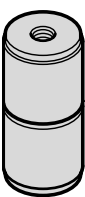




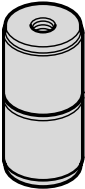
**Standard parts
for
Mould making**



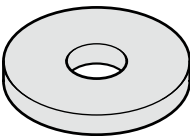
Contents



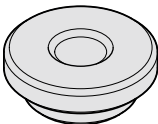
2442.12.
Centring unit
L10



2442.13.
Centring unit, flat
L10



2442.12.3.
Adjusting washer
L11



2442.12.4.
Retaining washer
L11



3300.10.
Ejector rod
L12



3100.04.
Centring sleeve
L13



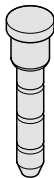
3202.12.
Guide pillar
L14



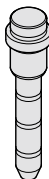
3202.13.
Guide pillar
L14



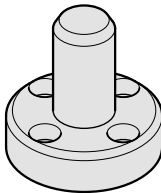
3111.10.
Guide pillar
L15



3111.20.
Guide pillar, shouldered
L16-19



3111.21.
Locating guide pillar, shouldered
L20-23



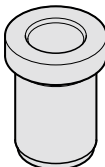
3111.31.
Guide pillar with flange
L24



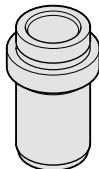
3110.11.
Guide pillar (Angle pin)
L25



3100.09.
Guide sleeve
L26

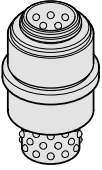
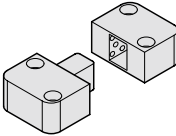

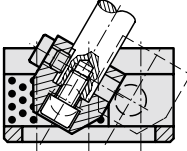









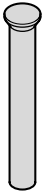
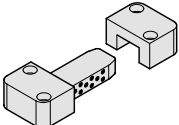
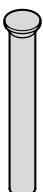


3120.40.
Guide bush, headed
L27

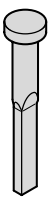
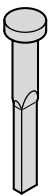



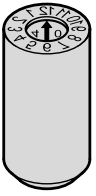

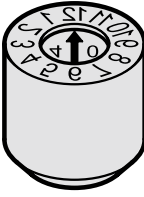
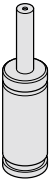
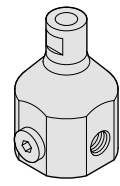
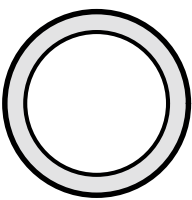


3120.42.
Locating guide bush, headed
L28

Contents

	3120.65.	L29		3131.80.	L39
Ball bearing guide, complete			Rectangular guide, Steel with Rollers		
	2087.72.	L30		2967.10.	L42
Guide bush with collar, Bronze with solid lubricant			Bolt guide		
	2087.70.	L31		237.1.	L44-45
Guide bush with collar, Bronze with solid lubricant			Ejector pin, hardened, DIN ISO 6751		
	2087.71.	L32		237.8.	L46-47
Guide bush with collar, Bronze with solid lubricant			Ejector pin, nitrided, DIN ISO 6751		
	2087.73.	L33		238.1.	L48
Guide bush with collar, Bronze with solid lubricant			Ejector pin, hardened, round stepped, DIN ISO 8694		
	3120.70.	L34-35		238.8.	L49
Guide bush, Bronze with solid lubricant			Ejector pin, nitrided, round stepped, DIN ISO 8694		
	3120.71.	L36-37		239.1.	L50-51
Guide bush, Bronze			Ejector pin, hardened, similar to DIN 1530 Shape D		
	3131.40.	L38		239.8.	L52
Rectangular Guide, Steel with solid lubricant			Ejector pin, nitrided, similar to DIN 1530 Shape D		

Contents

	263.1.	L54			L64-66
	Flat ejector pin, hardened, similar to DIN ISO 8693			Gas spring MOULD LINE - Description	
	263.8.	L55			L67-68
	Flat ejector pin, nitrided, similar to DIN ISO 8693			Gas spring MOULD LINE - Installation instructions	
	264.1.	L56			L70
	Ejector sleeve, hardened, DIN ISO 8405			Gas springs from FIBRO - The Safer Choice	
	264.8.	L57		3479.030.	L72
	Ejector sleeve, nitrided, DIN ISO 8405			Gas spring (spring-loaded plunger) MOULD LINE	
	2280.01.	L58		3479.032.	L73
	Date stamp complete, embossed lettering			Gas spring (spring-loaded plunger) MOULD LINE	
	2280.02.	L59		3487.12.00300.	L74-75
	Date stamp complete (short version), embossed lettering			Gas spring MOULD LINE	
	3820.10.	L60		3487.12.00500.	L76-77
	Quill holder for core tempering			Gas spring MOULD LINE	
	3800.01.01.01.	L61		3487.12.00750.	L78-79
	O-ring, Viton			Gas spring MOULD LINE	

Contents

3487.12.01000.	L80-81
Gas spring MOULD LINE	



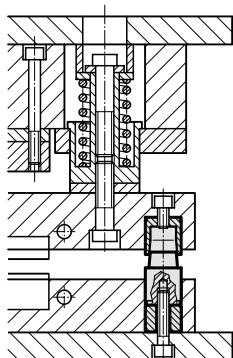
**Guide elements
for
Mould making**



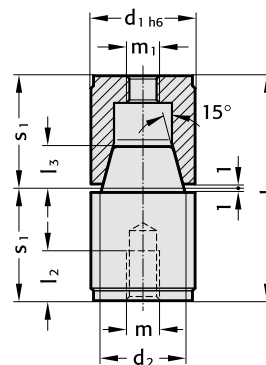
Centering unit Centring unit, flat



Mounting example



2442.12.



Description:

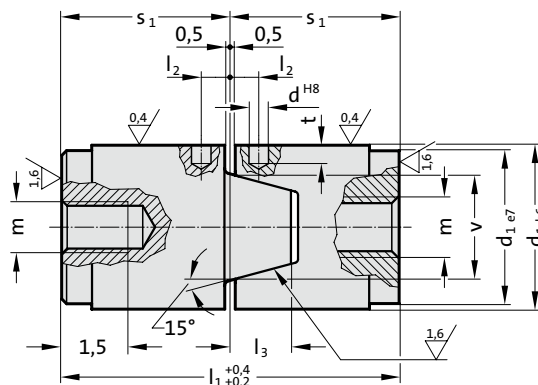
Conical centring units are used to increase repeat accuracy in mould, die and machine-making.

2442.12. Centering unit

Order No	d ₁	d ₂	l ₁	l ₂	l ₃	m	s ₁
2442.12.012.034	12	8	34	6	4	M4	17
2442.12.014.034	14	10	34	7.5	6	M5	17
2442.12.016.034	16	10	34	7.5	6	M5	17
2442.12.020.054	20	15	54	12	9	M8	27
2442.12.025.054	25	20	54	12	10	M8	27
2442.12.026.054	26	20	54	12	10	M8	27
2442.12.030.072	30	25	72	15	14	M10	36
2442.12.032.072	32	25	72	15	14	M10	36
2442.12.042.092	42	35	92	15	18	M10	46



2442.13.



2442.13. Centring unit, flat

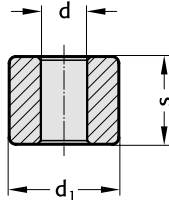
Order No	d ₁	d	l ₁	l ₂	l ₃	v	s ₁	t	m
2442.13.030.072	30	4	72	5	10	18	36	5	M10
2442.13.042.092	42	5	92	6	14	23	46	7	M10
2442.13.054.112	54	6	112	8	17	30	56	8	M12
2442.13.080.152	80	8	152	8	27	42	76	11	M16



Adjusting washer

Retaining washer

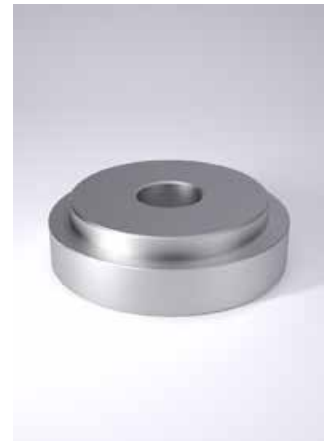
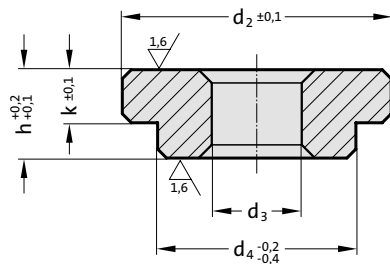
2442.12.3.



2442.12.3. Adjusting washer

Order No	d ₁	d	s	Order No	d ₁	d	s	Order No	d ₁	d	s
2442.12.3.012.010	12	4.5	10	2442.12.3.020.020	20	8.5	20	2442.12.3.026.030	26	8.5	30
2442.12.3.014.005	14	5.5	5	2442.12.3.020.030	20	8.5	30	2442.12.3.030.010	30	12.5	10
2442.12.3.014.010	14	5.5	10	2442.12.3.020.040	20	8.5	40	2442.12.3.030.020	30	12.5	20
2442.12.3.014.014	14	5.5	14	2442.12.3.025.009	25	10.5	9	2442.12.3.030.030	30	12.5	30
2442.12.3.014.019	14	5.5	19	2442.12.3.025.010	25	10.5	10	2442.12.3.030.040	30	12.5	40
2442.12.3.016.005	16	6.5	5	2442.12.3.025.015	25	10.5	15	2442.12.3.030.050	30	12.5	50
2442.12.3.016.010	16	6.5	10	2442.12.3.025.020	25	10.5	20	2442.12.3.032.010	32	12.5	10
2442.12.3.016.015	16	6.5	15	2442.12.3.025.025	25	10.5	25	2442.12.3.032.020	32	12.5	20
2442.12.3.016.019	16	6.5	19	2442.12.3.025.035	25	10.5	35	2442.12.3.032.030	32	12.5	30
2442.12.3.016.020	16	6.5	20	2442.12.3.025.045	25	10.5	45	2442.12.3.032.040	32	12.5	40
2442.12.3.016.025	16	6.5	25	2442.12.3.025.055	25	10.5	55	2442.12.3.032.050	32	12.5	50
2442.12.3.020.009	20	8.5	9	2442.12.3.026.009	26	8.5	9	2442.12.3.042.010	42	10.5	10
2442.12.3.020.010	20	8.5	10	2442.12.3.026.010	26	8.5	10	2442.12.3.042.020	42	10.5	20
2442.12.3.020.015	20	8.5	15	2442.12.3.026.020	26	8.5	20	2442.12.3.042.030	42	10.5	30

2442.12.4.



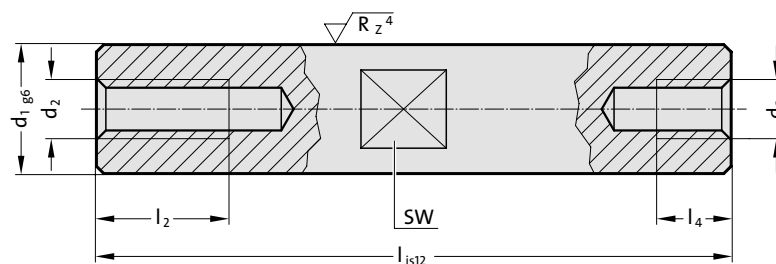
2442.12.4. Retaining washer

Order No	d ₄	d ₃	d ₂	h	k
2442.12.4.014	14	5.5	16	5	3.2
2442.12.4.020	20	8.5	25.5	9	6.3
2442.12.4.026	26	8.5	31.5	9	6.3
2442.12.4.030	30	11	35.5	10	6.3
2442.12.4.042	42	11	47.5	10	6.3

Ejector rod



3300.10.



3300.10. Ejector rod

d ₁	10	14	18	20	24	30
d ₂	M6	M8	M10	M12	M12	M16
l ₂	16	16	20	25	25	30
l ₄	9	11	12	14	14	16
AF*	9	12	14	16	19	24
l						
60	●	●				
70	●	●				
80	●	●				
100	●	●	●	●		
120	●	●	●	●	●	
140	●	●	●	●	●	
160		●	●	●	●	
180		●	●	●	●	●
200			●	●	●	
220			●	●		●
240			●	●	●	
260						●
300						●

*SW = Width across flats

Ordering Code (example):

Ejector rod =3300.10.

Guide diameter d₁ 20 mm = 020.

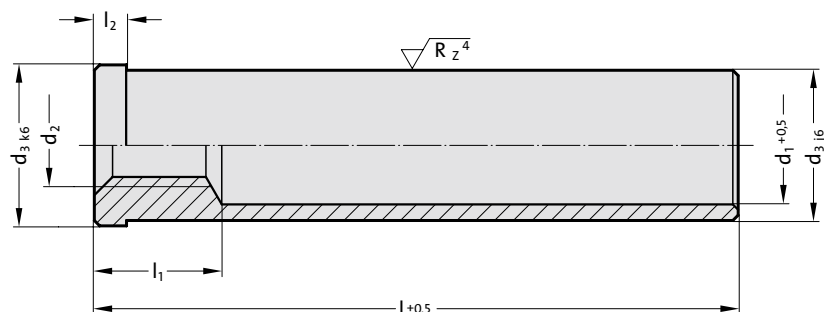
Length l 100 mm= 100

Order No =3300.10.020.100

Centring sleeve



3100.04.



3100.04. Centring sleeve

d ₃	14	20	26	30	42	54
d ₂	M6	M8	M10	M12	M16	M20
d ₁	11	16	21	25	33	43
l ₁	8	13	13	13	13	13
l ₂	2	2	2.5	2.5	4.5	4.5
l						
20	●					
30	●	●	●			
40	●	●	●	●	●	
50	●					
60	●	●	●	●	●	●
70	●					
80	●	●	●	●	●	●
100	●	●	●	●	●	
120		●	●	●	●	●
140		●	●	●	●	
160		●	●	●	●	●
180			●	●	●	
200				●	●	●
220					●	
240				●		●
260					●	
280						●
300					●	

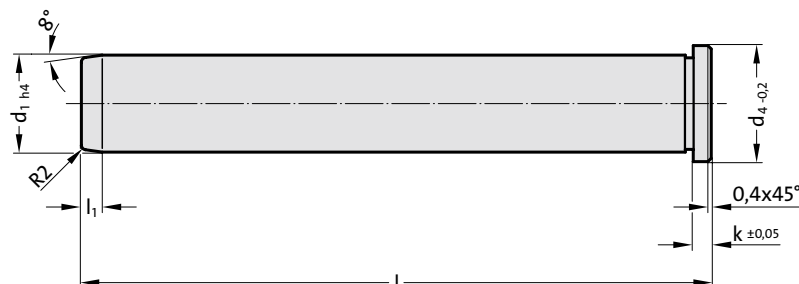
Ordering Code (example):

Centring sleeve	=3100.04.
Guide diameter d ₃ 30 mm=	030.
Length l 40 mm=	040
Order No	=3100.04.030.040

Guide pillar



3202.12.

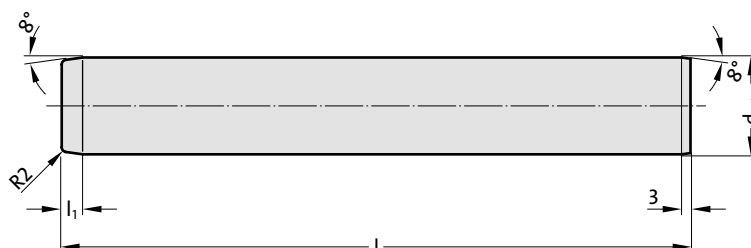


3202.12. Guide pillar

Order No	d ₁	l	d ₄	k	l ₁
3202.12.012.080	12	80	16	4	4
3202.12.012.100	12	100	16	4	4
3202.12.012.120	12	120	16	4	4
3202.12.018.120	18	120	22	6	7
3202.12.018.140	18	140	22	6	7
3202.12.018.160	18	160	22	6	7
3202.12.030.160	30	160	36	6	7
3202.12.030.200	30	200	36	6	7
3202.12.030.240	30	240	36	6	7



3202.13.



3202.13. Guide pillar

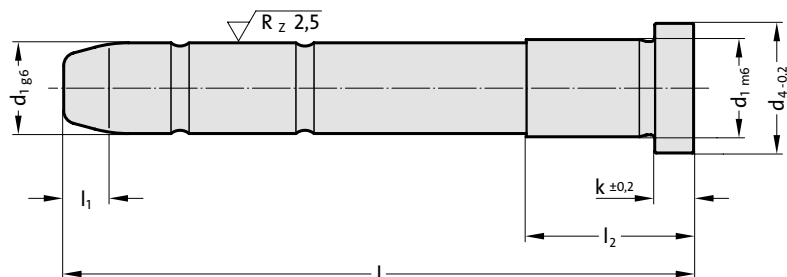
Order No	d ₁	l	l ₁
3202.13.012.100	12	100	3
3202.13.012.125	12	125	3
3202.13.018.125	18	125	6
3202.13.018.160	18	160	6
3202.13.030.160	30	160	6
3202.13.030.240	30	240	6



Guide pillar



3111.10.



3111.10. Guide pillar

d ₁	10	12	14	16	18	20	22	24	30	32	40	50	60
d ₄	12	16	18	20	22	24	26	28	36	36	48	58	68
k	3	6	8	8	8	8	15	15	15	15	15	15	20
l ₁	4	7	7	7	7	7	7	7	7	7	10	10	12
l	l ₂												
40	17												
60	17	17	17	22									
80	22	22	22	27	27	27							
100	27	27	27	27	27	27	36	36					
120		36	36	36	36	36	46	46					
140			46	46	46	46	46	46					
160			46	46	46	46	56	56	56	56			
180					56	56	56	56					
200					56	56	76	76	56	56	56	56	
220							76	76					
240									76	76	76	76	76
300											96	96	96
360													116

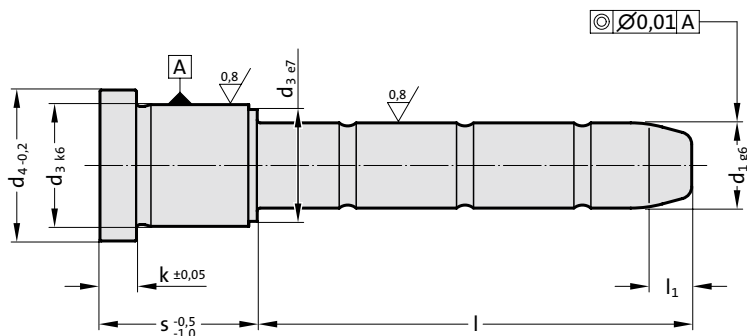
Ordering Code (example):

Guide pillar	=3111.10.
Guide diameter d ₁ 22 mm	= 022.
Length l 100 mm	= 100
Order No	=3111.10.022.100

Guide pillar, shouldered



3111.20.



3111.20. Guide pillar, shouldered

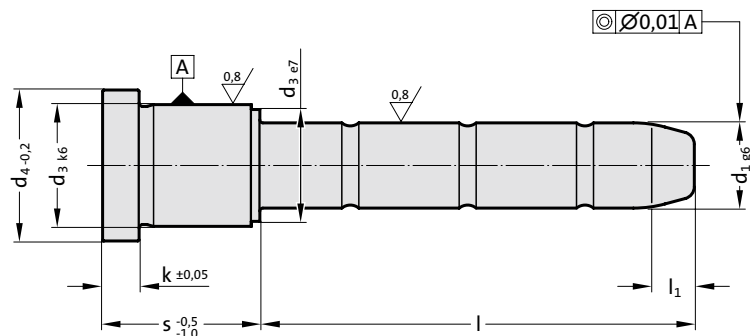
d ₁	9	9	9	9	9	9	10	10	10	10	10	10	14	14	14	14	14	14	14	15	15	15	15	15	15	15	15	
s	12	17	22	27	36	46	12	17	22	27	36	46	22	27	36	46	56	66	76	86	22	27	36	46	56	66	76	86
d ₃	14	14	14	14	14	14	14	14	14	14	14	14	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
d ₄	16	16	16	16	16	16	16	16	16	16	16	16	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
l ₁	4	4	4	4	4	4	4	4	4	4	4	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
k	3	3	3	3	3	3	3	3	3	3	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
l																												
20		●						●					●	●	●	●	●				●	●	●	●	●			
25			●		●	●				●	●	●																
30		●			●		●			●		●			●													
35		●		●	●	●		●	●	●	●			●	●	●	●	●			●	●	●	●	●			
40														●	●	●					●	●	●					
45	●				●	●	●				●	●	●	●	●	●					●	●	●	●				
50					●						●			●							●							
55			●			●				●			●	●	●	●		●	●	●	●	●	●		●	●	●	●
65													●	●	●	●		●			●	●	●	●		●		
70													●								●							
75						●						●			●		●						●		●		●	
85														●			●					●			●			
90																					●							
95																●	●	●	●	●				●	●	●	●	●
105														●		●								●		●	●	●
110													●			●					●			●				

Ordering Code (example):

Guide pillar, shouldered	=3111.20.
Guide diameter d ₁	24 mm= 024.
Einbaulänge s	27 mm= 027.
Guide length l	25 mm= 025
Order No	=3111.20.024.027.025

Guide pillar, shouldered

3111.20.



3111.20. Guide pillar, shouldered

[illegible]

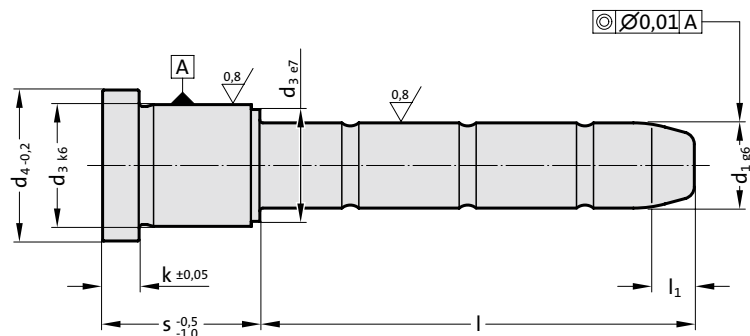
Ordering Code (example):

Guide pillar, shouldered	=3111.20.
Guide diameter d_1	24 mm= 024.
Einbaulänge s	27 mm= 027.
Guide length l	25 mm= 025
Order No	=3111.20.024.027.025

Guide pillar, shouldered



3111.20.



3111.20. Guide pillar, shouldered

d ₁	40	40	40	40	40	40	40	40	40	42	42	42	42	42	42	42	42	42	50	50	50	50	50	50	60	60	60	60	60	60
s	56	66	76	86	96	116	136	156	196	56	66	76	86	96	116	136	156	196	96	116	136	156	196	96	116	136	156	196	246	
d ₃	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	66	66	66	66	66	66	80	80	80	80	80	80
d ₄	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	72	72	72	72	72	72	86	86	86	86	86	86
l ₁	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	10	10	10	10	10	10	10	10	10	10	10	10
k	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20
l																														
75	●	●	●	●	●					●	●	●	●	●																
95						●	●									●	●													
115	●		●		●			●		●		●		●		●		●		●				●						
135		●		●		●	●				●		●		●	●				●	●	●				●	●			
155	●				●			●	●	●				●			●	●	●	●	●	●	●		●	●	●	●		
175			●									●												●						●
195	●					●			●	●					●			●	●	●	●	●	●	●	●	●	●	●	●	●
215							●	●									●	●												
235									●									●						●				●	●	●
275																														●
315																														●

Ordering Code (example):

Guide pillar, shouldered = 3111.20.

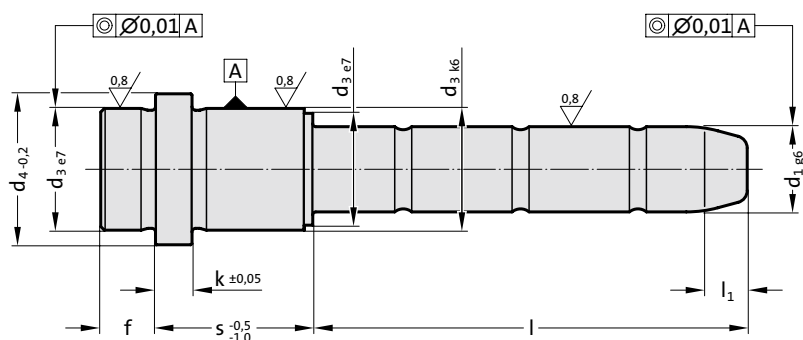
Guide diameter d₁ 24 mm = 024.

Einbaulaenge s 27 mm = 027.

Guide length l 25 mm = 025

Order No = 3111.20.024.027.025

3111.21.



3111.21. Locating guide pillar, shouldered

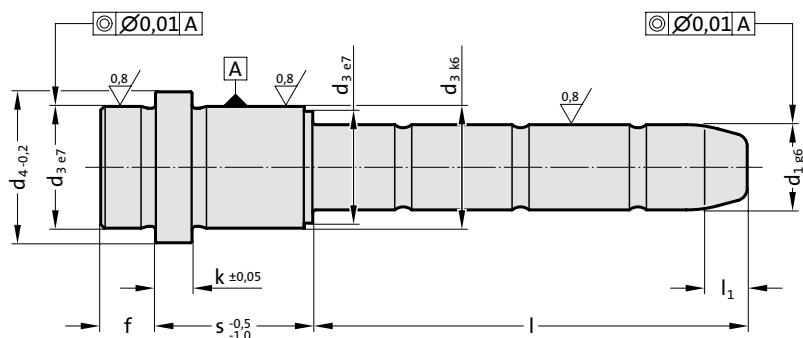
[illegible]

Ordering Code (example):

Locating guide pillar, shouldered	=3111.21.
Guide diameter d_1	22 mm = 022.
Mounting length s	17 = 017.
Guide length l	35 = 035
Order No	=3111.21.022.017.035

Locating guide pillar, shouldered

3111.21.



3111.21. Locating guide pillar, shouldered

[illegible]

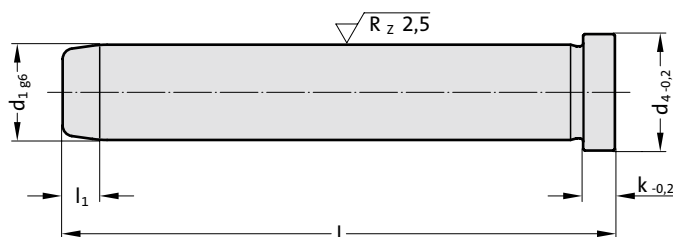
Ordering Code (example):

Locating guide pillar, shouldered	=3111.21.
Guide diameter d_1	22 mm = 022.
Mounting length s	17 = 017.
Guide length l	35 = 035
Order No	=3111.21.022.017.035



Guide pillar (Angle pin)

3110.11.



3110.11. Guide pillar (Angle pin)

d ₁	8	9	10	12	14	15	16	18	20	22	24	30	32	40	50
d ₄	10	12	12	16	18	18	20	22	24	26	28	36	36	48	58
k	3	3	3	6	8	8	8	8	8	15	15	15	15	15	15
l ₁	4	4	4	7	7	7	7	7	7	7	7	7	7	10	10
l															
40	•	•	•	•			•								
60	•	•	•	•	•	•	•	•	•						
80	•	•	•	•	•	•	•	•	•	•	•				
100	•	•	•	•	•	•	•	•	•	•	•	•	•		
120		•	•	•	•	•	•	•	•	•	•	•	•		
140				•	•	•	•	•	•	•	•	•	•		
160				•	•	•	•	•	•	•	•	•	•	•	•
180					•	•	•	•	•	•	•	•	•		
200							•	•	•	•	•	•	•	•	•
220										•	•				
240								•	•	•	•	•	•	•	•
300										•	•	•	•	•	•
360												•	•	•	•

Ordering Code (example):

Guide pillar (Angle pin) = 3110.11.

Guide diameter d₁ 18 mm = 018.

Length l 60 mm = 060

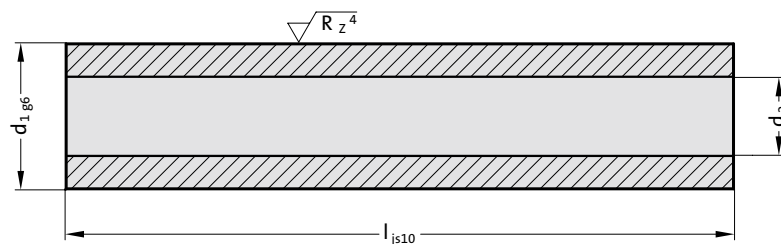
Order No = 3110.11.018.060



Guide sleeve



3100.09.



3100.09. Guide sleeve

d ₁	10	14	18	24	30
d ₂	6.2	8.3	10.4	12.5	16.5
l					
20	●				
30	●	●			
40	●	●	●		
50	●	●			
60	●	●	●	●	
70	●	●			
80	●	●	●	●	●
100	●	●	●	●	●
120	●	●	●	●	●
140	●	●	●	●	●
160		●	●	●	●
180		●	●	●	●
200			●	●	
220			●		●
240			●	●	
260					●
300					●

Ordering Code (example):

Guide sleeve = 3100.09.

Guide diameter d₁ 18 mm = 018.

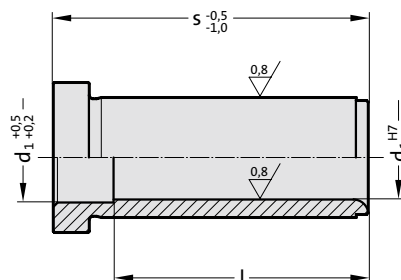
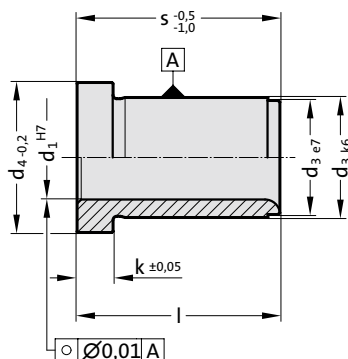
Length l 40 mm = 040

Order No = 3100.09.018.040

Guide Bush, headed



3120.40.



3120.40. Guide Bush, headed

d ₁	s	l	d ₃	d ₄	k	d ₁	s	l	d ₃	d ₄	k
9 10	9	9	14	16	3	22 24	36	36	30	35	6
9 10	12	12	14	16	3	22 24	46	46	30	35	6
9 10	17	17	14	16	3	22 24	56	56	30	35	6
9 10	22	22	14	16	3	22 24	66	66	30	35	6
9 10	27	27	14	16	3	22 24	76	76	30	35	6
9 10	36	36	14	16	3	22 24	86	86	30	35	6
9 10	46	46	14	16	3	22 24	96	96	30	35	6
9 10	56	46	14	16	3	22 24	116	96	30	35	6
9 10	66	46	14	16	3	22 24	136	96	30	35	6
12	17	17	18	23	6	22 24	156	96	30	35	6
12	22	22	18	23	6	30 32	27	27	42	47	6
12	27	27	18	23	6	30 32	36	36	42	47	6
12	36	36	18	23	6	30 32	46	46	42	47	6
12	46	46	18	23	6	30 32	56	56	42	47	6
12	56	56	18	23	6	30 32	66	66	42	47	6
14 15	12	12	20	25	6	30 32	76	76	42	47	6
14 15	17	17	20	25	6	30 32	86	86	42	47	6
14 15	22	22	20	25	6	30 32	96	96	42	47	6
14 15	27	27	20	25	6	30 32	116	116	42	47	6
14 15	36	36	20	25	6	30 32	136	116	42	47	6
14 15	46	46	20	25	6	30 32	156	116	42	47	6
14 15	56	56	20	25	6	30 32	176	116	42	47	6
14 15	66	56	20	25	6	40 42	46	46	54	60	10
14 15	76	56	20	25	6	40 42	56	56	54	60	10
14 15	86	56	20	25	6	40 42	66	66	54	60	10
14 15	96	56	20	25	6	40 42	76	76	54	60	10
16	17	17	22	27	6	40 42	86	86	54	60	10
16	22	22	22	27	6	40 42	96	96	54	60	10
16	27	27	22	27	6	40 42	116	116	54	60	10
16	36	36	22	27	6	40 42	136	136	54	60	10
16	46	46	22	27	6	40 42	156	136	54	60	10
16	56	56	22	27	6	40 42	196	136	54	60	10
18 20	17	17	26	31	6	40 42	246	136	54	60	10
18 20	22	22	26	31	6	50	76	76	66	72	10
18 20	27	27	26	31	6	50	96	96	66	72	10
18 20	36	36	26	31	6	50	116	116	66	72	10
18 20	46	46	26	31	6	50	136	136	66	72	10
18 20	56	56	26	31	6	50	156	136	66	72	10
18 20	66	66	26	31	6	50	196	136	66	72	10
18 20	76	76	26	31	6	60	76	76	80	86	20
18 20	86	76	26	31	6	60	96	96	80	86	20
18 20	96	76	26	31	6	60	116	116	80	86	20
18 20	116	76	26	31	6	60	136	136	80	86	20
22 24	17	17	30	35	6	60	156	136	80	86	20
22 24	22	22	30	35	6	60	196	136	80	86	20
22 24	27	27	30	35	6	60	246	136	80	86	20

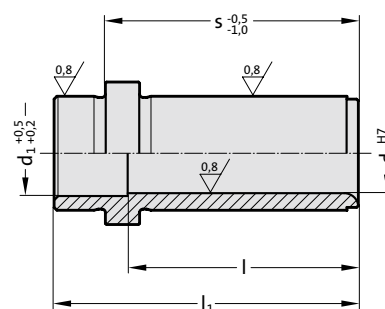
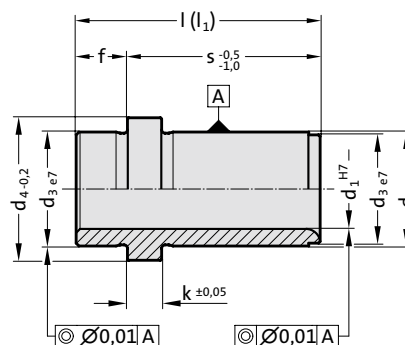
Ordering Code (example):

Guide Bush, headed	=3120.40.
d ₁	22 mm = 022.
Length s	17 mm = 017
Order No	=3120.40.022.017

Locating guide bush, headed



3120.42.



3120.42. Locating guide bush, headed

d_1	s	l	l_1	d_3	d_4	f	k	d_1	s	l	l_1	d_3	d_4	f	k
9 10	12	15	15	14	16	3	3	22 24	36	45	45	30	35	9	6
9 10	17	20	20	14	16	3	3	22 24	46	55	55	30	35	9	6
9 10	22	25	25	14	16	3	3	22 24	56	65	65	30	35	9	6
9 10	27	30	30	14	16	3	3	22 24	66	75	75	30	35	9	6
9 10	36	39	39	14	16	3	3	22 24	76	85	85	30	35	9	6
9 10	46	46	49	14	16	3	3	22 24	86	95	95	30	35	9	6
9 10	56	46	59	14	16	3	3	22 24	96	105	105	30	35	9	6
9 10	66	46	69	14	16	3	3	22 24	116	96	125	30	35	9	6
14 15	17	26	26	20	25	9	6	22 24	136	96	145	30	35	9	6
14 15	22	31	31	20	25	9	6	22 24	156	96	165	30	35	9	6
14 15	27	36	36	20	25	9	6	30 32	27	36	36	42	47	9	6
14 15	36	45	45	20	25	9	6	30 32	36	45	45	42	47	9	6
14 15	46	55	55	20	25	9	6	30 32	46	55	55	42	47	9	6
14 15	56	56	65	20	25	9	6	30 32	56	65	65	42	47	9	6
14 15	66	56	75	20	25	9	6	30 32	66	75	75	42	47	9	6
14 15	76	56	85	20	25	9	6	30 32	76	85	85	42	47	9	6
14 15	86	56	95	20	25	9	6	30 32	86	95	95	42	47	9	6
14 15	96	56	105	20	25	9	6	30 32	96	105	105	42	47	9	6
14 15	116	56	125	20	25	9	6	30 32	116	125	125	42	47	9	6
18 20	17	26	26	26	31	9	6	30 32	136	116	145	42	47	9	6
18 20	22	31	31	26	31	9	6	30 32	156	116	165	42	47	9	6
18 20	27	36	36	26	31	9	6	30 32	176	116	185	42	47	9	6
18 20	36	45	45	26	31	9	6	30 32	196	116	205	42	47	9	6
18 20	46	55	55	26	31	9	6	40 42	46	58	58	54	60	12	10
18 20	56	65	65	26	31	9	6	40 42	56	68	68	54	60	12	10
18 20	66	75	75	26	31	9	6	40 42	66	78	78	54	60	12	10
18 20	76	76	85	26	31	9	6	40 42	76	88	88	54	60	12	10
18 20	86	76	95	26	31	9	6	40 42	86	98	98	54	60	12	10
18 20	96	76	105	26	31	9	6	40 42	96	108	108	54	60	12	10
18 20	116	76	125	26	31	9	6	40 42	116	128	128	54	60	12	10
18 20	136	76	145	26	31	9	6	40 42	136	136	148	54	60	12	10
22 24	17	26	26	30	35	9	6	40 42	156	136	168	54	60	12	10
22 24	22	31	31	30	35	9	6	40 42	196	136	208	54	60	12	10
22 24	27	36	36	30	35	9	6	40 42	246	136	258	54	60	12	10

Ordering Code (example):

Locating guide bush, headed = 3120.42.

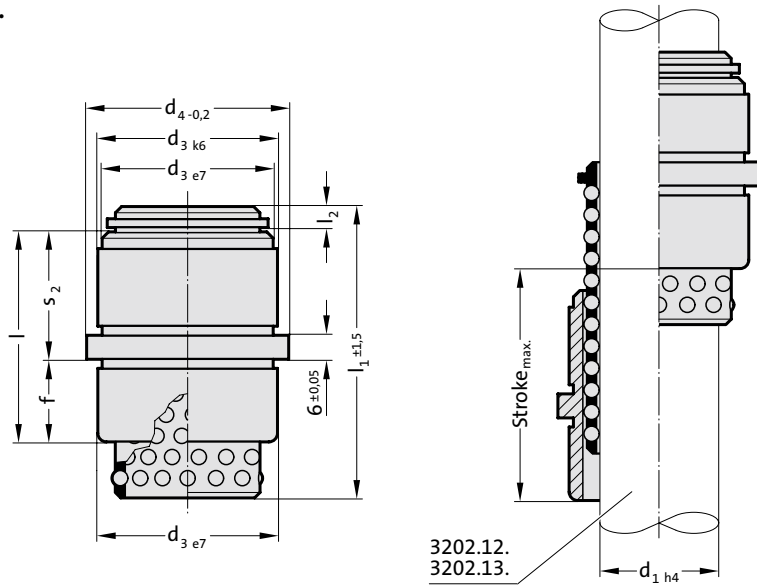
Guide diameter d_1 22 mm = 022.Length with collar s 17 = 017

Order No = 3120.42.022.017



Ball bearing guide, complete

3120.65.



3120.65. Ball bearing guide, complete

d_1	l	l_1	l_2	d_3	d_4	f	s_2	Stroke _{max.}
12	24	40	2.1	22	26	6	18	50
12	24	56	2.1	22	26	6	18	82
18	34	45	3	30	35	11	23	44
18	34	56	3	30	35	11	23	66
18	34	71	3	30	35	11	23	96
30	54	56	4.8	46	52	21	33	32
30	54	75	4.8	46	52	21	33	78
30	54	95	4.8	46	52	21	33	110

Ordering Code (example):

Ball bearing guide, complete =3120.65.

Guide diameter d_1 18 mm = 018.

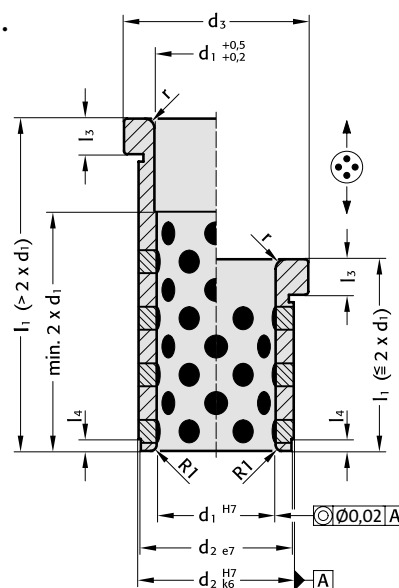
Total length of ball bearing guide l_1 45 mm = 045

Order No =3120.65.018.045

Guide bush with collar, Bronze with solid lubricant



2087.72.



Material:

Bronze with solid lubricant, oilless lubricating.

Note:

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:

Bushes can only be used with axial motion!

2087.72. Guide bush with collar, Bronze with solid lubricant

d ₁	9 10	12	14 15	16	18 20	22 24	25	30 32	40 42	50	60
d ₂	14	18	20	22	26	30	32	42	54	66	80
d ₃	16	23	25	27	31	35	38	47	60	72	86
r	0.5	1	1	2	2	3	3	3	3	3	3
l ₃	3	6	6	6	6	6	6	6	10	10	20
l ₄	1.5	2	2	2	2	3	3	4	5	5	5
l ₁											
12	•										
17	•	•	•	•	•	•					
22	•	•	•	•	•	•					
27	•	•	•	•	•	•		•			
36	•	•	•	•	•	•		•			
46	•	•	•	•	•	•	•	•	•		
56	•	•	•	•	•	•	•	•	•		
66					•	•	•	•	•		
76					•	•	•	•	•	•	
86						•	•	•	•	•	
96						•		•	•	•	•
116								•	•	•	•
136									•	•	•
156									•	•	•
196										•	•

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant	=2087.72.
Guide diameter d ₁	22 mm = 022.
Total length l ₁	17 mm = 017
Order No	=2087.72.022.017

Guide bush with collar, Bronze with solid lubricant

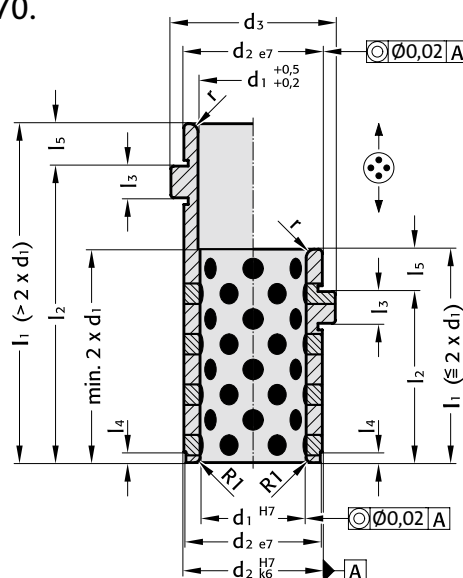


2087.70. Guide bush with collar, Bronze with solid lubricant

d ₁	9 10	14 15	18 20	22 24	30 32	40 42
d ₂	14	20	26	30	42	54
d ₃	16	25	31	35	47	60
l ₃	3	6	6	6	6	10
l ₄	1.5	2	2	3	4	5
l ₅	3	6	8	8	8	12
r	0.5	1	2	3	3	3
l ₁ l ₂						
15 12	●					
20 17	●					
25 22	●					
30 27	●					
39 36	●					
49 46	●					
59 56	●					
69 66	●					
23 17		●				
28 22		●				
33 27		●				
42 36		●				
52 46		●				
62 56		●				
72 66		●				
82 76		●				
92 86		●				
25 17			●	●		
30 22			●	●		
35 27			●	●	●	
44 36			●	●	●	
54 46			●	●	●	
64 56			●	●	●	
74 66			●	●	●	
84 76			●	●	●	
94 86			●	●	●	
104 96			●	●	●	
124 116			●	●	●	
144 136				●	●	
164 156				●	●	
58 46						●
68 56						●
78 66						●
88 76						●
98 86						●
108 96						●
128 116						●
148 136						●
168 156						●
208 196						●



2087.70.



Material:

Bronze with solid lubricant, oilless lubricating.

Note:

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:

Bushes can only be used with axial motion!

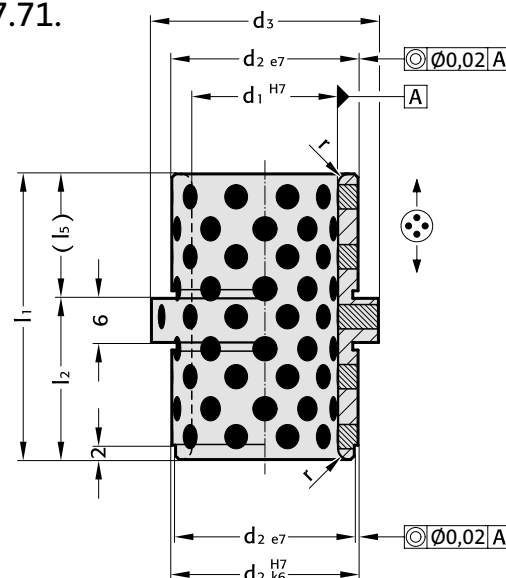
Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant	=2087.70.
Guide diameter d ₁	22 mm = 022.
Length with collar l ₂	17 mm = 017
Order No	=2087.70. 022. 017

Guide bush with collar, Bronze with solid lubricant



2087.71.



Material:

Bronze with solid lubricant, oilless lubricating.

Note:

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:

Bushes can only be used with axial motion!

2087.71. Guide bush with collar, Bronze with solid lubricant

d_1	14 15	18 20	22 24	30 32
d_2	20	26	30	42
d_3	25	31	35	47
r	1	1.5	2	2
l_1	26	39	49	63
l_2	17	22	27	36
l_5	9	17	22	27

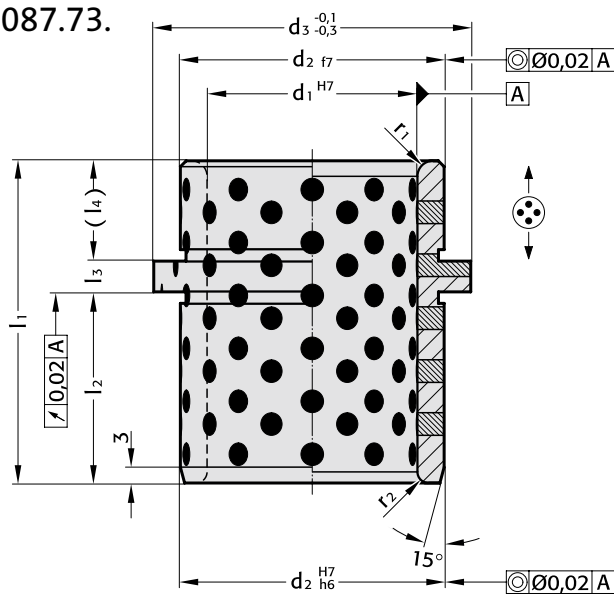
Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant	=2087.71.
Guide diameter d_1	22 mm = 022.
Length with collar l_2	27 mm = 027
Order No	=2087.71.022.027



Guide bush with collar, Bronze with solid lubricant

2087.73.



Material:

Bronze with solid lubricant, oilless lubricating.

Note:

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:

Bushes can only be used with axial motion!

2087.73. Guide bush with collar, Bronze with solid lubricant

d ₁	25	30	40	40	50	50	60	63	63	63
d ₂	35	42	50	50	63	63	80	80	80	80
d ₃	40	47	60	60	72	72	86	90	90	90
r ₁	3	3	4	4	4	4	3	4	4	4
r ₂	2	2	2	2	3	3	3	3	3	3
l ₁	43	43	60	64	77	92	78	95	100	108
l ₂	24	24	35.5	39.5	44.5	55.5	49	55.5	62.5	62.5
l ₃	7.5	7.5	6	6	8	8	7.5	8	8	8
l ₄	11.5	11.5	18.5	18.5	24.5	28.5	21.5	31.5	29.5	37.5

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant

=2087.73.

Guide diameter d₁

50 mm= 050.

Total length l₁

77 mm= 077

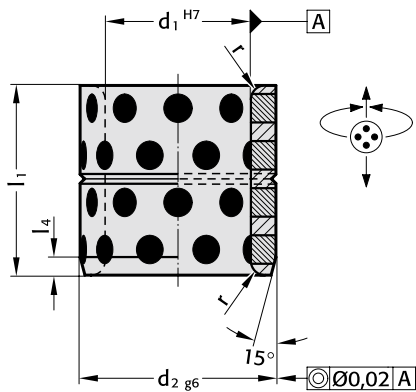
Order No

=2087.73.050.077



Guide bush, Bronze with solid lubricant

3120.70.



Material:

Bronze with solid lubricant, oilless lubricating.

Note:

Bushes can be used radially and axially.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:

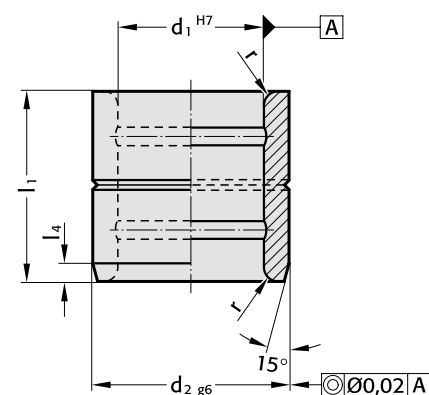
Connecting with adhesive or if needed secure with threaded pin or flat mushroom head screw 2192.61.

3120.70. Guide bush, Bronze with solid lubricant

d ₁	45	45	45	50	50	50	55	60	60	63	65	70	70	75	75	80	80	85	90	100	110	120	125	130	140	150	160
d ₂	55	56	60	60	62	65	70	74	75	75	80	85	90	90	95	96	100	100	110	120	130	140	145	150	160	170	180
r	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
l ₄	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
l ₁																											
30	•	•	•	•	•	•		•	•																		
35	•	•	•	•	•	•		•	•																		
40	•	•	•	•	•	•		•	•																		
50	•	•	•	•	•	•		•	•																		
60	•	•	•	•	•	•		•	•																		
70				•	•	•		•	•																		
80				•	•	•		•	•																		
95				•																							
100						•			•																		
120																											
130																											
140																											
150																											

Ordering Code (example):

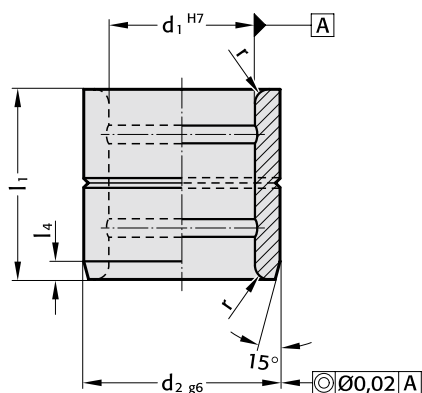
Guide bush, Bronze with solid lubricant	=3120.70.
Guide diameter d ₁	40 mm= 040.
External diameter d ₂	55 mm= 055.
Installation length l ₁	25 mm= 025
Order No	=3120.70.040.055.025



Guide bush, Bronze



3120.71.



Material:

Bronze.

Note:

Bushes can be used radially and axially.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:

Connecting with adhesive or if needed secure with threaded pin or flat mushroom head screw 2192.61.

3120.71. Guide bush, Bronze

d ₁	45	45	45	50	50	50	55	60	60	63	65	70	70	75	75	80	80	85	90	100	110	120	125	130	140	150	160
d ₂	55	56	60	60	62	65	70	74	75	75	80	85	90	90	95	96	100	100	110	120	130	140	145	150	160	170	180
r	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
l ₄	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
l ₁																											
30	•	•	•	•	•	•		•	•																		
35	•	•	•	•	•	•		•	•			•															
40	•	•	•	•	•	•	•	•	•			•				•	•										
50	•	•	•	•	•	•	•	•	•		•	•	•			•	•										
60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•							
70			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•							
80			•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•					
95				•																							
100						•			•			•		•	•	•	•		•	•	•	•	•	•	•	•	•
120										•						•	•		•	•	•	•	•	•	•		
130																			•	•					•		
140																	•			•		•			•		
150																										•	•

Ordering Code (example):

Guide bush, Bronze =3120.71.

Guide diameter d₁ 40 mm= 040.

External diameter d₂ 55 mm= 055.

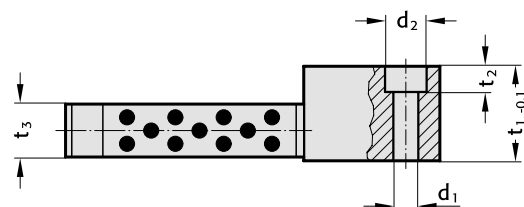
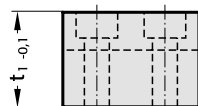
Installation length l₁ 25 mm= 025

Order No =3120.71.040.055.025

Rectangular guide, Steel with solid lubricant



3131.40.



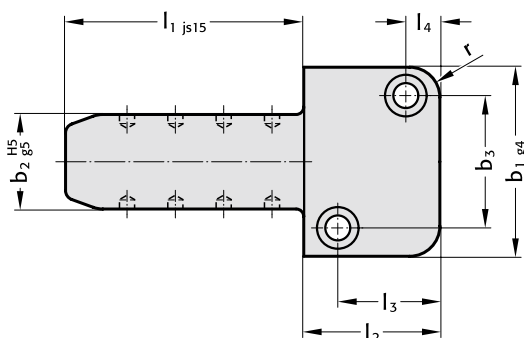
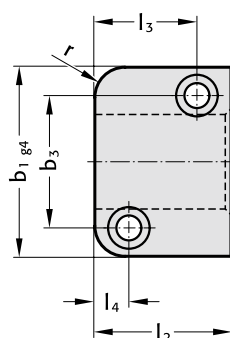
Material:

Steel with solid lubricant
Surface: case hardened, 580+40 HV 30

Steel
Surface: case hardened, 700+60 HV 30

Note:

The maximum operating temperature is 200°C.



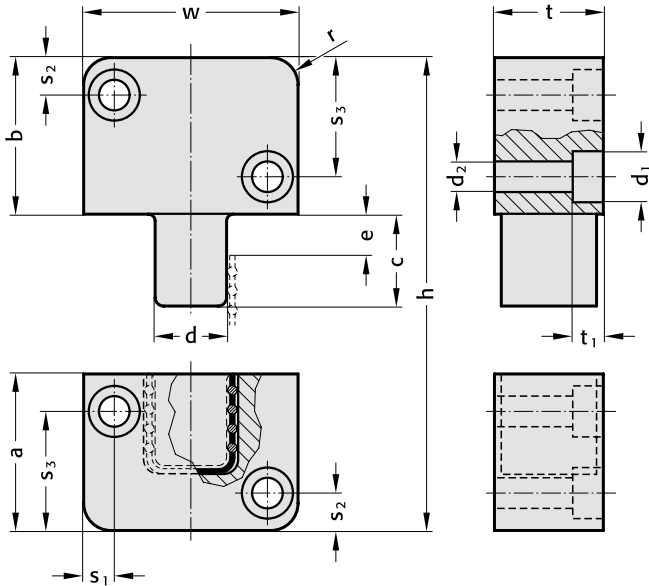
3131.40. Rectangular guide, Steel with solid lubricant

Order No	l_2	b_2	l_1	b_1	r	t_1	t_2	t_3	d_1	d_2	b_3	l_3	l_4
3131.40.022.016.020	22	16	20	40	6	20	6.8	11	6.6	11	26	15	7
3131.40.022.016.040	22	16	40	40	6	20	6.8	11	6.6	11	26	15	7
3131.40.027.020.025	27	20	25	45	6	22	6.8	13	6.6	11	31	19	7
3131.40.027.020.050	27	20	50	45	6	22	6.8	13	6.6	11	31	19	7
3131.40.036.025.032	36	25	32	50	8	25	6.8	14	6.6	11	35	27	9
3131.40.036.025.063	36	25	63	50	8	25	6.8	14	6.6	11	35	27	9
3131.40.046.032.040	46	32	40	63	8	32	9	19	9	15	45	35	11
3131.40.046.032.080	46	32	80	63	8	32	9	19	9	15	45	35	11
3131.40.056.040.050	56	40	50	85	10	36	11	22	11	18	60	40	15
3131.40.056.040.100	56	40	100	85	10	36	11	22	11	18	60	40	15
3131.40.066.050.056	66	50	56	100	10	40	13	24	14	20	74	48	18
3131.40.066.050.112	66	50	112	100	10	40	13	24	14	20	74	48	18



Rectangular guide, Steel with rollers

3131.80.



Description:

The rectangular guides with rollers guarantee the greatest precision when their mould is moved together. The rectangular guides must always be installed in the outer area of the mould plates to ensure problem-free functionality.

Advantages: no play or friction, low maintenance and no lubrication

Material:

Steel

Hardness: 56-58 HRC

Surface: burnished

Note:

The maximum operating temperature is 150°C.

3131.80. Rectangular guide, Steel with rollers

Order No	t	w	a	b	c	d	e	h	r	s ₁	s ₂	s ₃	d ₁	d ₂	t ₁
3131.80.032.063	32	63	46	46	27	21	12.1	92	8	9	11	35	15	9	9
3131.80.040.100	40	100	66	66	36	33	19.5	132	10	13	18	48	20	13.5	13

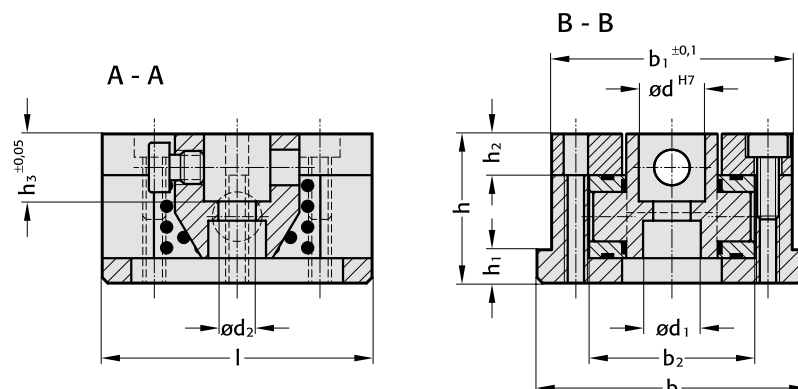


**Forming /
Demoulding**

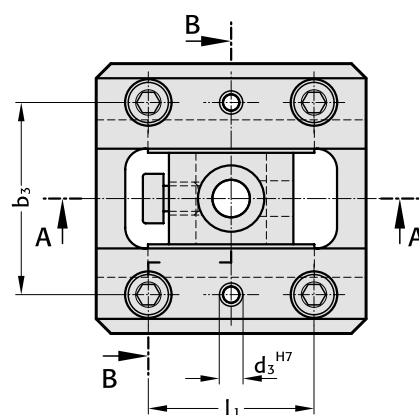
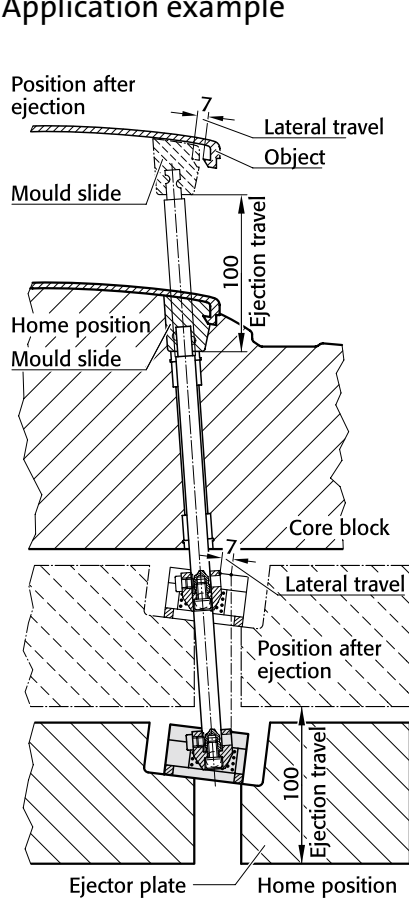




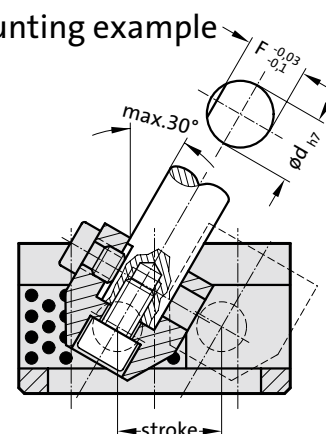
2967.10.



Application example



Mounting example



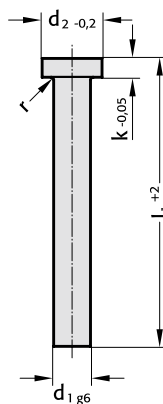
2967.10. Bolt guide

Order No	d	Stroke	b	l	h	b ₁	b ₂	b ₃	l ₁	h ₁	h ₂	h ₃	d ₁	d ₂	d ₃	F
2967.10.08.010	8	10	33	32	22	30	19	24	20	5	7	8	8	4	3	7
2967.10.10.018	10	18	45	45	27	40	25	32	30	5	8	10	10	5	4	9
2967.10.12.020	12	20	57	50	32	51	31	39	35	7	10	12	11	7	6	11
2967.10.16.025	16	25	65	65	36	58	38	46	40	8	10	16	14	9	6	14.5
2967.10.20.030	20	30	80	80	42	72	44	56	55	11	12	20	17	11	8	18
2967.10.25.035	25	35	93	90	50	85	52	66	65	15	15	25	20	14	10	22.5
2967.10.30.040	30	40	101	100	55	93	60	74	70	15	15	30	20	14	10	27
2967.10.35.045	35	45	120	120	62	110	70	85	80	15	18	35	20	14	10	32
2967.10.40.050	40	50	130	135	70	120	80	95	90	15	18	40	26	17.5	10	36
2967.10.45.055	45	55	140	150	80	130	90	105	110	15	20	45	26	17.5	10	40

Ejector pin, hardened, DIN ISO 6751



237.1.

**Material:**

WS

Order No 237.1.

Hardness:

Shaft 60 ± 2 HRCHead 45 ± 5 HRC

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank hardened and precision ground.

Head hot upset-forged.

237.1. Ejector pin, hardened, DIN ISO 6751

d_1	d_2	k	r	l_1	l_1	l_1	l_1	l_1	l_1	l_1	l_1	l_1	l_1	l_1
				40	63	80	100	125	160	200	250	315	400	500
1	2.5	1.2	0.2	●	●	●	●	●	●	●				
1.1	2.5	1.2	0.2	●	●	●	●	●	●	●				
1.2	2.5	1.2	0.2	●	●	●	●	●	●	●				
1.3	3	1.5	0.2	●	●	●	●	●	●	●				
1.4	3	1.5	0.2	●	●	●	●	●	●	●				
1.5	3	1.5	0.2	●	●	●	●	●	●	●				
1.6	3	1.5	0.2	●	●	●	●	●	●	●				
1.7	3	1.5	0.2	●	●	●	●	●	●	●				
1.8	3	1.5	0.2	●	●	●	●	●	●	●				
1.9	3	1.5	0.2	●	●	●	●	●	●	●				
2	4	2	0.2	●	●	●	●	●	●	●	●	●		
2.2	4	2	0.2				●	●	●	●	●	●		
2.5	5	2	0.3	●	●	●	●	●	●	●	●	●		
2.7	5	2	0.3				●	●	●	●	●	●		
3	6	3	0.3	●	●	●	●	●	●	●	●	●	●	●
3.2	6	3	0.3				●	●	●	●	●	●	●	
3.5	7	3	0.3				●	●	●	●	●	●	●	
3.7	7	3	0.3				●	●	●	●	●	●	●	
4	8	3	0.3	●	●	●	●	●	●	●	●	●	●	●
4.2	8	3	0.3				●	●	●	●	●	●	●	
4.5	8	3	0.3				●	●	●	●	●	●	●	

Ordering Code (example):

Ejector pin, hardened, DIN ISO 6751 =237.1.

Shank diameter d_1 5 mm = 0500.Length l_1 40 mm = 040

Order No =237.1. 0500.040



Ejector pin, hardened, DIN ISO 6751

Material:

237.1.

WS

Order No 237.1.

Hardness:

Shaft 60 ± 2 HRC

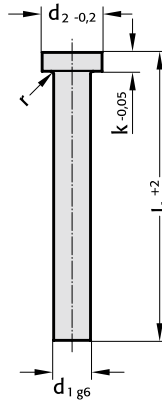
Head 45 ± 5 HRC

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank hardened and precision ground.

Head hot upset-forged.



237.1. Ejector pin, hardened, DIN ISO 6751

d ₁	d ₂	k	r	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁
4.7	8	3	0.3	40	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600
5	10	3	0.3	•	•	•	•	•	•	•	•	•	•	•	•	•			
5.2	10	3	0.3				•	•	•	•	•	•	•	•					
5.5	10	3	0.3				•	•	•	•	•	•	•	•					
6	12	5	0.5	•	•	•	•	•	•	•	•	•	•	•	•	•			
6.2	12	5	0.5				•	•	•	•	•	•	•	•	•				
6.5	12	5	0.5				•	•	•	•	•	•	•	•					
7	12	5	0.5				•	•	•	•	•	•	•	•	•				
8	14	5	0.5		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
8.2	14	5	0.5				•	•	•	•	•	•	•	•	•	•			
8.5	14	5	0.5				•	•	•	•	•	•	•	•	•				
9	14	5	0.5				•	•	•	•	•	•	•	•	•				
10	16	5	0.5			•	•	•	•	•	•	•	•	•	•	•	•	•	•
10.2	16	5	0.5				•	•	•	•	•	•	•	•	•				
10.5	16	5	0.5				•	•	•	•	•	•	•	•	•				
11	16	5	0.5						•	•	•	•	•	•	•				
12	18	7	0.8			•	•	•	•	•	•	•	•	•	•	•	•	•	•
12.2	18	7	0.8					•	•	•	•	•	•	•	•				
12.5	18	7	0.8				•	•	•	•	•	•	•	•	•				
14	22	7	0.8			•	•	•	•	•	•	•	•	•	•	•	•	•	•
16	22	7	0.8				•	•	•	•	•	•	•	•	•	•	•	•	•
18	24	7	0.8						•	•	•	•	•	•	•	•	•	•	•
20	26	8	1						•	•	•	•	•	•	•	•	•	•	•

Ordering Code (example):

Ejector pin, hardened, DIN ISO 6751

=237.1.

Shank diameter d₁ 5 mm = 0500.

Length l₁ 40 mm = 040

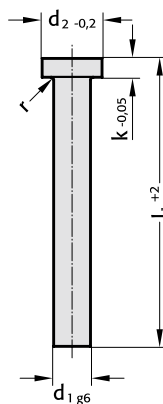
Order No =237.1. 0500.040



Ejector pin, nitrided, DIN ISO 6751



237.8.



Material:

NWA

Order No 237.8.

Hardness:

Shaft* ≥ 950 HV 0,3

Head 45 ± 5 HRC

Tensile Strength (core) > 1400 N/mm²

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank nitrided and precision ground.

Head hot upset-forged.

Note:

*Owing to thinness of nitrided skin, hardness testing on shank restricted to Vickers only.

Test load = 3 N max.

237.8. Ejector pin, nitrided, DIN ISO 6751

d ₁	d ₂	k	r	l ₁ 100	l ₁ 125	l ₁ 160	l ₁ 200	l ₁ 250	l ₁ 315	l ₁ 400	l ₁ 500	l ₁ 630	l ₁ 800
1.5	3	1.5	0.2	●	●	●	●						
2	4	2	0.2	●	●	●	●	●					
2.2	4	2	0.2	●	●	●	●						
2.4	5	2	0.2	●	●	●	●	●	●				
2.5	5	2	0.3	●	●	●	●	●	●				
2.7	5	2	0.3	●	●	●	●	●					
2.9	5	2	0.3	●	●	●	●	●	●				
3	6	3	0.3	●	●	●	●	●	●	●	●		
3.2	6	3	0.3	●	●	●	●	●	●	●			
3.4	6	3	0.3	●	●	●	●	●	●	●			
3.5	7	3	0.3	●	●	●	●	●	●	●			
3.7	7	3	0.3	●	●	●	●	●	●	●			
3.9	7	3	0.3	●	●	●	●	●	●	●			
4	8	3	0.3	●	●	●	●	●	●	●	●		
4.2	8	3	0.3	●	●	●	●	●	●	●			
4.4	8	3	0.3	●	●	●	●	●	●	●			
4.5	8	3	0.3	●	●	●	●	●	●	●			
4.7	8	3	0.3	●	●	●	●	●	●	●			
4.9	8	3	0.3	●	●	●	●	●	●	●			
5	10	3	0.3	●	●	●	●	●	●	●	●	●	●
5.2	10	3	0.3	●	●	●	●	●	●	●	●		
5.4	10	3	0.3	●	●	●	●	●	●	●	●		
5.5	10	3	0.3	●	●	●	●	●	●	●	●		
5.7	10	3	0.3	●	●	●	●	●	●	●	●		
5.9	10	3	0.3	●	●	●	●	●	●	●	●		
6	12	5	0.5	●	●	●	●	●	●	●	●	●	●

Ordering Code (example):

Ejector pin, nitrided, DIN ISO 6751 = 237.8.
 Shank diameter d₁ 6.2 mm = 0620.
 Length l₁ 100 mm = 100
 Order No = 237.8.0620.100



Ejector pin, nitrided, DIN ISO 6751

Material:

237.8.

NWA

Order No 237.8.

Hardness:

Shaft* ≥ 950 HV 0,3

Head 45 ± 5 HRC

Tensile Strength (core) > 1400 N/mm²

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

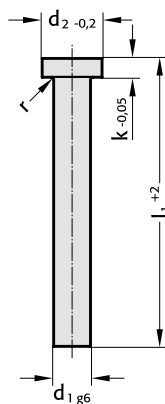
Shank nitrided and precision ground.

Head hot upset-forged.

Note:

*Owing to thinness of nitrided skin, hardness testing on shank restricted to Vickers only.

Test load = 3 N max.



237.8. Ejector pin, nitrided, DIN ISO 6751

d ₁	d ₂	k	r	l ₁ 100	l ₁ 125	l ₁ 160	l ₁ 200	l ₁ 250	l ₁ 315	l ₁ 400	l ₁ 500	l ₁ 630	l ₁ 800	l ₁ 1000
6.2	12	5	0.5	●	●	●	●	●	●	●	●	●		
6.5	12	5	0.5	●	●	●	●	●	●	●	●	●		
6.7	12	5	0.5	●	●	●	●	●	●					
6.9	12	5	0.5	●	●	●	●	●	●					
7	12	5	0.5	●	●	●	●	●	●	●	●	●		
7.2	12	5	0.5	●	●	●	●	●	●					
7.8	12	5	0.5	●	●	●	●	●	●					
8	14	5	0.5	●	●	●	●	●	●	●	●	●	●	●
8.2	14	5	0.5	●	●	●	●	●	●	●	●	●	●	●
8.4	14	5	0.5	●	●	●	●	●	●					
8.5	14	5	0.5	●	●	●	●	●	●	●	●	●		
9	14	5	0.5	●	●	●	●	●	●	●	●	●		
9.7	14	5	0.5	●	●	●	●	●	●					
10	16	5	0.5	●	●	●	●	●	●	●	●	●	●	●
10.2	16	5	0.5	●	●	●	●	●	●	●	●	●	●	
10.5	16	5	0.5	●	●	●	●	●	●	●	●	●		
11	16	5	0.5	●	●	●	●	●	●	●	●	●		
12	18	7	0.8	●	●	●	●	●	●	●	●	●	●	●
12.2	18	7	0.8	●	●	●	●	●	●	●	●	●	●	
12.5	18	7	0.8	●	●	●	●	●	●	●	●	●	●	
14	22	7	0.8	●	●	●	●	●	●	●	●	●	●	●
16	22	7	0.8	●	●	●	●	●	●	●	●	●	●	●
18	24	7	0.8			●	●	●	●	●	●	●	●	●
20	26	8	1			●	●	●	●	●	●	●	●	●
25	32	10	1				●	●	●	●	●	●	●	●
32	40	10	1				●	●	●	●	●	●	●	●

Ordering Code (example):

Ejector pin, nitrided, DIN ISO 6751

=237.8.

Shank diameter d₁ 6.2 mm = 0620.

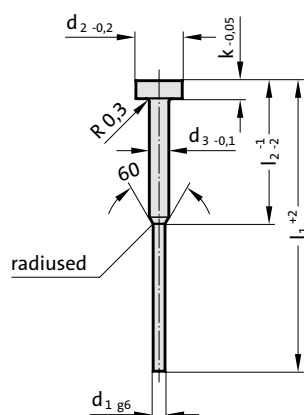
Length l₁ 100 mm = 100

Order No =237.8.0620.100

Ejector pin, hardened, round stepped, DIN ISO 8694



238.1.

**Material:**

WS

Order No 238.1.

Hardness:

Shaft 60 ± 2 HRCHead 45 ± 5 HRC

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank hardened and precision ground.

Head hot upset-forged.

238.1. Ejector pin, hardened, round stepped, DIN ISO 8694

d_1	d_2	d_3	k	l_1 l_2	63 30	80 32	100 50	125 50	160 63	200 80
0.8	4	2	2		●	●	●	●	●	
0.9	4	2	2		●	●	●	●	●	
1	4	2	2		●	●	●	●	●	●
1.1	4	2	2		●	●	●	●	●	●
1.2	4	2	2		●	●	●	●	●	●
1.3	4	2	2		●	●	●	●	●	●
1.4	4	2	2		●	●	●	●	●	●
1.5	6	3	3		●	●	●	●	●	●
1.6	6	3	3			●	●	●	●	●
1.7	6	3	3			●	●	●	●	●
1.8	6	3	3			●	●	●	●	●
1.9	6	3	3			●	●	●	●	●
2	6	3	3			●	●	●	●	●
2.1	6	3	3				●	●	●	●
2.2	6	3	3			●	●	●	●	●
2.3	6	3	3				●	●	●	●
2.4	6	3	3				●	●	●	●
2.5	6	3	3				●	●	●	●

Ordering Code (example):

Ejector pin, hardened, round stepped, DIN ISO 8694

=238.1.

Diameter d_1

1.7 mm = 0170.

Length l_1

80 mm = 080

Order No

=238.1.0170.080



Ejector pin, nitrided, round stepped, DIN ISO 8694

Material:

238.8.

NWA

Order No 238.8.

Hardness:

Shaft* ≥ 950 HV 0,3

Head 45 ± 5 HRC

Tensile Strength (core) > 1400 N/mm²

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

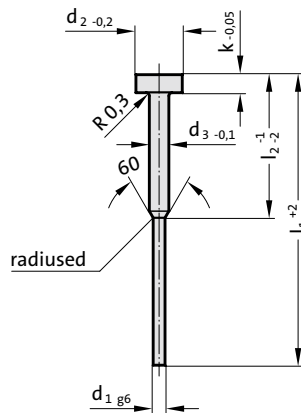
Shank nitrided and precision ground.

Head hot upset-forged.

Note:

*Owing to thinness of nitrided skin, hardness testing on shank restricted to Vickers only.

Test load = 3 N max.



238.8. Ejector pin, nitrided, round stepped, DIN ISO 8694

d ₁	d ₂	d ₃	k	l ₁ l ₂	63 30	80 32	100 50	125 50	160 63	200 80
0.8	4	2	2		●	●	●	●	●	
0.9	4	2	2		●	●	●	●	●	
1	4	2	2		●	●	●	●	●	
1.1	4	2	2		●	●	●	●	●	
1.2	4	2	2		●	●	●	●	●	
1.3	4	2	2		●	●	●	●	●	
1.4	4	2	2		●	●	●	●	●	
1.5	6	3	3		●	●	●	●	●	●
1.6	6	3	3			●	●	●	●	●
1.7	6	3	3			●	●	●	●	●
1.8	6	3	3			●	●	●	●	●
1.9	6	3	3			●	●	●	●	●
2	6	3	3			●	●	●	●	●
2.2	6	3	3			●	●	●	●	●
2.5	6	3	3				●	●	●	●

Ordering Code (example):

Ejector pin, nitrided, round stepped, DIN ISO 8694

=238.8.

Diameter d₁ 1.5 mm = 0150.

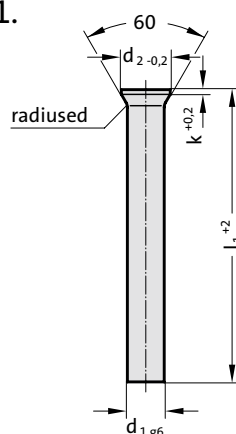
Length l₁ 63 mm = 063

Order No =238.8.0150.063

Ejector pin, hardened, similar to DIN 1530 Shape D



239.1.

**Material:**

WS

Order No 239.1.

Hardness:

Shaft 60 ± 2 HRCHead 45 ± 5 HRC

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank hardened and precision ground.

Head hot upset-forged.

239.1. Ejector pin, hardened, similar to DIN 1530 Shape D

d ₁	d ₂	k	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁
			40	60	71	80	100	125	160	200	250	315
0.8	1.4	0.5					●	●	●	●		
0.9	1.6	0.5					●	●	●	●		
1	1.8	0.5	●	●	●	●	●	●	●	●		
1.1	1.8	0.5			●		●	●	●	●		
1.2	2	0.5			●		●	●	●	●		
1.25	2	0.5					●	●	●	●		
1.3	2	0.5			●		●	●	●	●		
1.4	2.2	0.5			●		●	●	●	●		
1.5	2.2	0.5	●	●	●	●	●	●	●	●		
1.6	2.5	0.5			●	●	●	●	●	●		
1.7	2.5	0.5			●		●	●	●	●		
1.75	2.8	0.5			●		●	●	●	●		
1.8	2.8	0.5			●		●	●	●	●		
1.9	2.8	0.5			●		●	●	●	●		
2	3	0.5	●	●	●	●	●	●	●	●	●	
2.1	3.2	0.5			●		●	●	●	●		
2.2	3.2	0.5			●		●	●	●	●	●	
2.25	3.2	0.5					●	●	●	●		
2.3	3.5	0.5			●		●	●	●	●		
2.4	3.5	0.5			●		●	●	●	●		
2.5	3.5	0.5	●	●	●	●	●	●	●	●	●	
2.6	4	0.5			●		●	●	●	●		
2.7	4	0.5			●		●	●	●	●	●	
2.75	4	0.5			●		●	●	●	●		
2.8	4	0.5			●		●	●	●	●		
2.9	4	0.5			●		●	●	●	●		
3	4.5	0.5	●	●	●	●	●	●	●	●	●	●
3.1	4.5	0.5			●		●	●	●	●		
3.2	4.5	0.5			●		●	●	●	●		

Ordering Code (example):

Ejector pin, hardened, similar to DIN 1530 Shape D =239.1.
 Shank diameter d₁ 3.2 mm = 0320.
 Length l₁ 71 mm = 071
 Order No =239.1. 0320.071



Ejector pin, hardened, similar to DIN 1530 Shape D

Material:

WS

Order No 239.1.

Hardness:

Shaft 60 ± 2 HRC

Head 45 ± 5 HRC

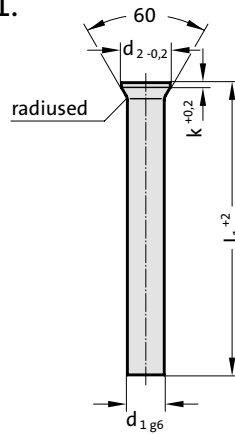
Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank hardened and precision ground.

Head hot upset-forged.

239.1.



239.1. Ejector pin, hardened, similar to DIN 1530 Shape D

d ₁	d ₂	k	l ₁ 40	l ₁ 60	l ₁ 71	l ₁ 80	l ₁ 100	l ₁ 125	l ₁ 160	l ₁ 200	l ₁ 250	l ₁ 315
3.25	4.5	0.5			●		●	●	●	●		
3.5	5	0.5			●	●	●	●	●	●	●	●
3.6	5	0.5			●		●	●	●	●		
3.75	5	0.5			●		●	●	●	●		
4	5.5	0.5	●	●	●	●	●	●	●	●	●	●
4.1	5.5	0.5			●		●	●	●	●		
4.2	5.5	0.5			●		●	●	●	●		
4.25	5.5	0.5			●		●	●	●	●		
4.5	6	0.5			●		●	●	●	●		
4.6	6	0.5			●		●	●	●	●		
5	6.5	0.5	●	●	●	●	●	●	●	●	●	●
5.1	6.5	0.5			●		●	●	●	●		
5.2	6.5	0.5			●		●	●	●	●		
5.25	6.5	0.5			●		●	●	●	●		
5.5	7	0.5		●	●	●	●	●	●	●	●	●
6	8	0.5	●	●	●	●	●	●	●	●	●	●
6.2	8	1			●	●	●	●	●	●	●	●
6.5	9	1			●	●	●	●	●	●	●	●
7	9	1			●	●	●	●	●	●	●	●
7.5	10	1			●		●	●	●	●	●	●
8	10	1		●	●	●	●	●	●	●	●	●
8.2	10	1			●		●	●	●	●	●	●
8.5	11	1			●		●	●	●	●	●	●
9	11	1			●		●	●	●	●	●	●
10	12	1			●	●	●	●	●	●	●	●
12	14	1				●	●	●	●	●	●	●
14	16	1.5					●	●	●	●	●	●
16	18	1.5					●	●	●	●	●	●

Ordering Code (example):

Ejector pin, hardened, similar to DIN 1530 Shape D

= 239.1.

Shank diameter d₁

3.2 mm = 0320.

Length l₁

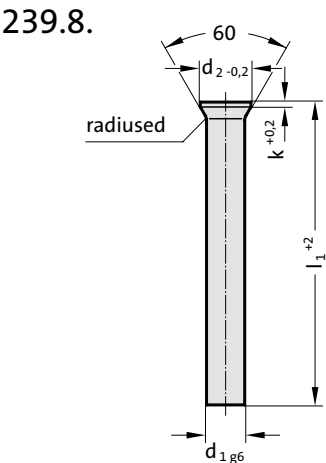
71 mm = 071

Order No

= 239.1. 0320.071



Ejector pin, nitrided, similar to DIN 1530 Shape D



Material:
 NWA
 Order No 239.8.
 Hardness:
 Shaft* ≥ 950 HV 0,3
 Head 45 ± 5 HRC
 Tensile Strength (core) > 1400 N/mm²

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
 Shank nitrided and precision ground.
 Head hot upset-forged.

Note:
 *Owing to thinness of nitrided skin, hardness testing on shank restricted to Vickers only.
 Test load = 3 N max.

239.8. Ejector pin, nitrided, similar to DIN 1530 Shape D

d ₁	d ₂	k	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁
			100	125	160	200	250	315
3	4.5	0.5	●	●	●	●	●	●
4	5.5	0.5	●	●	●	●	●	●
5	6.5	0.5	●	●	●	●	●	●
6	8	0.5	●	●	●	●	●	●
8	10	1	●	●	●	●	●	●
10	12	1	●	●	●	●	●	●
12	14	1	●	●	●	●	●	●
14	16	1.5			●	●	●	●
16	18	1.5			●	●	●	●

Ordering Code (example):

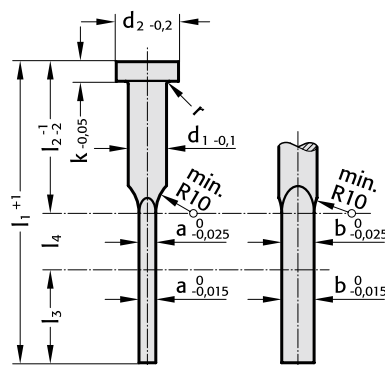
Ejector pin, nitrided, similar to DIN 1530 Shape D	=239.8.
Shank diameter d ₁	8 mm = 0800.
Length l ₁	100 mm = 100
Order No	=239.8.0800.100



Flat ejector pin, hardened, similar to DIN ISO 8693



263.1.



Material:

WS

Order No 263.1.

Hardness:

Shaft 60 ± 2 HRC

Head 45 ± 5 HRC

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank hardened and precision ground.

Head hot upset-forged.

Note:

Special dimensions a and b available on request.

263.1. Flat ejector pin, hardened, similar to DIN ISO 8693

d ₁	4	4.2	4.2	4.2	5	5	5	6	6	6	6	8	8	8	10	10	12	12
d ₂	8	8	8	8	10	10	10	12	12	12	12	14	14	14	16	16	18	18
k	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	7	7
r	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.8
a	1	0.8	1	1.2	1	1.2	1.5	1	1.2	1.5	2	1.2	1.5	2	1.5	2	2	2.5
b	3.5	3.8	3.8	3.8	4.5	4.5	4.5	5.5	5.5	5.5	5.5	7.5	7.5	7.5	9.5	9.5	11.5	11.5
l ₁ l ₂ l ₃ l ₄																		
63 30 25 10	●	●	●															
80 40 30 10	●	●	●	●	●	●		●	●									
100 50 40 10	●	●	●	●	●	●	●	●	●	●	●	●	●					
125 60 50 15	●	●		●	●	●	●	●	●	●	●	●	●	●				
160 80 50 30			●	●	●	●	●	●	●	●	●	●	●	●	●			
200 100 60 40				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
250 125 60 65														●	●	●	●	●
315 160 70 85																●	●	●

Ordering Code (example):

Flat ejector pin, hardened, similar to DIN ISO 8693

=263.1.

Width a 1.5 mm = 15.

Length b 5.5 mm = 055.

Length l₁ 100 mm = 100

Order No =263.1. 15. 055.100



Flat ejector pin, nitrided, similar to DIN ISO 8693

Material:

NWA

Order No 263.8.

Hardness:

Shaft* ≥ 950 HV 0,3

Head 45 ± 5 HRC

Tensile Strength (core) > 1400 N/mm²

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank nitrided and precision ground.

Head hot upset-forged.

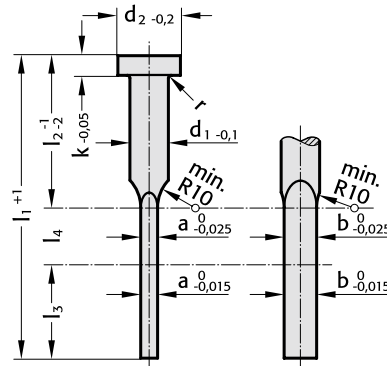
Note:

*Owing to thinness of nitrided skin, hardness testing on shank restricted to Vickers only.

Test load = 3 N max.

Special dimensions a and b available on request.

263.8.



263.8. Flat ejector pin, nitrided, similar to DIN ISO 8693

d ₁	4	4.2	4.2	4.2	5	5	5	6	6	6	6	8	8	8	10	10	12	12	16	16
d ₂	8	8	8	8	10	10	10	12	12	12	12	14	14	14	16	16	18	18	22	22
k	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	7	7	7	7
r	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.8
a	1	0.8	1	1.2	1	1.2	1.5	1	1.2	1.5	2	1.2	1.5	2	1.5	2	2	2.5	2	2.5
b	3.5	3.8	3.8	3.8	4.5	4.5	4.5	5.5	5.5	5.5	5.5	7.5	7.5	7.5	9.5	9.5	11.5	11.5	15.5	15.5
l ₁	63	30	25	10																
l ₂	80	40	30	10																
l ₃	100	50	40	10																
l ₄	125	60	50	15																
	160	80	50	30																
	200	100	60	40																
	250	125	60	65																
	315	160	70	85																
	400	200	95	105																

Ordering Code (example):

Flat ejector pin, nitrided, similar to DIN ISO 8693

=263.8.

Width a 2 mm = 20.

Length b 5.5 mm = 055.

Length l₁ 125 mm = 125

Order No =263.8. 20.055.125



Ejector sleeve, nitrided, DIN ISO 8405

Material:

NWA

Order No 264.8.

Hardness:

Shaft** ≥ 950 HV 0,3

Head 45 ± 5 HRC

Tensile Strength (core) > 1400 N/mm²

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shank nitrided and precision ground.

Head hot upset-forged.

Guide bore precision ground and honed.

*up to $\varnothing d_4 = 4,5$ tolerance $+0,2/-0,1$

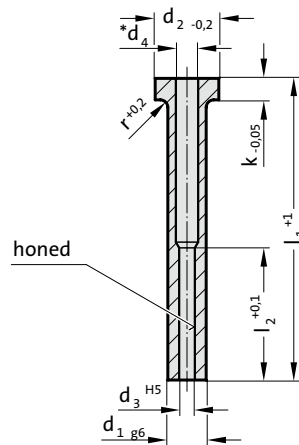
*from $\varnothing d_4 = 5$ tolerance $+0,3/-0,1$

Note:

**Owing to thinness of nitrided skin, hardness testing on shank restricted to Vickers only.

Test load = 3 N max.

264.8.



264.8. Ejector sleeve, nitrided, DIN ISO 8405

d ₁	d ₃	d ₄	d ₂	k	r	l ₂	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁	l ₁
3	1.5	1.8	6	3	0.3	35	75	100	125	150	175	200	225	250	275
3	1.6	1.9	6	3	0.3	35	●	●	●	●					
4	2	2.5	8	3	0.3	35	●	●	●	●					
4	2.2	2.4	8	3	0.3	35	●	●	●	●					
5	2.5	3	10	3	0.3	35	●	●	●	●					
5	2.7	3	10	3	0.3	45	●	●	●	●					
5	3	3.5	10	3	0.3	45	●	●	●	●	●				
5	3.2	3.5	10	3	0.3	45	●	●	●	●	●	●			
6	3.5	4	12	5	0.5	45	●	●	●	●	●	●			
6	3.7	4	12	5	0.5	45	●	●	●	●	●	●			
6	4	4.3	12	5	0.5	45	●	●	●	●	●	●	●		
8	4.2	5	14	5	0.5	45	●	●	●	●	●	●	●		
8	5	5.5	14	5	0.5	45	●	●	●	●	●	●	●	●	
8	5.2	5.5	14	5	0.5	45	●	●	●	●	●	●	●	●	
10	6	6.5	16	5	0.5	45	●	●	●	●	●	●	●	●	
10	6.2	6.5	16	5	0.5	45	●	●	●	●	●	●	●	●	
12	8	8.5	20	7	0.8	45	●	●	●	●	●	●	●	●	●
12	8.2	8.5	20	7	0.8	45	●	●	●	●	●	●	●	●	●
14	10	10.5	22	7	0.8	45		●	●	●	●	●	●	●	●
14	10.2	10.5	22	7	0.8	45		●	●	●	●	●	●	●	●
16	12	12.5	22	7	0.8	45		●	●	●	●	●	●	●	●

Ordering Code (example):

Ejector sleeve, nitrided, DIN ISO 8405

= 264.8.

Diameter ejector pin d₃ 4 mm = 0400.

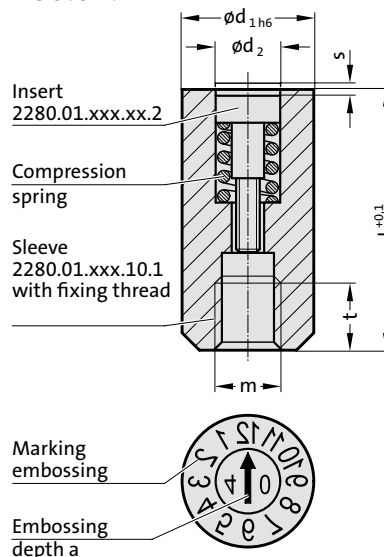
Length l₁ 75 mm = 075

Order No = 264.8. 0400. 075

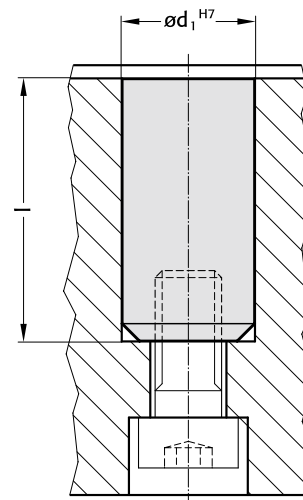
Date stamp complete, embossed lettering



2280.01.



Mounting example



Material:

1.2767, hardened HRC 54±2, ground

Note:

The sleeve and insert can be ordered separately (see ordering example).

Description:

- sleeve with engraving
- adjustable insert with display arrow and year (can be rotated using an ordinary screwdriver)
- metric thread for fixing
- mirror image engraving

Mounting:

Fixing:

Screw in the insert in a clockwise direction until it is flush with the top edge and set to the required position.

Setting:

Set the insert by turning clockwise or anti-clockwise. When correctly set, the insert of a stamp with $d_1 = 6 \text{ mm}$ (.060.) is typically a maximum of 0.1 mm above or below the top edge of the sleeve.

Changing:

To change the insert turn it anti-clockwise to remove.

2280.01. Date stamp complete, embossed lettering

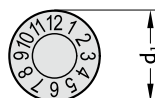
d_1	d_2	l	m	t	s	a
4	2.5	14	2	2	0.2	0.3
5	3.1	17	3	3	0.2	0.4
6	3.1	17	3	3	0.2	0.4
8	4.6	20	4	4	0.35	0.4
10	4.6	20	5	4	0.35	0.4
12	6.4	25	6	6	0.5	0.6
16	8.4	33	8	8	0.6	0.6

Ordering examples:

Date insert, complete	= 2280.
Standard version	= 01.
Sleeve diameter $d_1 = 5$	= 050.
Sleeve with display:	
Months (1-12)	= 10.
Insert with display: Arrow + year	
(variable) e.g. 2004	= 04
Order No	= 2280.01.050.10.04



Date insert, Sleeve	= 2280.
Standard version	= 01.
Sleeve diameter $d_1 = 5$	= 050.
Sleeve with display:	
Months (1-12)	= 10.
Sleeve	= 1
Order No	= 2280.01.050.10.1



Date insert, Insert	= 2280.
Standard version	= 01.
Sleeve diameter $d_1 = 5$	= 050.
Insert with display: Arrow + year	
(variable) e.g. 2004	= 04.
Insert	= 2
Order No	= 2280.01.050.04.2

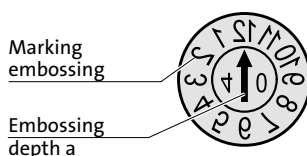
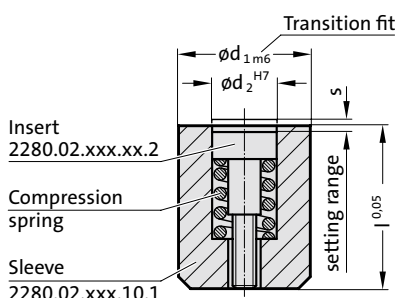
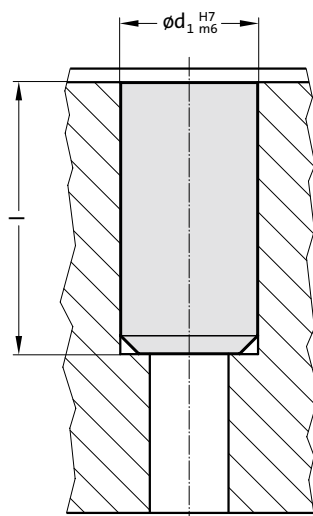


Date stamp complete (short version), embossed lettering



Mounting example

2280.02.



Material:

1.2767, hardened HRC 54±2, ground

Note:

The sleeve and insert can be ordered separately (see ordering example).

Description:

- sleeve with engraving
- adjustable insert with display arrow and year (can be rotated using an ordinary screwdriver)
- metric thread for fixing
- mirror image engraving

Mounting:

Fixing:

Screw in the insert in a clockwise direction until it is flush with the top edge and set to the required position.

Setting:

Set the insert by turning clockwise or anti-clockwise. When correctly set, the insert of a stamp with $d_1 = 6 \text{ mm}$ (.060.) is typically a maximum of 0.1 mm above or below the top edge of the sleeve.

Changing:

To change the insert turn it anti-clockwise to remove.

2280.02. Date stamp complete (short version), embossed lettering

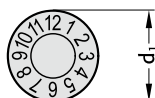
d_1	d_2	l	s	a
2.6	1.4	4	0.2	0.3
3	1.5	4	0.2	0.3
4	2.1	5	0.25	0.3
5	3.1	8	0.2	0.4
6	3.1	8	0.2	0.4
8	4.4	10	0.25	0.4
10	5.2	12	0.35	0.4
12	6.2	14	0.35	0.6

Ordering examples:

Date insert, complete	= 2280.
Standard version	= 02.
Sleeve diameter $d_1 = 5$	= 050.
Sleeve with display:	
Months (1-12)	= 10.
Insert with display: Arrow + year	
(variable) e.g. 2004	= 04
Order No	= 2280.01.050.10.04



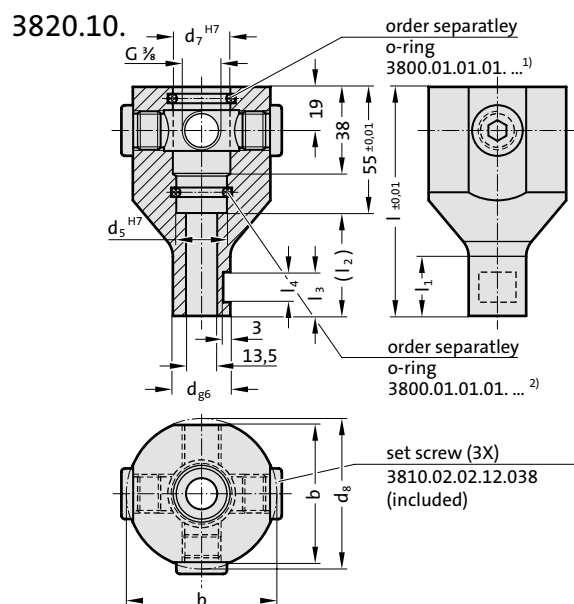
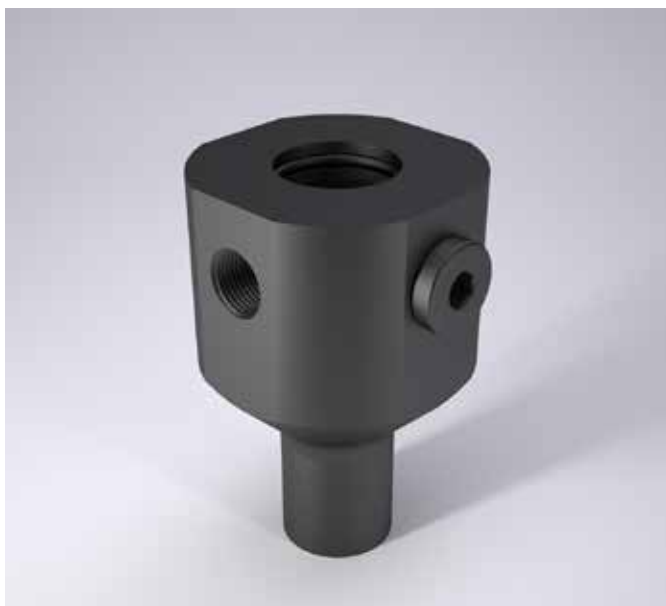
Date insert, Sleeve	= 2280.
Standard version	= 02.
Sleeve diameter $d_1 = 5$	= 050.
Sleeve with display:	
Months (1-12)	= 10.
Sleeve	= 1
Order No	= 2280.01.050.10.1



Date insert, Insert	= 2280.
Standard version	= 02.
Sleeve diameter $d_1 = 5$	= 050.
Insert with display: Arrow + year	
(variable) e.g. 2004	= 04.
Insert	= 2
Order No	= 2280.01.050.04.2



Quill holder for core tempering



Description:

The quill holder is preferably used with bolt guide 2967.10. and quills with internal bore for slider tempering. 4 connections make it possible to implement tempering circuits either directly or in series.

Material:

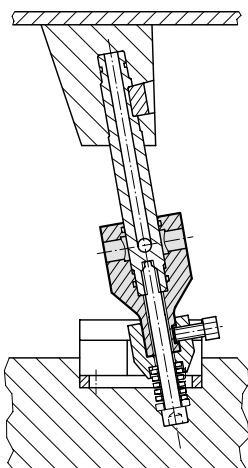
Stainless steel

3820.10. Quill holder for core tempering

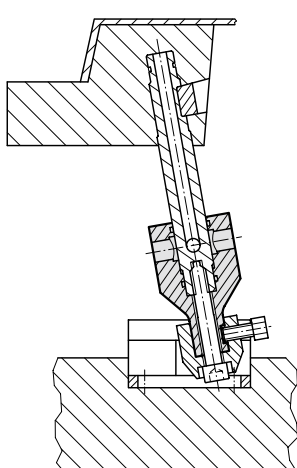
Order No	d	d ₇	d ₈	d ₅	b	l	l ₁	l ₂	l ₃	l ₄
3820.10.025.025	25	25	65	22	60	100	26	45	19	13
3820.10.030.030	30	30	70	27	65	105	31	50	22	14.5
3820.10.040.040	40	40	80	37	75	115	41	60	28	16.5

Mounting example

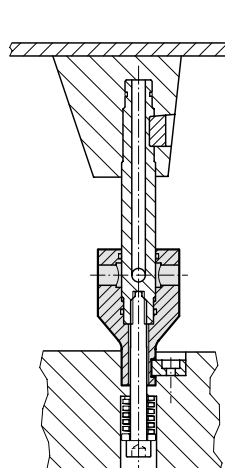
1. Swivelled
Slider without sealing surfaces



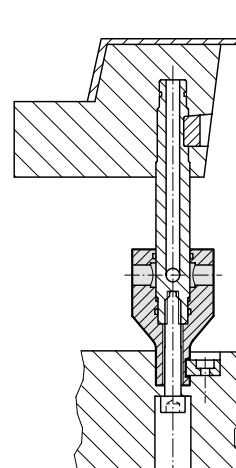
2. Swivelled
Slider with sealing surfaces



3. Not swivelled
Slider without sealing surfaces



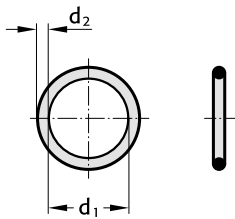
4. Not swivelled
Slider with sealing surfaces



O-ring, Viton



3800.01.01.01.



3800.01.01.01. O-ring, Viton

Order No		d ₁	d ₂	used in
3800.01.01.01.0240.30	1)	24	3	3820.10.025.025
3800.01.01.01.0210.30	2)	21	3	3820.10.025.025
3800.01.01.01.0292.30	1)	29.2	3	3820.10.030.030
3800.01.01.01.0260.30	2)	26	3	3820.10.030.030
3800.01.01.01.0392.30	1)	39.2	3	3820.10.040.040
3800.01.01.01.0360.30	2)	36	3	3820.10.040.040

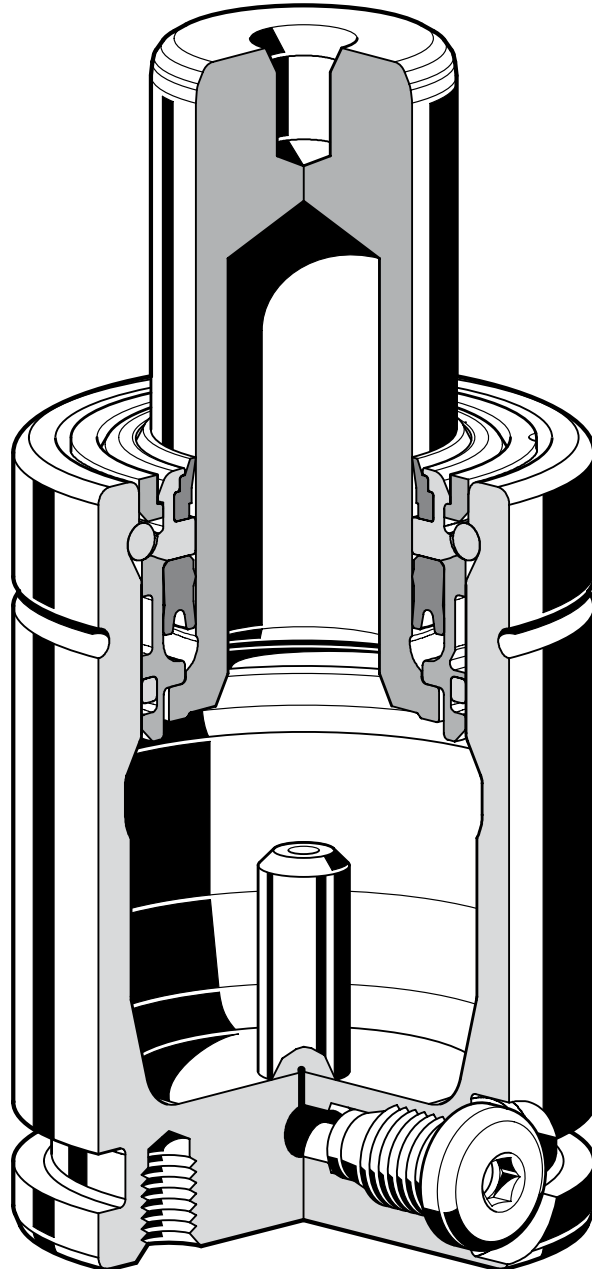
Material:
 Viton® (FPM)
Note:
 Operating temperature -15°C to +200°C



Mould Line Gas springs and Spring plungers for Mould making



FML Gas springs for Mould making



FML Gas springs for Mould Making

FIBRO Mould Line Gas springs (FML)

FIBRO FML Gas springs are an ideal supplement to and expansion of the traditional FIBRO product lines of helical, disc and elastomer springs for manufacturing tools, devices, moulds and machines.

Gas springs can be used for all applications where lift movements are required in parallel to mould opening.

FIBRO Mould Line Gas springs (FML), which were specially developed for mould making, are characterised by their high force, small size, long service life and a constant operating temperature of 120°C.

Of course, FIBRO FML Gas springs are approved as per European Pressure Equipment Directive 97/23/EC (14th GSGV ordinance on pressure vessels). FIBRO FML Gas springs are filled with nitrogen and do not require any pressure space that is positioned externally or in tool plates. They also require no gas supply lines.

In certain special cases, however, monitoring of charge pressure in the installed state is required. These may be found in the list of accessory products if needed. As long as all mounting details are laid out with due circumspection, it is no problem at all to remove and install FIBRO FML Gas springs.

Operating instructions are included with every delivery of FIBRO FML Gas springs. Application examples are shown on the following pages.

Functioning

The pressure medium is a commercially available, environment-friendly nitrogen. FIBRO FML Gas springs have a standard charge pressure of max. 150 bar.

Pressure Build-Up

In operation the piston rod enters the spring space whose volume is progressively reduced. The resulting pressure rise can be plotted on the Gas spring Diagram as a multiplication factor. The spring force is the product of initial force times that pressure-rise factor and can therefore be calculated easily.

Working temperature

The spring temperature should not exceed +120°C.

Charge pressure

Modification of charge pressure allows variation of the force rating and can be predetermined from the spring Diagram.

Installation

FIBRO FML Gas springs can be used in any installation position. Whether or not external forces act on them when at rest is of no consequence and can therefore be calculated easily.



All FIBRO Gas springs meet the requirements of the Pressure Equipment Directive 97/23/EC.

The Pressure Equipment Directive (97/23/EC) has been ratified by the European Parliament and the Council of Europe. The requirements of the pressure equipment directive came into force throughout the EC on 29 May 2002.

The directive defines pressure equipment as vessels, pipework, safety devices and pressure accessories. In terms of the directive a vessel is a casing which is designed and manufactured to contain fluids under pressure.

It follows from this definition that nitrogen gas springs of all sizes are deemed to be pressure vessels and must in this respect comply with the pressure equipment directive (97/23/EC) from 29 May 2002.

FML Gas springs for Mould making

Maintenance

FIBRO FML Gas springs are designed for long-term maintenance-free operation. We recommend lightly oiling the piston rod before using. Sealing and guide elements can be replaced easily in very little time.

They are available in a spare parts kit.

Each spare parts kit comes with detailed instructions for maintenance of Gas springs.

Caution!

Gas springs may only be charged with commercial grade 5.0 nitrogen gas.

Accessories

The range of accessories for gas springs includes fastening devices, charging and control units, screw connections and lines for setting up compound systems.

Advantages of the FIBRO Mould Line series:

- Very little calibration work required in the tool
- No lubrication required
- No maintenance required for up to 1,000,000 strokes¹
- Variably adjustable forces
- For mould temperatures of up to 120°C
- Approved as per the european pressure equipment directive 97/23/EC (14th GSGV regulation for pressure vessels)
- Standard safety features (FIBRO Safer Choice)²
 - Safety piston rod
 - Excess pressure protection
 - Overstroke protection
- A pressure monitoring system makes it possible to recognise an impending failure at an early point (prevention)
- No tool breakage if the 2nd separation level is locked (the plate comes to a standstill; after the jam is removed, production can be resumed)
- Used worldwide in one million FIBRO Gas springs
- Cost savings: approximately 60-70% (e.g. compared to a latch-locking unit)

¹ At 80°C to 120°C/ 500,000 strokes

² Depending on type of spring

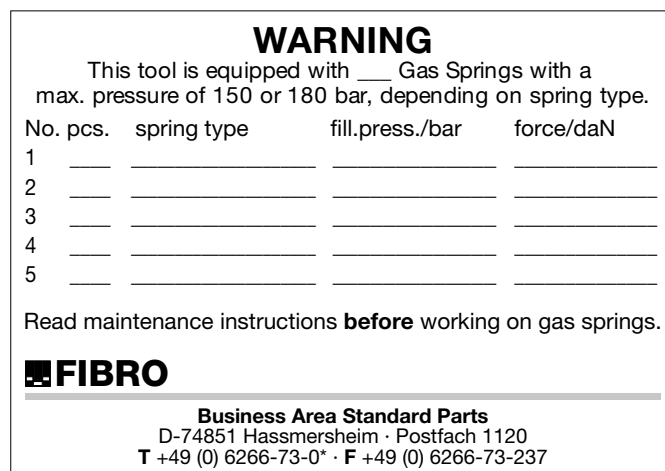
Warning signs

These are available on request. The signs should be affixed near the springs in as prominent a position as possible.



Size 35×50 mm

Language	Order No
german	2480.00.035.050.1
english	2480.00.035.050.2
french	2480.00.035.050.3
italian	2480.00.035.050.4
spanish	2480.00.035.050.5
polish	2480.00.035.050.PL
czech	2480.00.035.050.CZ
turkish	2480.00.035.050.TR
chinese	2480.00.035.050.CN



Size 75×105 mm

Language	Order No
german	2480.00.075.105.1
english	2480.00.075.105.2
french	2480.00.075.105.3
italian	2480.00.075.105.4
spanish	2480.00.075.105.5
polish	2480.00.075.105.PL
czech	2480.00.075.105.CZ
turkish	2480.00.075.105.TR
chinese	2480.00.075.105.CN

Size 110×150 mm

Language	Order No
german	2480.00.110.150.1
english	2480.00.110.150.2
french	2480.00.110.150.3
italian	2480.00.110.150.4
spanish	2480.00.110.150.5
polish	2480.00.110.150.PL
czech	2480.00.110.150.CZ
turkish	2480.00.110.150.TR
chinese	2480.00.110.150.CN

Installation instructions

FML Gas springs



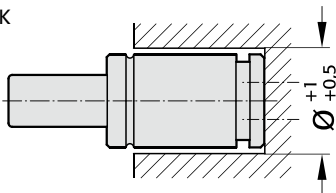
FIBRO

Mounting examples

Mounting possibilities for gas springs are listed below.

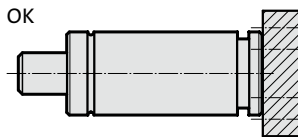
For additional information on mounting, see the corresponding pages in the catalogue.

OK



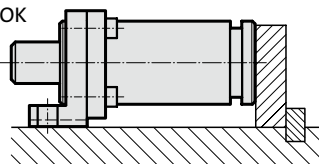
Screw mounted at the base

OK

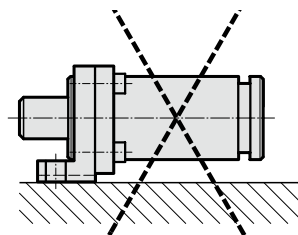


Screw mounted at the base with 2480.011.

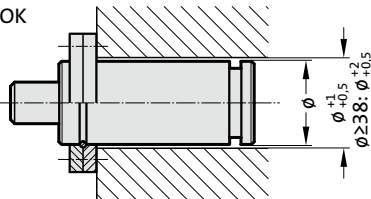
OK



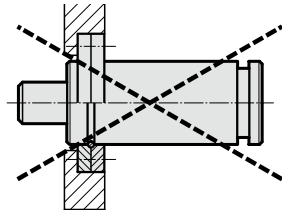
Fastened with 2480.044./045./047.



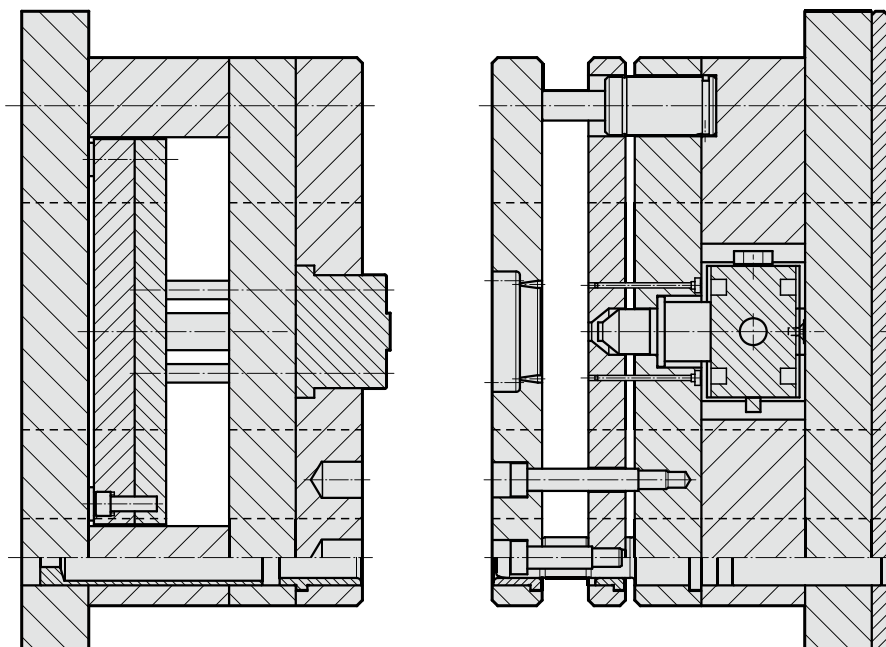
OK



Fastened with 2480.055./057./064.



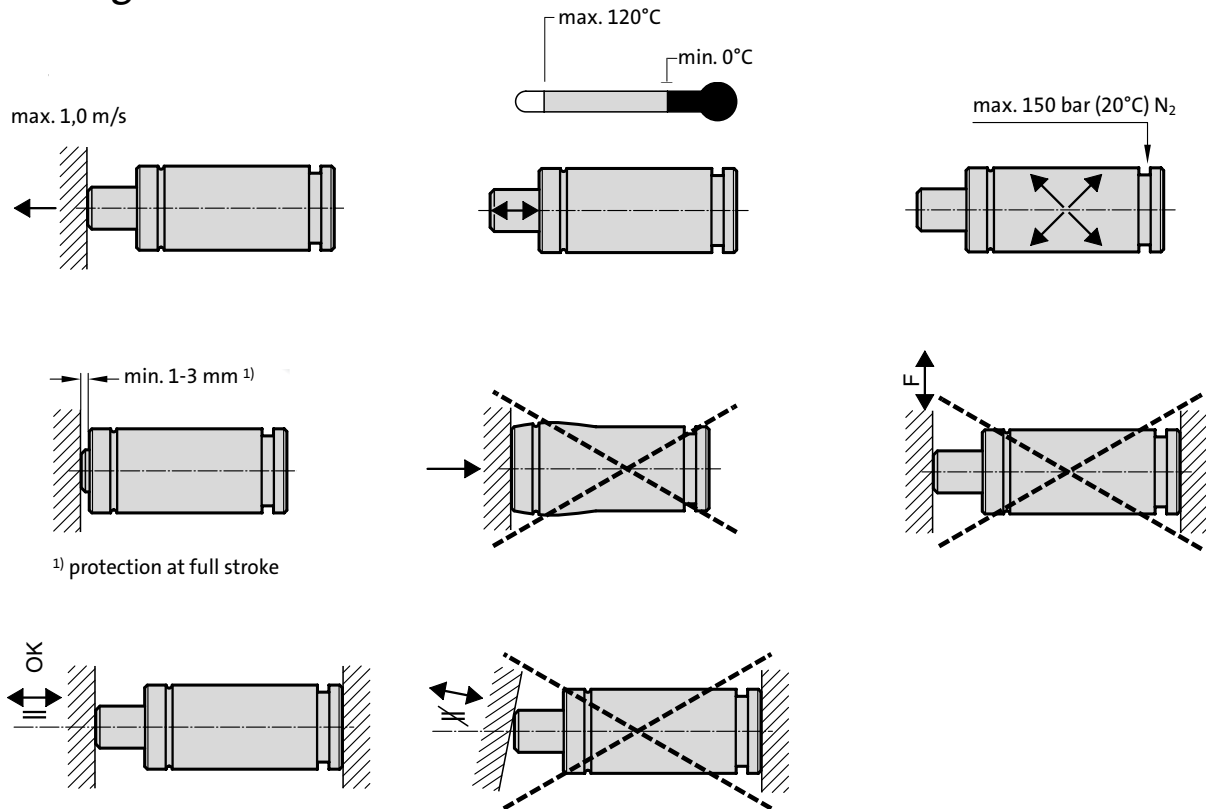
Installation principle:



Mounting directions FML Gas springs

To achieve the best possible service-life and safety from the gas spring, the directions below must be followed.

Mounting instructions



- ▶ Secure the gas spring to the tool/machine whenever possible, using the threaded hole(s) in the base of the gas spring or a suitable flange. Never exceed the maximum torque values for the threads in the base of the gas spring: (M6 = 10 Nm; M8 = 24 Nm; M10 = 45 Nm; M12 = 80 Nm)
- ▶ The threaded hole in the piston rod top should not be used for mounting purposes. It is only to be used when carrying and servicing the gas spring.
- ▶ Do not use the gas spring in such a way that the piston rod is realised freely from its compressed position, as this could cause internal damage to the gas spring.
- ▶ Make sure the gas spring is mounted parallel to the direction of the compression stroke.
- ▶ Ensure the contact surface of the piston rod top is perpendicular to the direction of the compression stroke and is sufficiently hardened.
- ▶ The gas spring should not be subjected to the side loads.
- ▶ Protect the piston rod against mechanical damage and contact with fluids.
- ▶ We do not recommend the last 5 mm or 10% of the nominal stroke be utilised.
- ▶ The maximum charging pressure as a function of the working temperature must not be exceeded as it may effect the safety of the product.
- ▶ Exceeding the gas spring's recommended operating temperature will shorten the service-life of the gas spring.
- ▶ The entire contact surface of the piston rod / piston should be used.

Gas springs – The Safer Choice

FIBRO - The Safer Choice

At FIBRO, safety and reliability are paramount. Particularly when it comes to our gas springs. With their unique range of safety features, FIBRO gas springs are the safest on the market.

FIBRO safety features¹⁾



PED approval for 2 million strokes

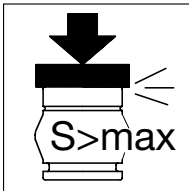
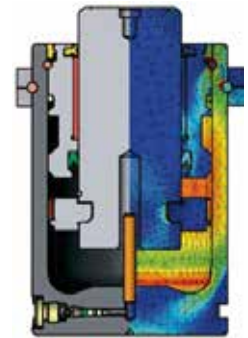
FIBRO gas springs are developed, manufactured and tested for 2 million full strokes* in accordance with DGRL97/23/EG. The springs deliver this full performance at the maximum permissible limits in terms of filling pressure and operating temperature - even when combined with any of the various mounting types available.

* Unless specified otherwise on the spring

The benefit for you:

► Guaranteed safety and reliability for the entire service life of the spring

Repair kits and qualified training sessions available through FIBRO Service offer increased effectiveness and process reliability.



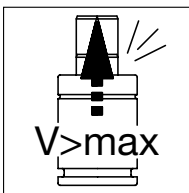
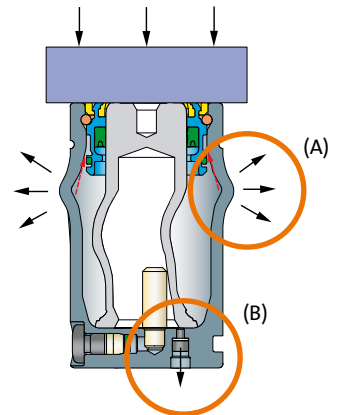
Overstroke protection

Conventional gas springs can burst in the event of an over-extended stroke. If this happens, parts flying around can become dangerous projectiles.

FIBRO gas springs are different: in the event of an overstroke and depending on the spring type the patented protection system will ensure that either the cylinder wall of the gas spring is deformed in a predefined manner (A) or the piston rod destroys a rupture bolt in the floor of the cylinder (B), thereby allowing the gas to escape into the atmosphere.

The benefit for you:

► No risk of parts flying around in the event of an overstroke



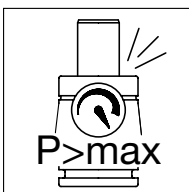
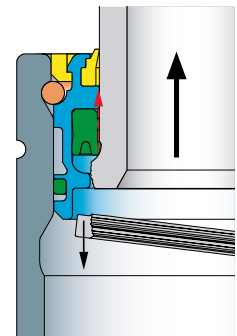
Return stroke protection

A particularly dangerous situation can arise with conventional gas springs if tool components become jammed and the pressure on the compressed piston rod is then abruptly released: in this case, the piston rod is then fired out of the cylinder like a missile.

FIBRO gas springs are different: special guides and a patented safety stop in the piston rods ensure your safety. If the speed is too high during the return stroke, the collar on the piston rod will automatically break. The integrated safety stop then destroys the seal, which allows the gas to escape into the atmosphere and the gas spring to become depressurised.

The benefit for you:

► No risk of a piston rod firing out if the return stroke is too fast



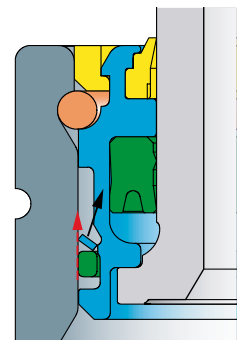
Overpressure protection

Conventional gas springs can burst if the internal pressure rises above a maximum permitted value. If this happens, parts flying around can become dangerous projectiles.

FIBRO gas springs are different: if the pressure rises above the maximum permitted value, the safety collar on the sealing set is automatically destroyed. The gas then escapes into the atmosphere and the gas spring is depressurised.

The benefit for you:

► No risk of bursting parts in the event of overpressure



¹⁾ Not all the safety features mentioned here have been implemented on all FIBRO gas springs.

Please refer to the relevant data sheets to check the current safety equipment which is provided with the gas spring you are interested in, or contact FIBRO GmbH directly for more information.

Gas springs – The Safer Choice

FIBRO reliability features

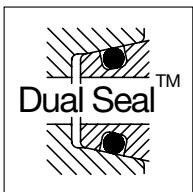
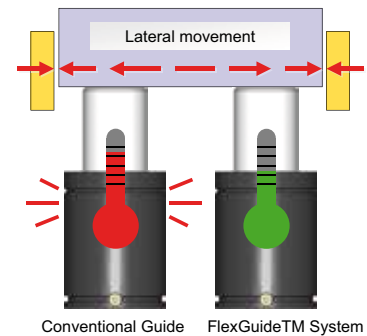
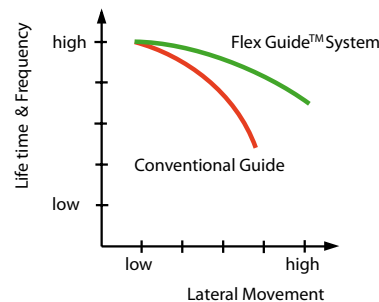


The benefits for you:

Flexible guides: The Flex Guide™ System

The Flex Guide™ System is a flexible guide in the gas spring which absorbs lateral movements of the piston rod. It minimises friction and lowers the operating temperature.

- ▶ Extended service life
- ▶ Increased stroke frequency, i.e. more strokes per minute

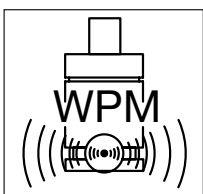
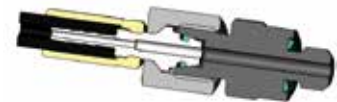


The benefits for you:

Safe hose connections: The Dual Seal™ System

The FIBRO Dual Seal™ System combines a metal seal with a soft elastomer seal. On hose connection systems, the system provides two leak-tight connections and prevents rotation.

- ▶ Leak-tight connection, even under vibrations
- ▶ High process reliability
- ▶ Minimised tool down time
- ▶ Simple installation thanks to anti-rotation function



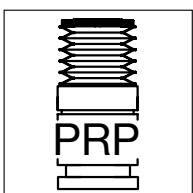
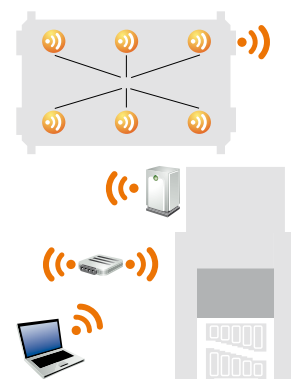
The benefits for you:

Wireless monitoring: The Wireless Pressure Monitoring (WPM) System

The optional Wireless Pressure Monitoring System (WPM) (patent pending) wirelessly monitors the pressure and temperature of FIBRO gas springs. Before a defective part is produced, the press operator receives a message from the WPM and can take appropriate action.

- ▶ Preventative quality assurance
- ▶ High process reliability
- ▶ Minimised tool down time
- ▶ Reduced maintenance and costs

Potential faults are individually displayed. As a result, service intervals can be extended. Maintenance and repair costs are reduced.

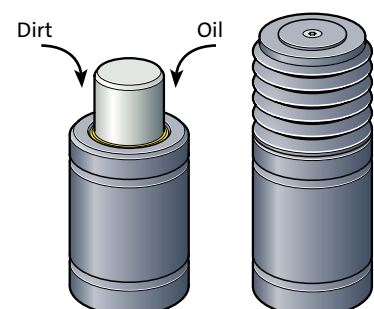


The benefits for you:

Protected piston rods: FIBRO Concertina Shrouds

The FIBRO Piston Rod Protection (patented) reliably protects the piston rods in gas springs against dirt, oil and emulsion. In this way, the system prevents damage to the piston rod surface and leaks at internal seals.

- ▶ Significantly longer service life for gas springs under harsh operating conditions





Gas spring (Spring plunger) MOULD LINE, with hexagon socket

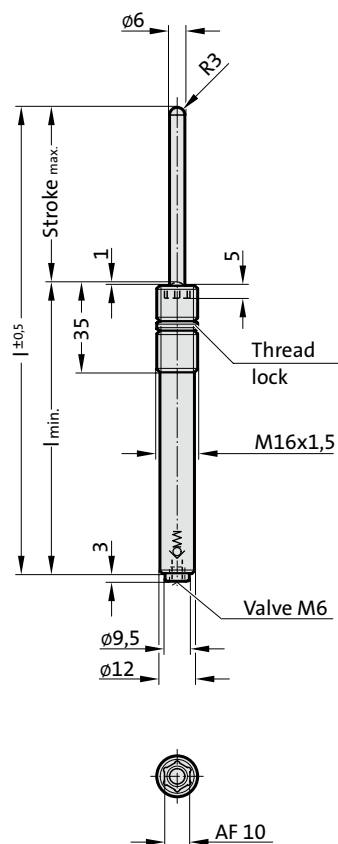


3479.030.

Gas spring (Spring plunger)
MOULD LINE, with hexagon
socket

Order No	Stroke _{max.}	l _{min.}	l
3479.030.00040.010	10	55	65
3479.030.00040.020	20	65	85
3479.030.00040.030	30	75	105
3479.030.00040.040	40	85	125
3479.030.00040.050	50	95	145
3479.030.00040.060	60	105	165
3479.030.00040.070	70	115	185
3479.030.00040.080	80	125	205

3479.030.



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.12.010.017).

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen - N₂

Max. filling pressure depends on working temperature:

150 bar (20°C) at 0°C-80°C

125 bar (20°C) at 80°C-100°C

115 bar (20°C) at 100°C-120°C

Min. filling pressure: 25 bar (20°C)

Working temperature: 0°C to +120°C

Temperature related force increase: $\pm 0.3\%/^{\circ}\text{C}$

Max. recommended extensions per minute:

20 (at 0°C-80°C)

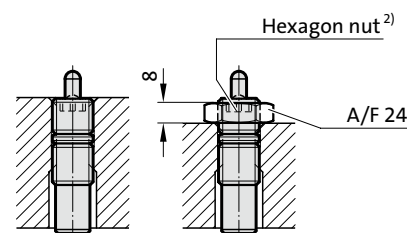
15 (at 80°C-100°C)

10 (at 100°C-120°C)

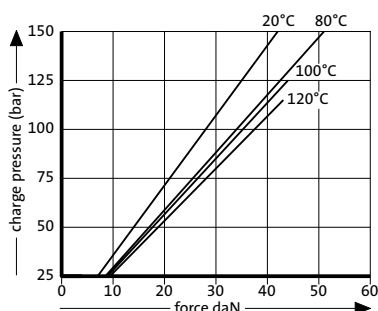
Max. piston speed: 1.0 m/s

2) Hexagon nut order supplementary:

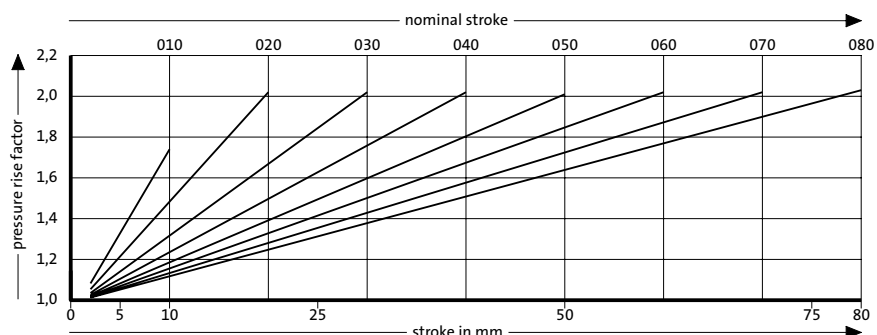
2480.004.00040.1 (M16 x 1,5)



Initial spring force
versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!



Gas spring (Spring plunger) MOULD LINE, with hexagon socket

Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.12.010.017).

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen - N₂

Max. filling pressure depends on working temperature:

150 bar (20°C) at 0°C-80°C

125 bar (20°C) at 80°C-100°C

115 bar (20°C) at 100°C-120°C

Min. filling pressure: 25 bar (20°C)

Working temperature: 0°C to +120°C

Temperature related force increase: $\pm 0.3\%/^{\circ}\text{C}$

Max. recommended extensions per minute:

20 (at 0°C-80°C)

15 (at 80°C-100°C)

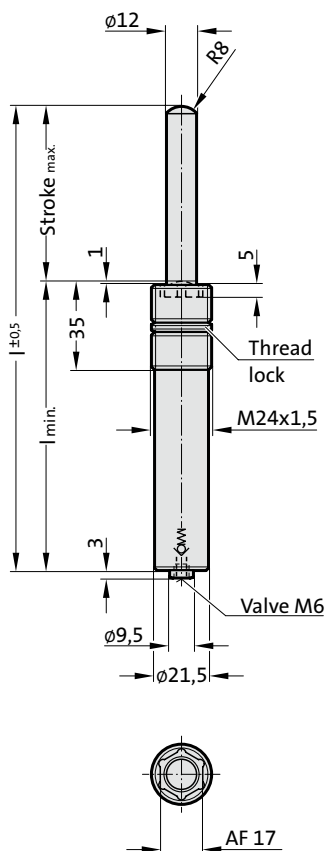
10 (at 100°C-120°C)

Max. piston speed: 1.0 m/s

2) Hexagon nut order supplementary:

2480.004.00170

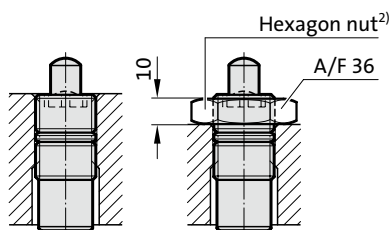
3479.032.



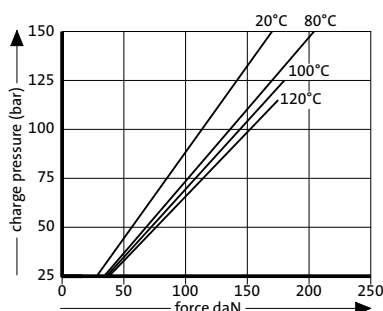
3479.032.

Gas spring (Spring plunger)
MOULD LINE, with hexagon
socket

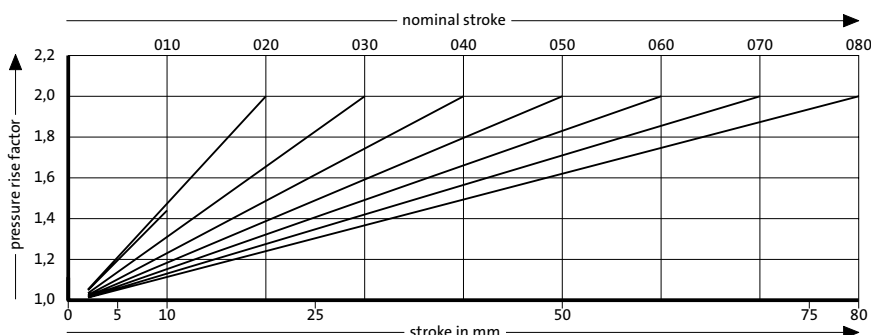
Order No	Stroke _{max.}	l _{min.}	l
3479.032.00170.010	10	55	65
3479.032.00170.020	20	65	85
3479.032.00170.030	30	75	105
3479.032.00170.040	40	85	125
3479.032.00170.050	50	95	145
3479.032.00170.060	60	105	165
3479.032.00170.070	70	115	185
3479.032.00170.080	80	125	205



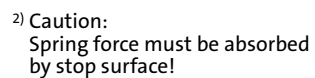
Initial spring force
versus charge pressure



Spring force Diagram displacement versus stroke rise

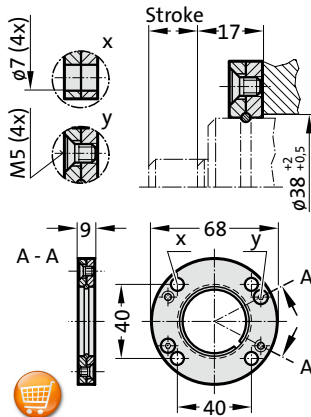


Pressure rise factor accounts for displacement but not external influences!

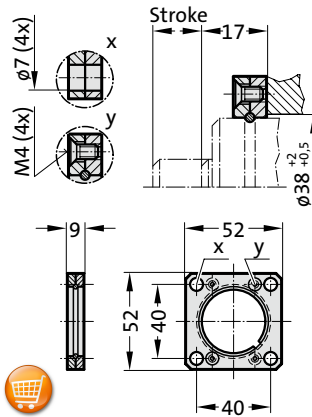


Gas spring Mould Line Mounting variations

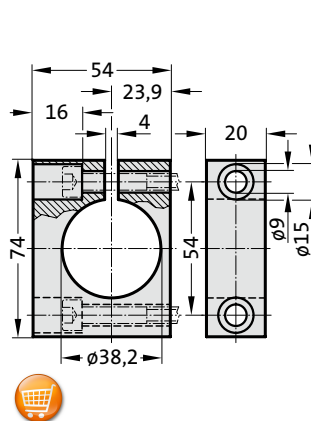
2480.055.00250



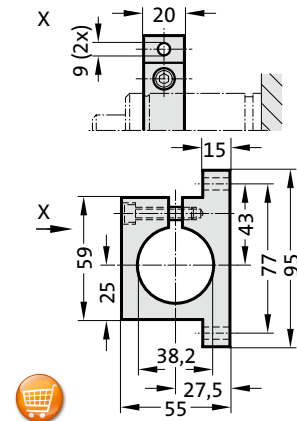
2480.057.00250



2480.044.03.00250 ²⁾



2480.044.00250 ²⁾



Note:

²⁾ Caution:
Spring force must be absorbed
by stop surface!



Gas spring accessories

see registry F:
Gas spring accessories





Auxiliary equipment

see registry H: Chemical tooling aids
see registry J: Peripheral equipment



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