5111 0.750 kg
Order number **SZ 9704.1**

Application!

It is necessary to shake product before use. Use a brush or cloth to apply to parts several times in 10–15 minute intervals, let dry, and polish with a soft cloth.
Allows a trouble-free separation or removal of molded parts or laminates of ARALDIT from pore-free forming materials: ARALDIT, UREOL, metal, glass, porcelain, etc.

Warning!

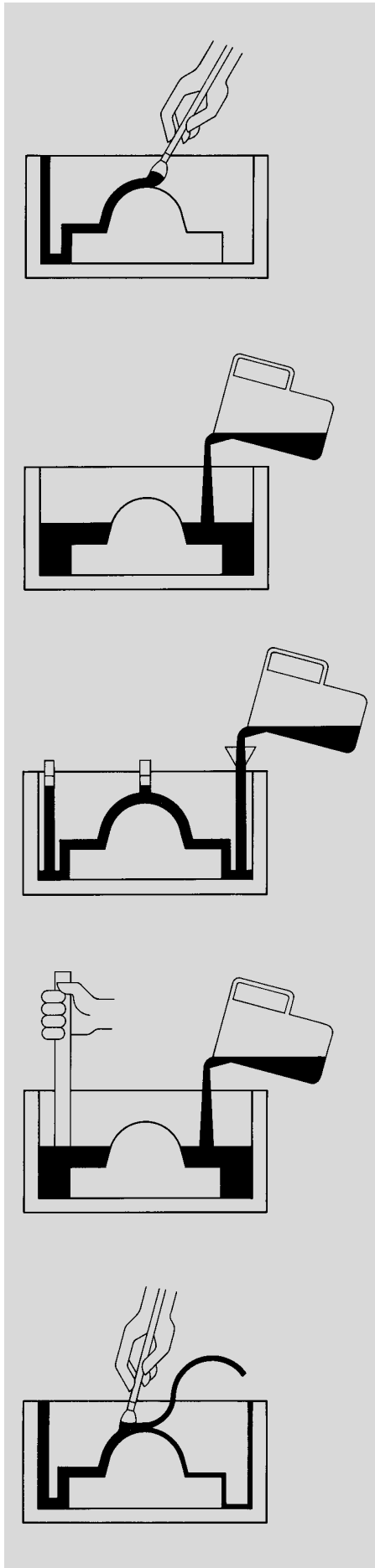
Separating fluid QZ 5111 is combustible.

Properties Resin/activator mixture at 25 °C

	Test prescription	Araldite CW 2418 Activator Hy 5162	Unit
Mixing ratio		100 : 15	Parts by weight
Viscosity at 25 °C		4000 – 6000	mPa.s
Useability period at 25 °C (1000g)		20 – 30	min
Removeable	from mould after	8 – 12	h
	with thickness of layer	10	mm

After complete hardening

		7 days / 20 – 25 °C or 14 h / 40 °C	
Density		2,3	g/cm ³
Shore D hardness	ISO 868	85 – 90	Degree
Compression strength	ISO R 604	85 – 90	N/mm ²
Flectional strength	ISO 178	80 – 85	N/mm ²
E-module from flection test	ISO 178	5000 – 5500	N/mm ²
Impact strength	ISO R 179	5 – 7	kJ/m ²
Constancy			
of form in warmth (Martens)	ISO R 75	60 – 65	°C
Linear dwindling		0,1 – 0,3	‰
Test specimen: 900 x 75 x 10 mm			
Cold water take-up			
10 days	ISO R 62	0,20 – 0,40	%
Water at boil take-up			
30 min	ISO R 117	0,05 – 0,30	%
60 min	ISO R 117	0,10 – 0,45	%
Abrasion (S-33-sandpaper-strips, Charge: 500 P)	NEMA	100 – 120	mg/100 U.



Introduction

The construction of foundry models, templates, fixtures, moulding and tolerance gauges a.o. foundry devices by making use of model resin Araldit CW 2215 has the following advantages:

- Quick manufacture with simple means
- Excellent constancy to form and permanency to dimension of the end product
- Excellent sturdiness, little wear
- Little weight
- Easy to change, quick to repair, practical to make up

In tool and model manufacture four simple basic working methods resp. mounting procedures are applied depending on the type of the workpiece and its usage:

- Creating the surface coat
- Casting
- Backfilling
- Laminating

Basic models and their pre-treatments

Master or gauge patterns of high precision are required for manufacturing model devices out of Araldit CW 2215. Their surface quality has a decisive influence upon the surface smoothness of the negatives and of the model devices.

The extraordinary adhesive force of Araldit CW 2215 on almost all materials must be compensated by an appropriate pretreatment of the basic models with sealing and using the separating agent QZ 5111 (SZ 9704).

Thereby the well hardened models can be perfectly be removed from the moulds. In case of proferous surfaces (f. e. wood) several layers should be applied for reasons of expediency. Each layer must dry for a short time, the last layer should be polished with a soft cloth or cotton wad in order to obtain a blank surface on the to be cast workpiece. Basic models can be made out of all usual model materials such as f.e. wood, gypsum, metal, concrete and epoxy araldite resin

Set-up methods

Surface coats:

A surface coating is applied with a short cut brush onto the pretreated basic models or is cast between negative and too low sized core. This coating makes a flexible until hard surface with a high edge tear resistance allowing a precise shaping of finest contours.

The surface layers are backed up by cast model resin or are lined up by a high-fill model resin mass, depending on the usage of the production equipment of concern.

Full mould casting:

Pretreated moulds can be cast out directly with Araldit CW 2215. This full mould casting method is suited for manufacturing screw-on models and negatives up to layer thicknesses of 20 mm at maximum.

Front mould casting:

With this method a too low sized core of metal or araldite epoxy resin is required. This core is fixed according to the desired front layer thickness in the negative form with keeping a distance of 12-18 mm all the way around where the casting resin is cast.

Backfilling:

Big quantities of filling materials are mixed into the model resin. This resin/activator/filler mixture is cast into the moulds provided with surface coat and coupling layer or laminate or is rammed. As filling materials various sorts can be used: silica sand, aluminium crit etc. Backfill masses of silica sand reach highest resistance to pressure whereas admixtures of aluminium grit work out as backfillers which are well to treat and dissipate the heat. To facilitate the treatment of model devices on the rearside an additional well treatable casting resin layer of Araldit CW 2215 is cast on in a thickness of approx. 5 - 10 mm.

Laminating:

When laminating, glass fabric is perfused thoroughly with laminating resin by means of a stiff-bristled brush, a ductor blade or a special laminating hook and is built up in layers until the required mould shell is reached.

Instead of the time consuming set-up of a laminate shell out of several glass fabric layers a shell can be made in one work cycle in an economical way by using araldite laminating pasters.

Model resin

Model resin Araldit CW 2215

A light-beige fluid epoxy resin system filled with minerals for layer thicknesses up to 20 mm designated for the manufacture of models, gauges and devices.

Fields of application:

Manufacture of foundry and copy-milling models, screw thread models, core boxes, dimension gauges, moulding plates.

Set-up methods

Full mould casting
Front mould casting

Characteristics

Light-beige fluid casting resin
Hardening in room temperature
Little sedimentation
Excellent casting properties
Layer thickness up to approx. 40 mm can be cast in one work cycle.
Inkable with araldite colour pastes
Easy to treat mould material

Product description of Araldit CW 2215

Modified epoxy resin with mineral filler
Supplied type: light-beige paste
Viscosity at 25 °C: 80.000 – 140.000 mPa.s
Density: 1,7 g/cm³
Flash point (Pensky-Martens): 135 °C
Storability at 18 – 25 °C: 1 year

Activator Hy 5161

Formulated polyamino-activator for layers in thicknesses up to 20 mm at max., especially designed for cutting die guides.
Supplied type: clear, light yellow liquid
Viscosity at 25 °C: 30 – 70 mPa.s.
Density: 1,0 g/cm³
Flash point (Pensky-Martens): 162 °C
Storability at 18 – 25 °C: 1 year

Ratio of components

**100 parts by weight of resin Araldite CW 2215
20 parts by weight of Activator Hy 5161**

Work-up

The resin must be stirred well in spite of its little sedimentation tendency, before making use of it. The the apt activator can be added but must be mixed thoroughly. If fine contours are to be formed of it, before the casting is done either a special surface coat of the resin or a thin layer of the casting resin/activator mixture must be applied on the mould surface by means of a short-bristled brush.

Storage

Araldit CW 2215 and Activator Hy 5161 must be stored at 18 – 25 °C, must be always stay well closed and kept in a dry place, if possible in original packages. Under these conditions the storability conforms to the times as designated in the product description.

Industrial hygiene

As with many chemicals it is necessary to act in accordance with the recommendations for industrial hygiene also with regard to the handling of epoxy resins and activators.



6 cans of resin CW 2215 à 0,750 kg 4.500 kg
6 cans of activator Hy 5161 à 0,150 kg 0.900 kg
Order number **SZ 9720**

1 can of resin CW 2215 10.000 kg
1 can of activator Hy 5161 2.000 kg
Order number **SZ 9720.2**

3 cans of resin CW 2215 à 0,750 kg 2.250 kg
3 cans of activator Hy 5161 à 0,150 kg 0.450 kg
Order number **SZ 9722**

Separating fluid QZ 5111 0.750 kg
Order number **SZ 9704.1**

Application:

It is necessary to shake product before use. Use a brush or cloth to apply to parts several times in 10–15 minute intervals, let dry, and polish with a soft cloth. Allows a trouble-free separation or removal of molded parts or laminates of ARALDIT from pore-free forming materials: ARALDIT, UREOL, metal, glass, porcelain, etc.

Warning!

Separating fluid QZ 5111 is combustible

Properties

Resin/activator mixture at 25 °C

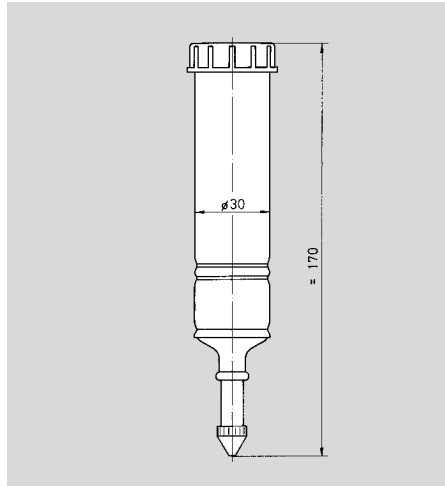
Test prescription	Araldite CW 2215 Activator Hy 5161	Unit
Mixing ration	100 : 20	Parts by weight
Viscosity at 25 °C	4000 – 6000	mPa.s
Useability period at 25 °C (1000g)	30 – 40	min
Removeable from mould after with thickness of layer	12 – 16 20	h mm

After complete hardening

		7 days / 20 – 25 °C or 14 h / 40 °C	
Density		1.7	g/cm ³
Shore d hardness	ISO 868	85 – 90	degree
Compression strength	ISO R 604	85 – 90	N/mm ²
Flectional strength	ISO 178	60 – 70	N/mm ²
E-module from flection test	ISO 178	5800 – 6200	N/mm ²
Impact strength	ISO R 179	4 – 5	kJ/m ²
Constancy of form in warmth (Martens)	ISO R 75	55 – 60	°C
Linear dwindling		0.7 – 0.9	‰
Test spedimen: 900 x 75 x 20 mm			
Cold water take-up 10 days	ISO R 62	0.25 – 0.30	%
Water at boil take-up 30 min	ISO R 117	0.10 – 0.30	%
60 min	ISO R 117	0.20 – 0.55	%
Abrasion (S-33-sandpaper strips, Charge: 500 P)	NEMA	140 – 150	mg/100 U.

Rush-type hand guns

Hand-lever grease press



Rush-type hand guns

similar to DIN 1282

with pointed mouth piece for funnel-type lubricating nipple incorporate in guides.

Contents 60 cm³

Conveyed quantity per stroke: approx. 0.7 cm³

Order example: Rush-type hand gun
SZ 9800

Order number **SZ 9800**



Hand-lever grease press

Characteristics:

- Constructed all of steel
- Possible to lubricate every opening
- No wear parts in high-pressure section
- Secure piston rod fastening
- Universal filling possibilities
- Suitable for grease cartridges

Suitable grease cartridge: SZ 9005 and
SZ 9006

Order number **SZ 9810**

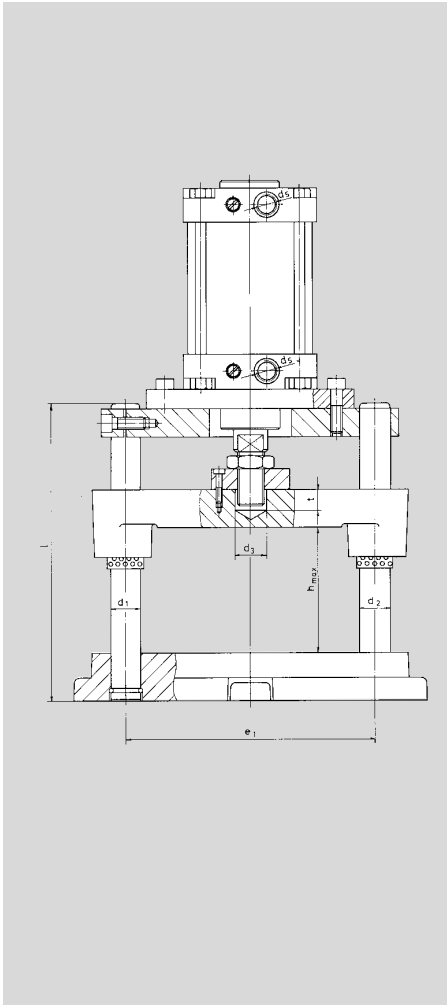
Mechanical equipment

- Pneumatic stamping-unit
- Hand-toggle-lever presses



Pneumatic-stamping-units

with die-sets made of special grey cast iron



Pneumatic-stamping units consisting of die-sets with ball guide, traverse, threaded flange and pneumatic cylinder

Application:

Cutting, bending, trimming, riveting, flanged and assembly working operations

Description:

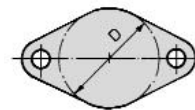
The traverse will be clamped to the pillars above the die sets upper plate and of use for the attachment of the pneumatic cylinder. The piston rod of the pneumatic cylinder is fastened onto the die-sets upper plate by help of the threaded flange.

Order example: Pneumatic-stamping-unit with die-set made of special grey cast iron with round working surface **ST 1092**

D = 200 mm

Add **200**

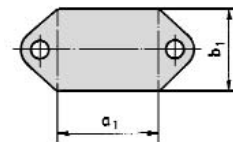
Order number **ST 1092.200**



Round Working surface

like ST 1002, however with longer pillars

Order-no. **ST 1092.**



Rectangular Working surface

like ST 1202, however with longer pillars

Order-no. **ST 1292.**

Add size to order number

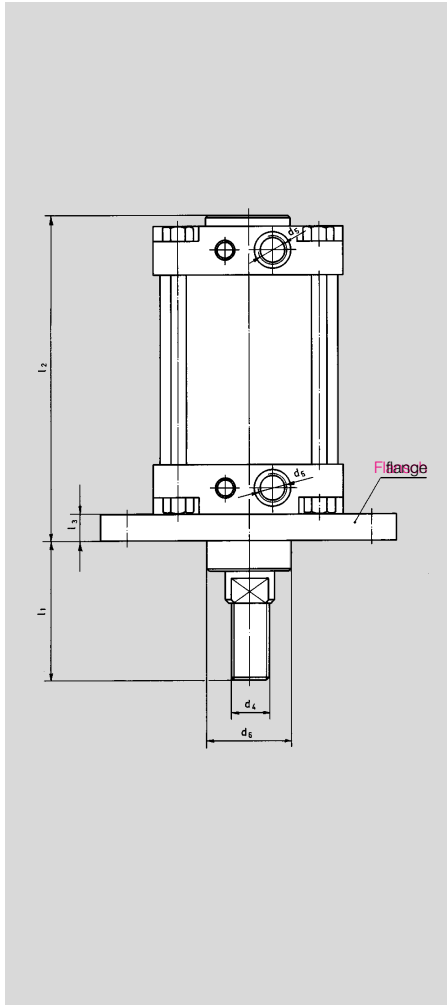
x

Working surface									Pneumatic cylinder		Compressive force F at 6 bar	
round	rectangular	d ₃	d ₅	e ₁	h _{max.}	t	d ₁ /d ₂ x l*)	Diameter	Stroke		▲	▲
D	a ₁ x b ₁											
125		25	G 3/8"	184	115	15	24/25 x 280	80	50	3015 N	125	
	125 x 80	25	G 3/8"	184	115	15	24/25 x 280	80	50	3015 N	125 x 080	
	125 x 100	25	G 3/8"	184	115	15	24/25 x 280	80	50	3015 N	125 x 100	
160		25	G 1/2"	229	130	15	30/32 x 315	100	50	4712 N	160	
	160 x 125	25	G 1/2"	229	130	15	30/32 x 315	100	50	4712 N	160 x 125	
200		32	G 1/2"	269	165	20	30/32 x 355	125	100	7360 N	200	
	200 x 100	32	G 1/2"	269	165	20	30/32 x 355	125	100	7360 N	200 x 100	
	200 x 125	32	G 1/2"	269	165	20	30/32 x 355	125	100	7360 N	200 x 125	
	200 x 160	32	G 1/2"	269	165	20	30/32 x 355	125	100	7360 N	200 x 160	
250		42	G 3/4"	335	170	28	38/40 x 400	160	100	12060N	250	
	250 x 200	42	G 3/4"	335	170	28	38/40 x 400	160	100	12060N	250 x 200	

*) Denote different lengths of pillars on your order

Pneumatic-stamping-units

Pneumatic cylinders with flange



DIN/ISO 6431

Note: When using cylinders without flange the next size is suitable for the traverse. Screw on from underneath! If required enlarge the length l of the pillars appropriately. Hydro-supported pneumatic cylinders upon request.

Order example: Pneumatic cylinder with flange **ST 9041**

Cylinder-Diameter 80, Stroke 50 mm

Add **080 x 050**

Order number **ST 9041.080 x 050**

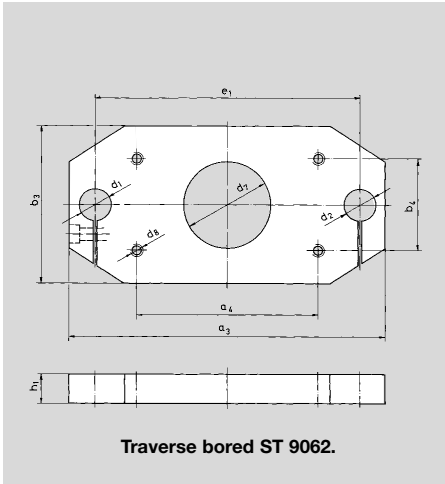
Add
size to
order number

Order-no. **ST 9041.** x

Cylinder-diameter	Cylinder-stroke	Compressive force F at 6 bar	d_4	d_5	d_6	l_1	l_2	$l_3 \sim$	▲
80	50	3015 N	M 20 x 1,5	G $\frac{3}{8}$ "	48	70	148	18	080 x 050
100	50	4712 N	M 20 x 1,5	G $\frac{1}{2}$ "	52	75	159	18	100 x 050
125	100	7360 N	M 27 x 2	G $\frac{1}{2}$ "	60	99	186	20	125 x 100
160	100	12060 N	M 36 x 2	G $\frac{3}{4}$ "	80	132	205	25	160 x 100
200 (without flange)	100	18840 N	M 36 x 2	G $\frac{3}{4}$ "	80	142	217	25	200 x 100

Pneumatic-stamping-units

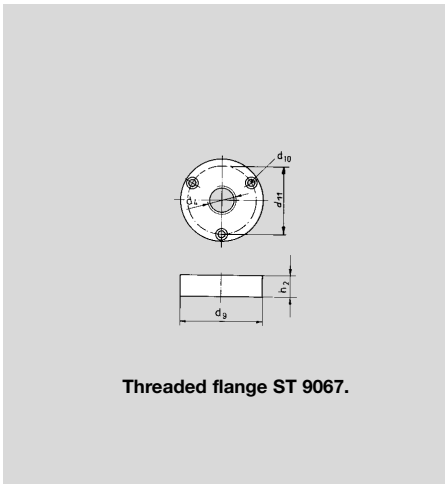
Traverses and threaded flanges



Traverses suitable to pneumatic-stamping units with die-sets made of special grey cast iron and for pneumatic cylinders ST 9041

The traverses are also deliverable without boreholes d_7 and d_8 .

Order example: Traverses suitable to pneumatic-stamping units with die-sets made of special grey cast iron **ST 9062**
Space of the pillars $e_1 = 184$ mm
Add **184**
Order number **ST 9062.184**



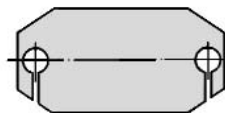
Threaded flange for pneumatic cylinder ST 9041.

Order example: Threaded flange **ST 9067**
 $d_4 = M 20 \times 1,5$
Add **20**
Order number **ST 9067.20**



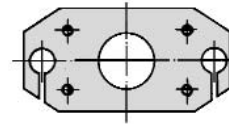
Threaded flange single Add size to order number
Order-no. **ST 9067.**

d_4	d_9	d_{10}	d_{11}	e_1	h_2	▲
M 20 x 1,5	70	M 6	56	184	16	20
M 20 x 1,5	70	M 6	56	229	16	20
M 27 x 2	80	M 8	62	269	20	27
M 36 x 2	105	M 8	85	335	28	36



Traverse not bored without threaded flange Add size to order number
Order-no. **ST 9061.**

a_3	b_3	d_1	d_2	h_1	▲
228	115	24	25	28	184
280	135	30	32	28	229
320	160	30	32	38	269
400	200	38	40	38	335

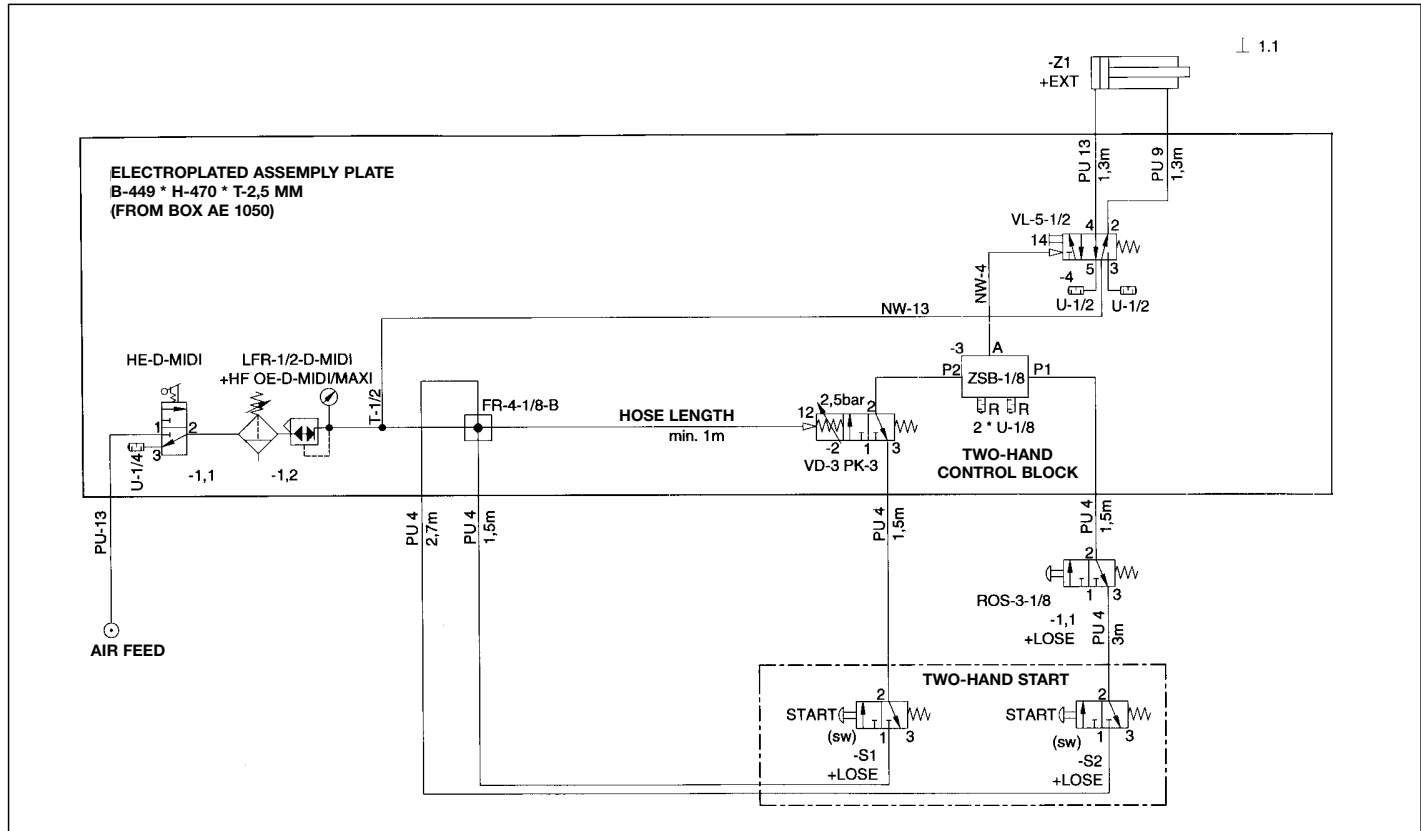


Traverse bored without threaded flange Add size to order number
Order-no. **ST 9062.**

a_4	b_4	d_7	d_8	▲
126	63	52	M 10	184
150	75	56	M 12	229
180	90	74	M 14	269
230	115	110	M 16	335

Pneumatic-stamping-units

steering mechanism and table



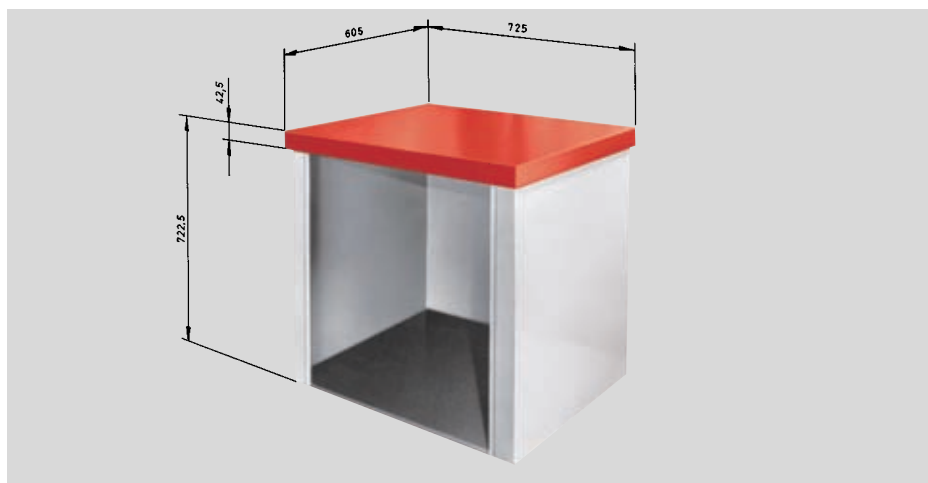
Pneumatic two-hand safety control consists of:

- Quick air-relief valve
- Pneumatic valve
- Two-hand control block
- Two-hand start
- Maintenance unit
- Manual sliding valve
- Pressure gauge with control lever valve
- Sound absorber

Mount cylinder complete on assembly plate with accessories and connecting hoses.

Order example: Pneumatic two-hand safety control **ST 9070**

Order number **ST 9070**



Mounting table as base for pneumatic-stamping-units

Order example: Mounting table **ST 9072.01**
Order number **ST 9072.01**

Pneumatic-stamping-units

built up complete



Pneumatic-stamping-unit ready for work, with table and both hands safety steering mechanism

Use: cutting, bending, trimming, riveting, flanging and mounting work cycles

If not specified otherwise, the stamping-unit ST 1092 respectively ST 1292 is mounted in the middle of the table. As a standard there are 3 mounting possibilities. If you need another position of the stamping-unit, please indicate so on your order.

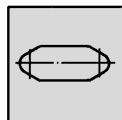
Order example: Pneumatic-stamping-unit built up complete **ST 9075**

Position to the operation side 02

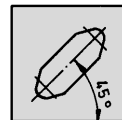
Working surface $a_1 \times b_1 = 200 \times 100$ mm

Add **02.200 x 100**

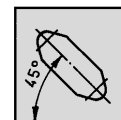
Order number **ST 9075.02.200 x 100**



Operation side



Operation side



Operation side

Add size to order number

Order-no. **ST 9075.01.**

Order-no. **ST 9075.02.**

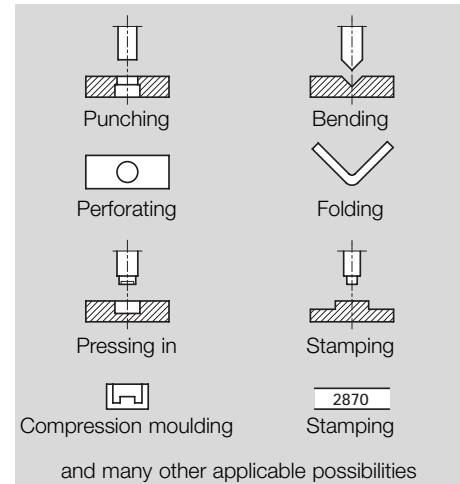
Order-no. **ST 9075.03.**

x

Working surface round D	Working surface rectangular $a_1 \times b_1$	Pneumatic connection	Pneumatic cylinder diameter	stroke	Compressive F force at 6 bar	▲	▲
125	125 x 80 125 x 100	G 3/8"	80	50	3015 N	125	
		G 3/8"	80	50	3015 N		125 x 080
		G 3/8"	80	50	3015 N		125 x 100
160	160 x 125	G 1/2"	100	50	4712 N	160	
		G 1/2"	100	50	4712 N		160 x 125
200	200 x 100 200 x 125 200 x 160	G 1/2"	125	100	7360 N	200	
		G 1/2"	125	100	7360 N		200 x 100
		G 1/2"	125	100	7360 N		200 x 125
		G 1/2"	125	100	7360 N		200 x 160
250	250 x 200	G 3/4"	160	100	12060N	250	
		G 3/4"	160	100	12060N		250 x 200

Toggle-lever presses

compressive force 2.5 kN – 16 kN



Characteristics

High compressive force from 2500 up to 16000 N with only little force needed at the hand lever. Large ram stroke resp. slide stroke. The whole toggle-lever unit is adjustable in the height by a threaded spindle, adjustment with a setscrew. Work table with T-slot mounting for tool attachment. Clearance bore-hole in the middle of the table. Compact and stable type of construction, little space required.

Special technical features

The hand lever, which can be adjusted 360° and thereby allows for the easiest lever movement for any assembly process.

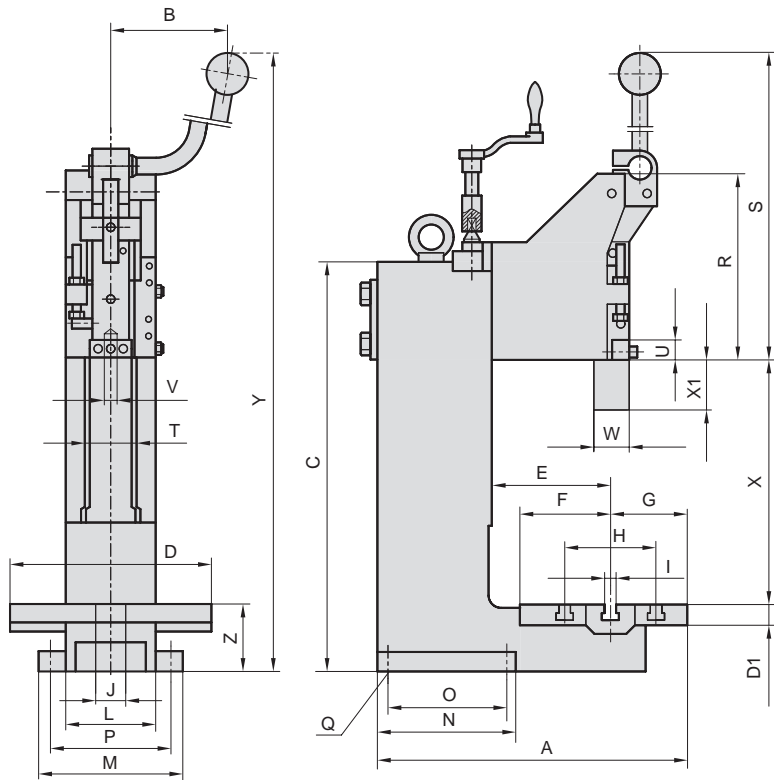
Technical data	ST 9120	ST 9122	ST 9124	ST 9126	
Compressive force ca. 1 mm before the bottom dead center	kN	2,5	5	8 + 12	8 + 16
Overhang	mm	90	90	120	160
Ram stroke	mm	0–42	0–40	0–45	0–58
Pitch range of the toggle lever unit	mm	75–195	75–200	75–235	105–325
Smallest distance between table and ram (stroke at the bottom, toggle-lever unit at the bottom)	mm	33	25	30	42
Largest distance between table and ram (stroke on top, toggle-lever unit on top)	mm	195	195	243	325
Mounting surface at the ram	mm	27 x 30	33 x 48	33 x 48	48 x 65
Truing-up trunnion bore in the ram	mm	10 ^{H7}	10 ^{H7}	10 ^{H7}	15 ^{H7}
Mounting surface table	mm	150 x 100	190 x 110	200 x 165	300 x 230
Center bore in the table (falling through bore-hole)	mm	25	30	40	80
Width of groove	mm	10	10	10	10
Height of the press	mm	400	420	500	710
Base space	mm	150 x 200	180 x 240	180 x 310	300 x 420
Space requirement	mm	150 x 600	180 x 665	180 x 819	230 x 1150
Weight	kp	10	20	32	79

Convertible by change of the bearing bolt
12 kN max. Stroke 25 mm
16 kN max. Stroke 25 mm

Order example: Toggle-lever press with 5 kN compressive force
Order number **ST 9122**

Toggle-lever presses

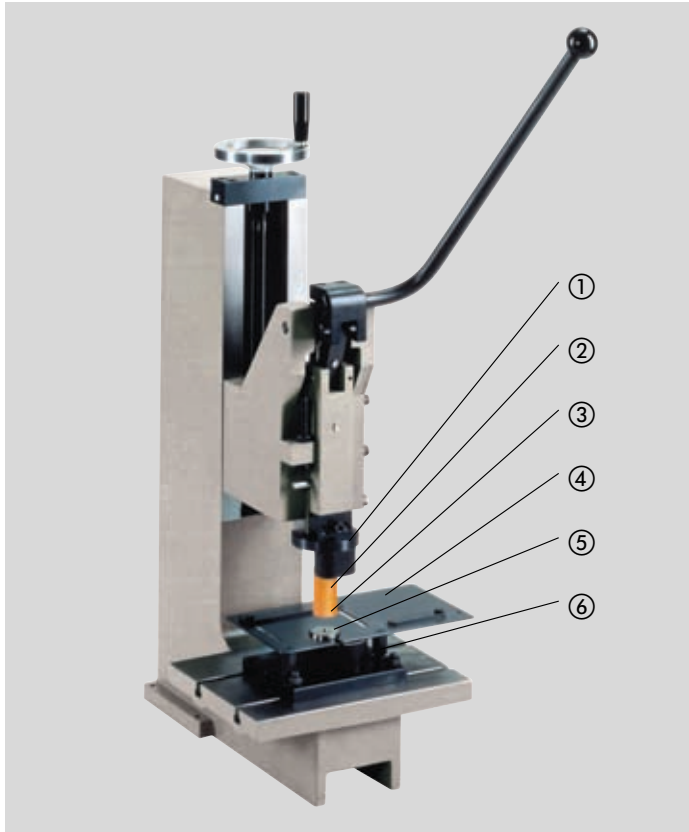
Drawing dimensions



Dimensions	ST 9120	ST 9122	ST 9124	ST 9126
kN	2,5	5	8 + 12	8 + 16
A	200	230	315	420
B	65	90	133	120
C	320	345	415	590
D	150	180	200	300
D 1	22	24	21	25
E	90	90	120	160
F	60	60	93	130
G	40	40	75	100
H	-	-	-	100
I	10	10	10	10
J	25	30	40	80
K	25	30	40	60
L	56	80	90	120
M	90	130	140	160
N	110	115	140	160
O	85	95	120	130
P	74	110	120	144
Q	Ø 7	Ø 9	Ø 9	Ø 9
R	145	172	190	270
S	350	408	508	708
T	30	48	48	65
U	25	21	21	29
V	Ø 10 ^{H7}	Ø 10 ^{H7}	Ø 10 ^{H7}	Ø 15 ^{H7}
W	27	33	33	48
X	75-195	65-195	75-243	100-325
X 1	0-42	0-48	0-45	0-58
Y	480-597	533-668	642-820	933-1160
Z	52	55	72	125

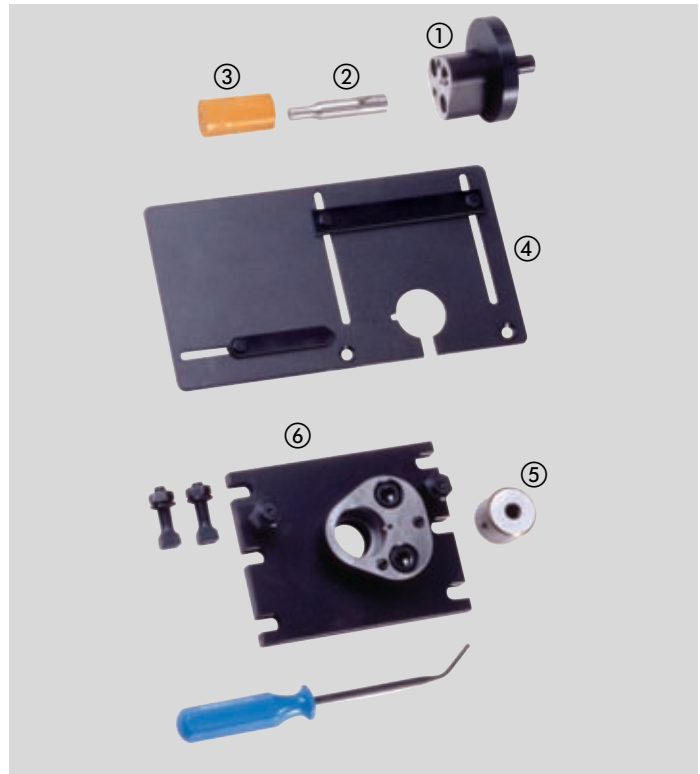
Toggle-lever presses

Accessories

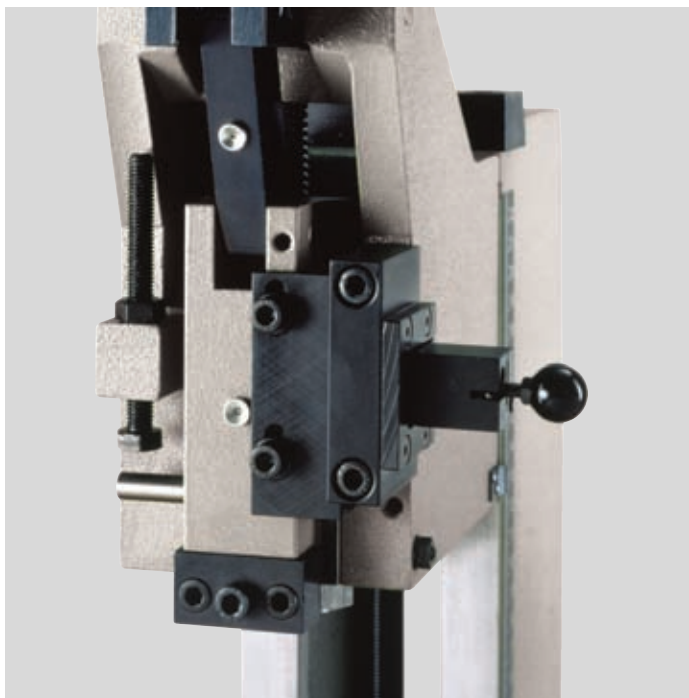


Price and delivery upon request

Quick-change cutting punch system



1. Quick-change punch holder
2. Quick-change punch
3. Urethane stripper
4. Support with adjustable end stops
5. Quick-change die
6. Quick-changer for dies



Return stroke blocking mechanism

for toggle-lever presses 2.5 kN – 8/16 kN

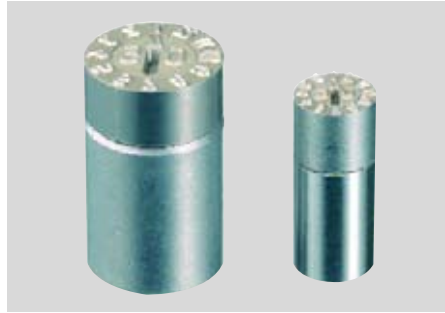
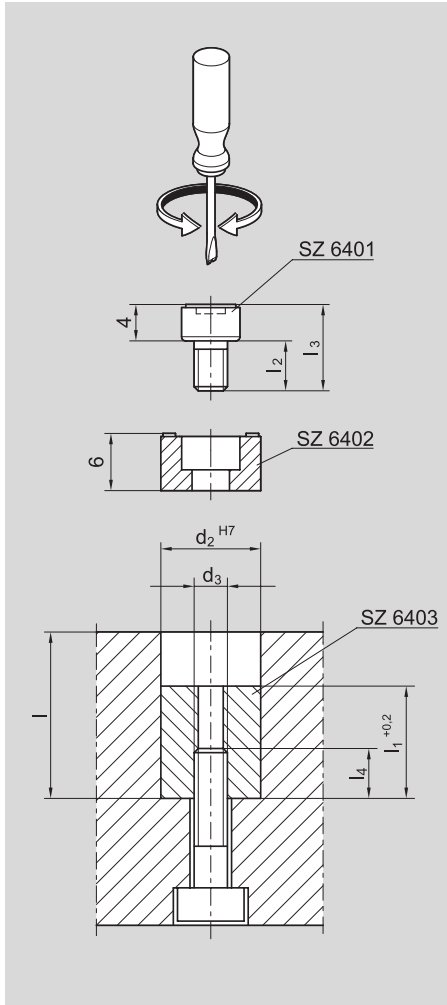
When precise embossing, bending, riveting and cutting work is of importance, the return stroke blocking mechanism guarantees that the ram reaches the exact bottom dead center.

The return stroke safety is triggered 8 mm before the ram reaches the bottom dead center.

After a complete stroke cycle, only about 18 mm return stroke is necessary. This corresponds to pulling the hand-lever back 60° in order to be able to start the next stroke.

The blocking mechanism can easily be locked and unlocked as required. Subsequent installation is possible without any problems.

Embossing stamp SZ 640.

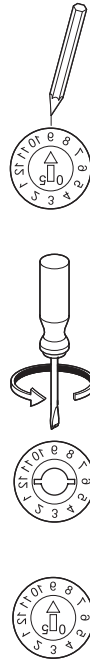


Assembly instruction:

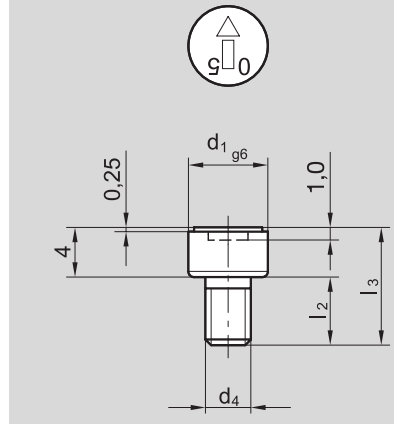
Assemble the embossing stamp and mark the direction of the arrow.

Screw out the inner embossing stamp SZ 6401 and turn the inserts SZ 6402 into the marked position.

Screw the inner embossing stamp SZ 6401 and check the correct position.



Inner embossing stamp SZ 6401



materials: 1.2379
hardness: 60 HRC

Add size to order number

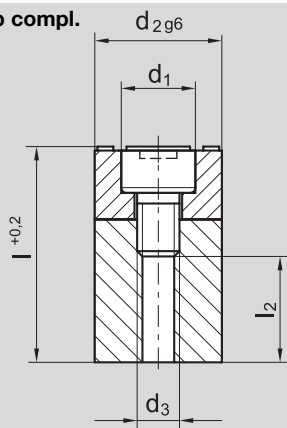
Order no. **SZ 6401.**

d ₁	l ₂	l ₃	d ₄	▲
3,4	4,5	8,5	M 2,5	06
5,9	5,5	9,5	M 4	10

Please indicate year date in order.

Special gravure on request.

Embossing stamp compl. SZ 6400



materials: 1.2379
hardness: 60 HRC

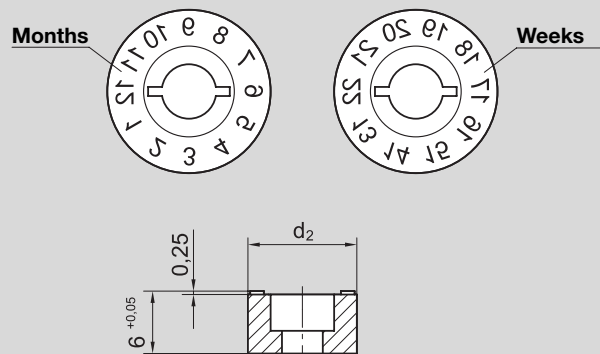
Add size to order number

Bestell-Nr. **SZ 6400.** x

d ₂	l	l ₁	l ₂	l ₄	d ₃	Period Weeks	Period Weeks	▲
6	15	9	6	5,0	M 3	-	1 - 12	06 x 12
6	15	9	6	5,0	M 3	1 - 52	-	06 x 52
10	18	12	8	6,5	M 4	-	1 - 12	10 x 12
10	18	12	8	6,5	M 4	1 - 52	-	10 x 52

Period Months = 1 insert with numbers
Period Weeks = 5 inserts with numbers

Inswerts with numbers SZ 6402



materials: 1.2379
hardness: 60 HRC

Add size to order number

Bestell-Nr. **SZ 6402.** x

d ₂	Period Weeks	Period Weeks	▲
6	-	1 - 12	06 x 12
6	1 - 52	-	06 x 52
10	-	1 - 12	10 x 12
10	1 - 52	-	10 x 52

Period Months = 1 insert with numbers
Period Weeks = 5 inserts with numbers

Scrap Transporter SZ 8800

Pneumatic



Application:

The pneumatic scrap transporter is used to transport parts and dispose of scraps. The stamped parts and scraps are transported by vibration out of the tool. The transfer tray is adjusted and screwed on to serve as the parts transporter.

Transfer trays can be made according to your drawings. Price and delivery upon request.

Special Features:

- Low air consumption
- Maintenance-free
- Noiseless
- Low production costs

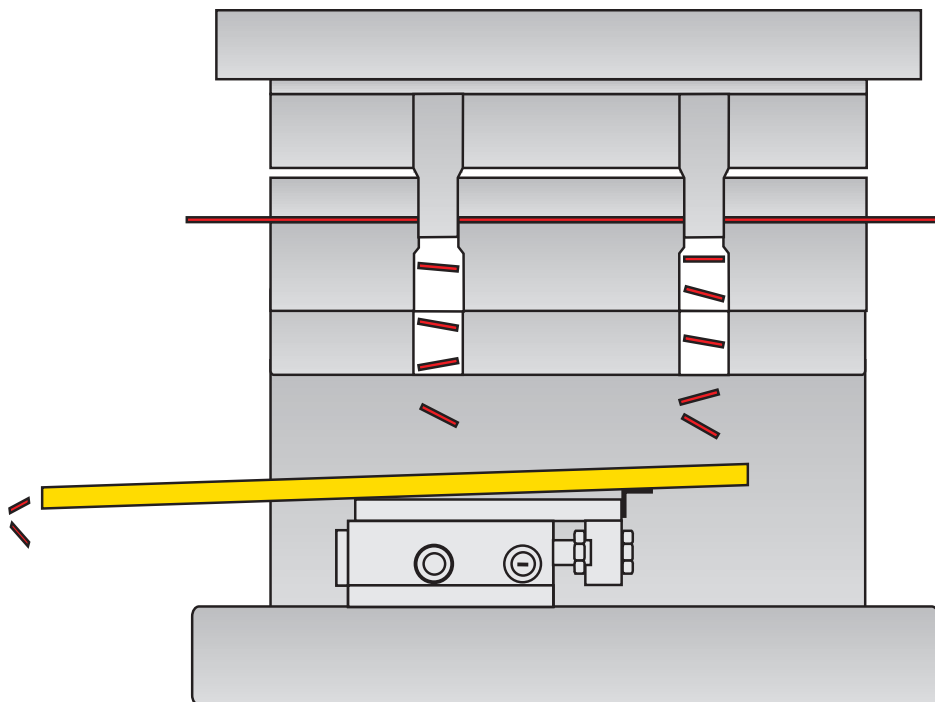
Order example: Scrap transporter **SZ 8800**

For a load size of 25 kp = Typ 2

Add **02**

Order number: **SZ 8800.02**

Example of use



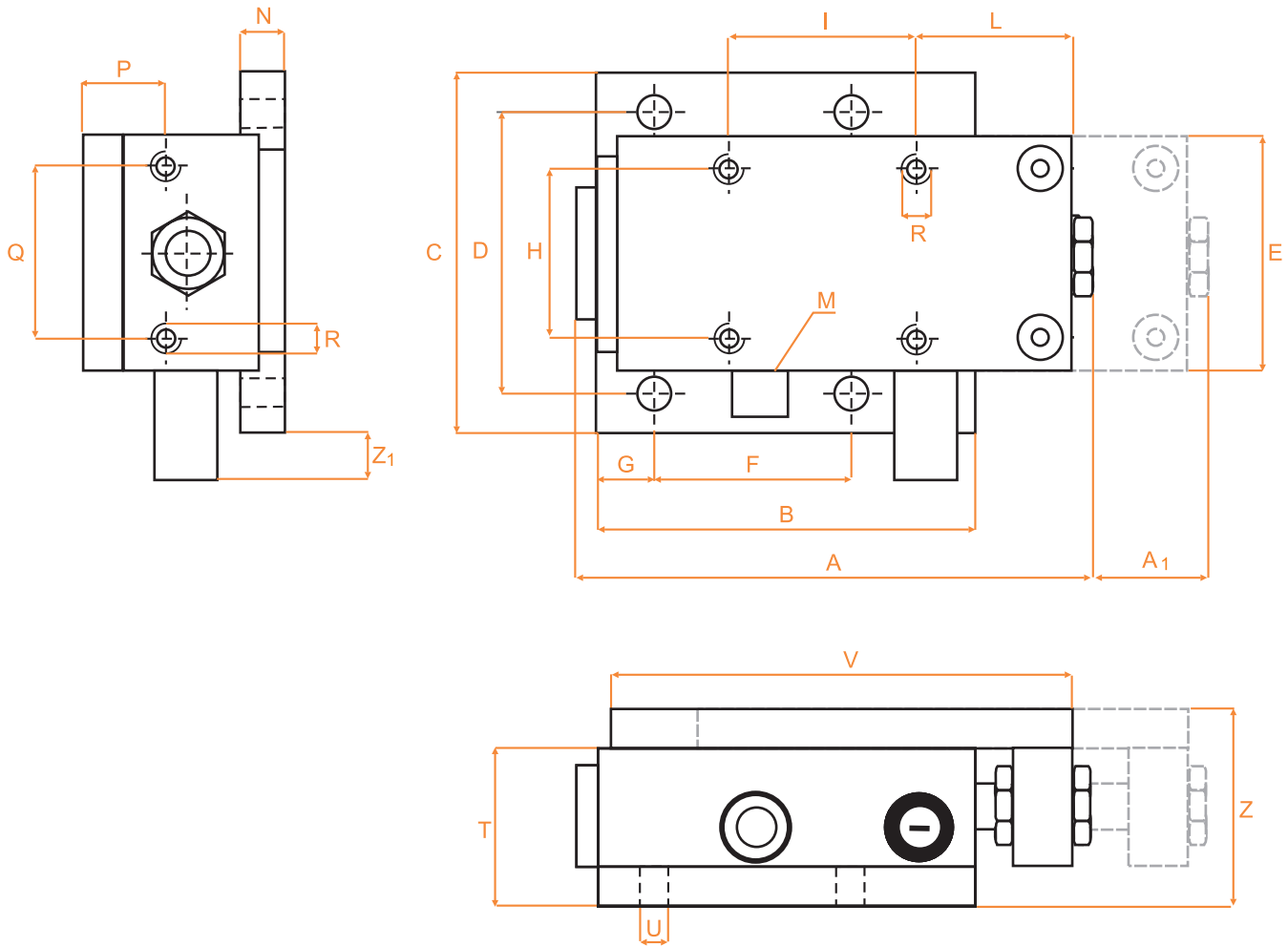
Low air consumption

High load capacity

Model	Type	Working pressure (bar)	Max. piston stroke (m/min.)	Min. mounting inclination	Max. load (kg)
SZ 8800.01	Air	2/6	25	5°	10
SZ 8800.02			25		25
SZ 8800.03			25		50
SZ 8800.04			25		80

Scrap Transporter SZ 8800

Technical Data



Add
size to
Order number

Scrap Transporter

Order number **SZ 8800.**

A	A ₁	B	C	D	E	F	G	H	I	L	M	N	P	Q	R	T	U	V	Z	Z ₁	▲
131	30	95	90	70	60	49	14	25	40	40	1/8"	10	20	40	M6	36	9	120	48	15	01
158	29	118	100	82	70	60	15	30	50	50	1/4"	12	25	50	M6	53	9	145	65	15	02
158	33	118	122	104	90	60	15	40	60	60	1/4"	14	25	75	M6	76	9	145	88	18	03
169	34	130	150	130	110	65	20	50	70	70	3/8"	18	30	80	M6	94	11	157	107	22	04

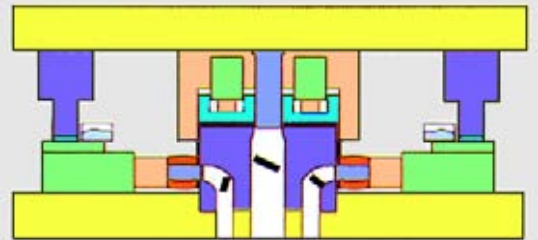
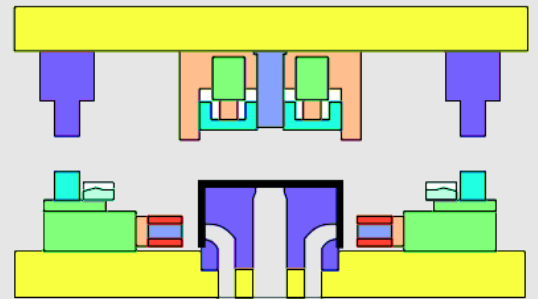
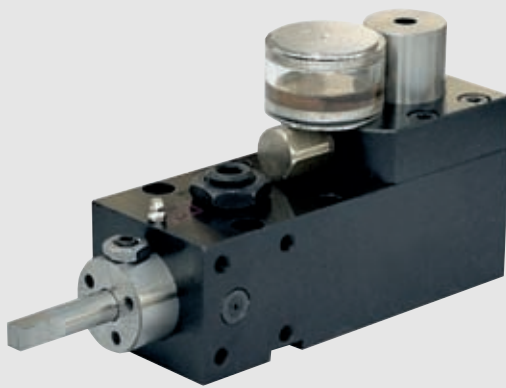
Transfer trays are available in several versions according to your specifications upon request.

JOLLYCAM[®]

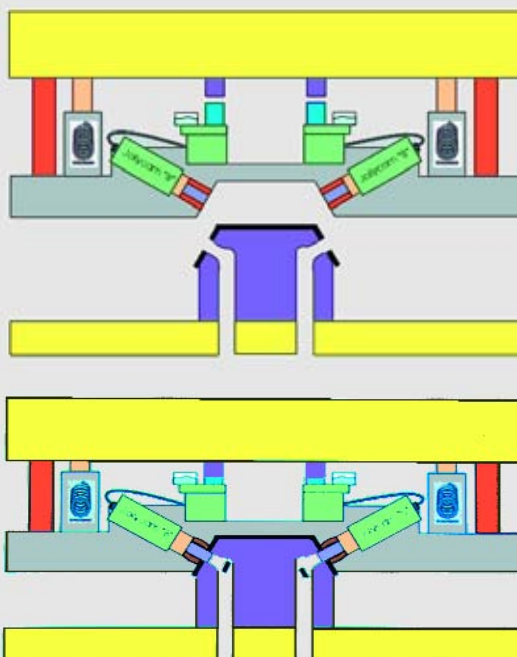
Combination Hydraulic Slide

(registered patent)

Type A



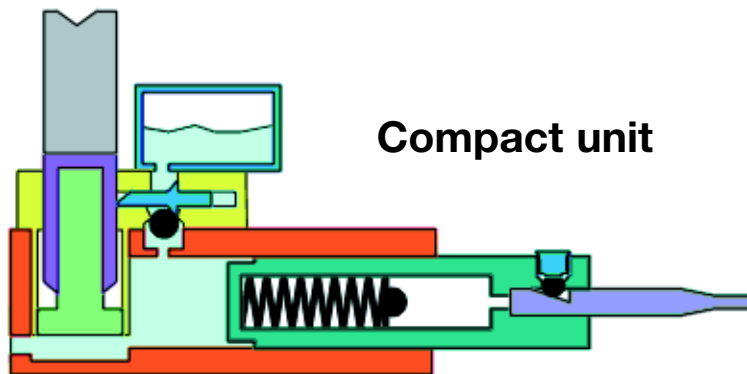
Type B



Type A sz 8600

Combination Hydraulic Slide

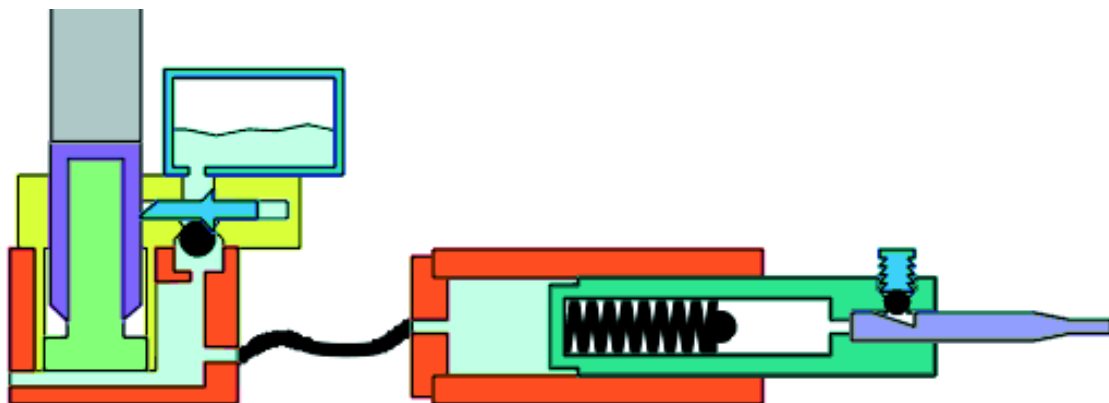
This compact unit is used where lateral perforation, punching and similar operations are necessary. The slide operates in the final phase of the downward movement and the initial phase of the upward movement of the tool. Slide retraction is realised by a built-in helical compression spring. Slide movement is horizontal.



Type B sz 8610

Pressure Cylinder with External Slide

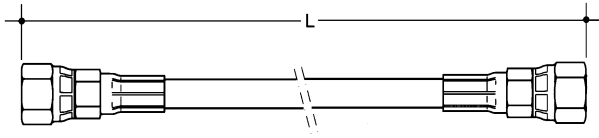
The pressure cylinder is utilised to actuate the freely-positionable slide. The slides are connected to the pressure cylinder by a pressure hose line and can thus be fitted in any position or angle on the tool.



Caution: Type B is supplied in an assembled state (pump + hose + slide), completely screwed together and aerated.

Please do not remove the hose, as air will otherwise penetrate the oil circuit and the functionality of the unit can no longer be ensured.

Dismantling necessary for repairs is not easy and should only be carried out by skilled personnel. Repairs can be carried out at our facility.



Hoses for Type B

Hose	DA
1/4"	13,2
3/8"	17,2

Please give the hose length for Type B as well when ordering.

Table of forces

SZ 8600	Stroke mm	Force ① tonne	Retraction force ② daN	
			Helical spring	
			Initial force	Final force
060 x 015 060 x 025	15 25	1,5	40	80
070 x 015 070 x 025	15 25	3	75	150
080 x 015 080 x 025	15 25	5	125	250
100 x 025 100 x 050	25 50	7	150	350
110 x 025 110 x 050	25 50	10	200	500
SZ 8610				
060 x 015 060 x 025	15 25	1,5	40	80
070 x 015 070 x 025	15 25	3	75	150
080 x 015 080 x 025	15 25	5	125	250
100 x 025 100 x 050	25 50	7	150	350
110 x 025 110 x 050	25 50	10	200	500

Remark:

- ① The forces specified apply at a pressure of approx. 250 bar.
- ② The retraction springs cannot be used for stripping.
Always use an urethane or rubber stripper for this purpose.

**The compact unit and slide can be supplied with a gas retraction spring for greater retraction forces.
(Price and delivery date available on request)**

Maximum working temperature: 70 °C
Maximum stroke speed: 10 m/min.

JOLLYCAM® SZ 8600

Type A Compact Unit

STEINEL
NORMALIEN

Combination Hydraulic Slide

Function:

The slide operates in the final phase of the downward movement and the initial phase of the upward movement of the tool.

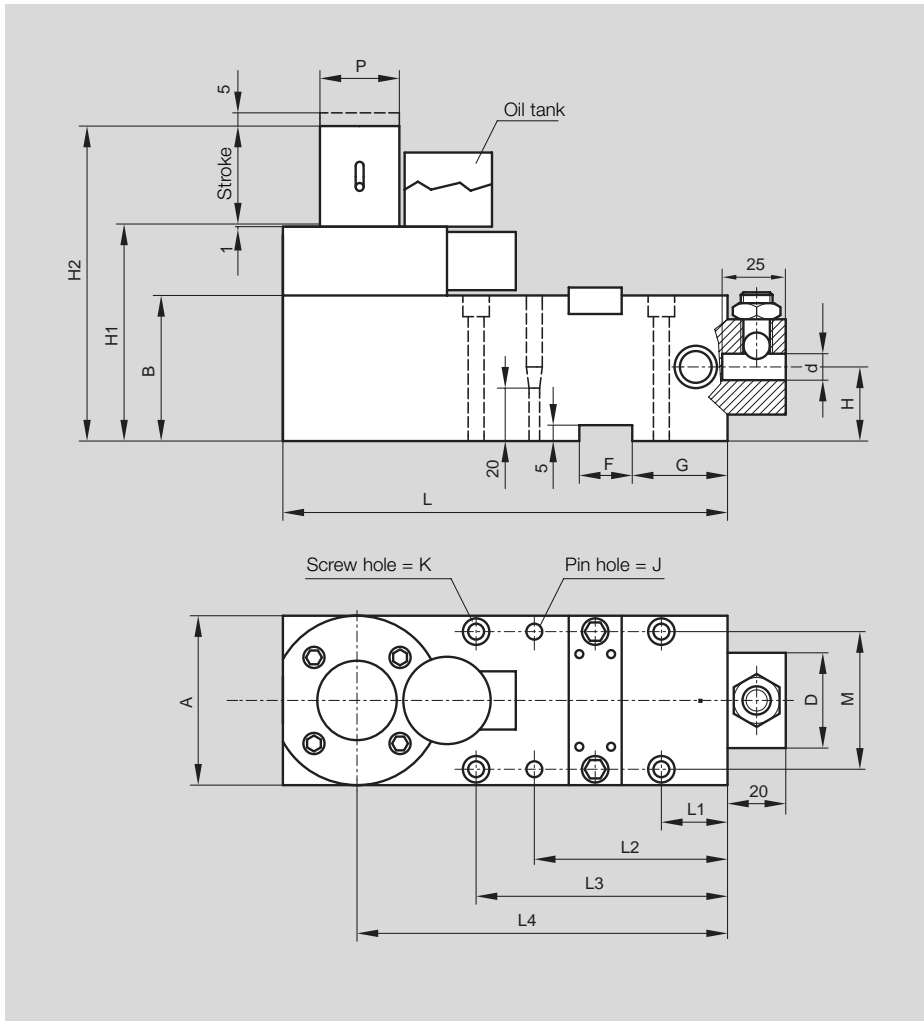
Tool stroke = Slide stroke

Slide retraction: helical compression spring

Application:

Bending, embossing, beading, trimming, perforation, etc.

Price and delivery date available on request.



Order example: Type 1A SZ 8600

combination hydraulic slide with a width of A = 80 mm and stroke of 25 mm

Add: **080 x 025**

Order number **SZ 8600.080 x 025**

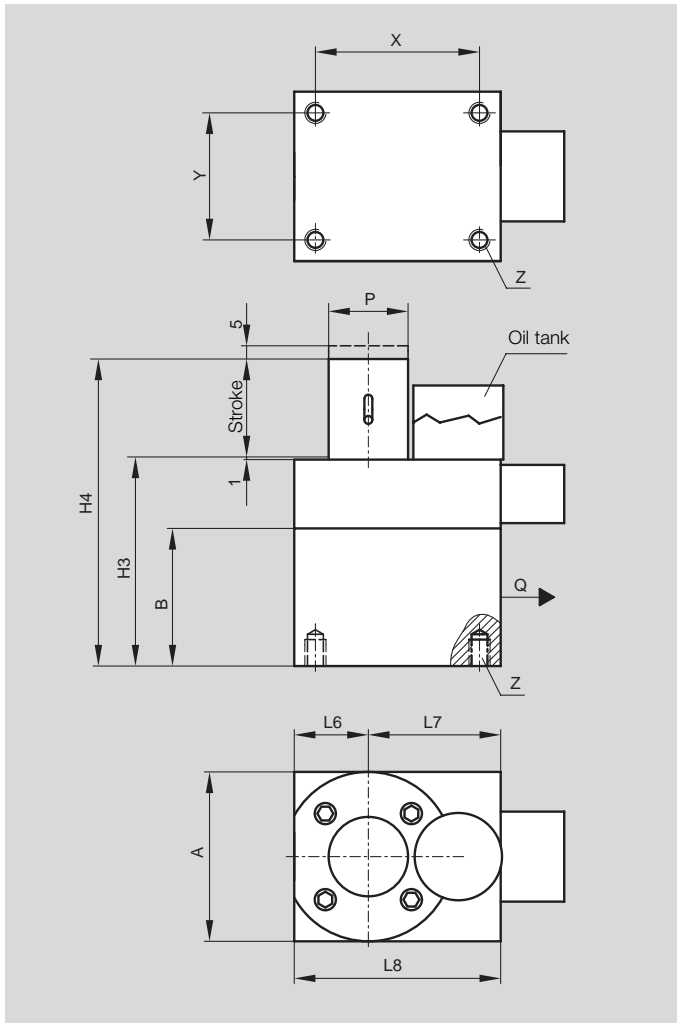
Add size to order number

Order no. **SZ 8600** x

A	Stroke	B	d	D	F	G	H ^{±0,02}	H1	H2	J	K	L	L1	L2	L3	L4	M	P	▲
60	15	50	10	32	18	33	25	75	90	5,8	M 6	145	25	55	70	118	47	28	060 x 015
	100								70					90	138	060 x 025			
70	15	60	13	40	18	36	30	85	100	7,8	M 8	155	30	60	75	124	55	36	070 x 015
	110								75					95	144	070 x 025			
80	15	70	16	50	18	36	35	95	110	7,8	M 8	170	30	60	80	133	65	44	080 x 015
	120								80					100	153	080 x 025			
100	25	85	20	60	18	50	40	110	135	9,8	M 10	210	35	85	105	167	80	50	100 x 025
	160								135					155	217	100 x 050			
110	25	95	25	70	18	50	45	120	145	11,8	M 12	220	35	85	105	172	90	60	110 x 025
	170								135					155	222	110 x 050			

JOLLYCAM® SZ 8610

Type B Pressure Cylinder with External Slide



Pressure Cylinder with External Slide

Function:

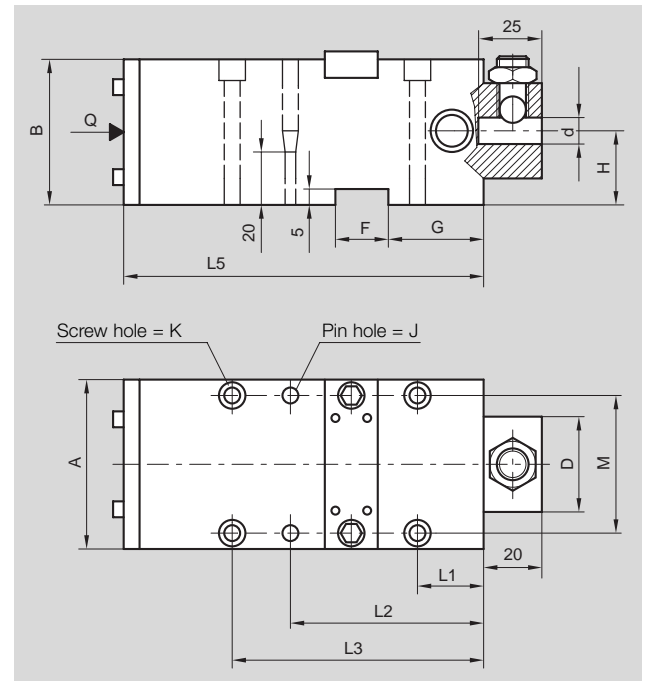
The pressure cylinder is utilised to actuate the freely-positionable slide. The slides are connected to the pressure cylinder by a pressure hose line and can thus be fitted in any position or angle on the tool.

Order example: Pressure cylinder with Type B **SZ 8610** slide, with a width of A = 80 mm and stroke of 25 mm

Extension: **080 x 025**

Order number: **SZ 8610.080 x 025**

Please state the required hose lengths as well!



Add size to order number

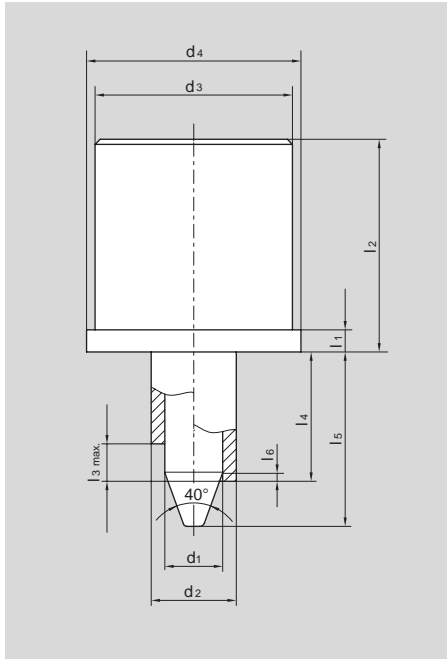
Order no. **SZ 8610** x

A	Stroke	H3	H4	L6	L7	L8	P	Q	X	Y	Z	▲
60	15	80	95	28	47	75	28	1/4 G	55	40	M 6	060 x 015
	25		105									060 x 025
70	15	90	105	34	51	85	36	3/8 G	60	45	M 8	070 x 015
	25		115									070 x 025
80	15	100	115	39	56	95	44	3/8 G	70	55	M 8	080 x 015
	25		125									080 x 025
100	25	115	140	43	62	105	50	3/8 G	80	75	M 8	100 x 025
	50		165									100 x 050
110	25	125	150	48	67	115	60	3/8 G	85	80	M 10	110 x 025
	50		175									110 x 050

B	d	D	F	G	H = 0.02	J	K	L1	L2	L3	L5	M
50	10	32	18	33	25	5,8	M 6	25	55	70	120	47
									70	90	140	
60	13	40	18	36	30	7,8	M 8	30	60	75	120	55
									75	95	140	
70	16	50	18	36	35	7,8	M 8	30	60	80	125	65
									80	100	145	
85	20	60	18	50	40	9,8	M 10	35	85	105	155	80
									135	155	205	
95	25	70	18	50	45	11,8	M 12	35	85	105	155	90
									135	155	205	

Pilot Pin Unit SZ 4540

STEINEL[®]
NORMALIEN



Pilot Pin Unit

Features:

This pilot pin unit is a combination of a pilot pin with a spring-loaded stripper in a compact design.

Application:

This unit will be primarily used in large tools for the manufacture of sheet metal stamped parts. The sheet metal part is stripped by means of an integrated compression spring.

Order example: Pilot pin unit SZ 4540

$d_1 = 12 \text{ mm}$

Add **12**

Order number: **SZ 4540.12**

Add
size to
Order number

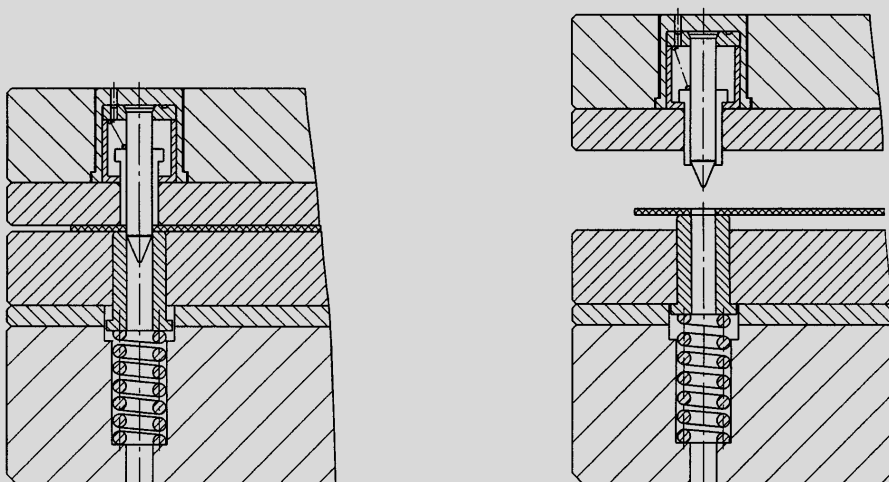
Pilot pin unit

Bestell-Nr. **SZ 4540.**



$d_1 -0,05$	$d_2 k_6$	$d_3 h_9$	$d_4 h_9$	$l_1 -0,1$	$l_2 -0,2$	$l_3 \text{ max.}$	l_4	l_5	l_6	Initial F in N	▲
6	12	29	33	5	45	8	27	31,5	1,5	50	06
8	14	31	35	5	45	8	27	32,5	1,5	80	08
10	16	33	37	5	45	8	27	33,5	1,5	100	10
12	18	36	40	5	45	8	27	35,5	1,5	120	12
16	22	41	45	5	45	8	27	40,5	1,5	160	16

Mounting example





Поставки промышленного оборудования

Системы линейного перемещения:

- линейные подшипники
- линейные направляющие
- прецизионные валы
- линейные модули
- координатные столы
- системы позиционирования
- шариковинтовые передачи (ШВП),
и роликвинтовые передачи (РВП),
стандартизованные и по чертежам
заказчика, опоры к ШВП и РВП
- линейные приводы и актуаторы
- электромеханические приводы

Сборочные технологии:

- модульные системы профилей

Прецизионное оборудование:

- шпиндели

Промышленные вентиляторы:

- центробежные вентиляторы низкого,
среднего и высокого давления
- осевые вентиляторы
- калориферы
- канальные вентиляторы
- вентиляторы отводного канала
- крышные вентиляторы
- бытовые вентиляторы

Другая продукция:

- опорно-поворотные устройства
- шариковые опоры
- уплотнения, муфты, ремни, шкивы
- другая продукция промышленного
назначения

**Поставщик на территории Российской Федерации
и стран бывшего СНГ:**

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<http://www.aketon.ru>

<http://www.promsnab.info>

<http://www.ventur-vent.ru>

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