



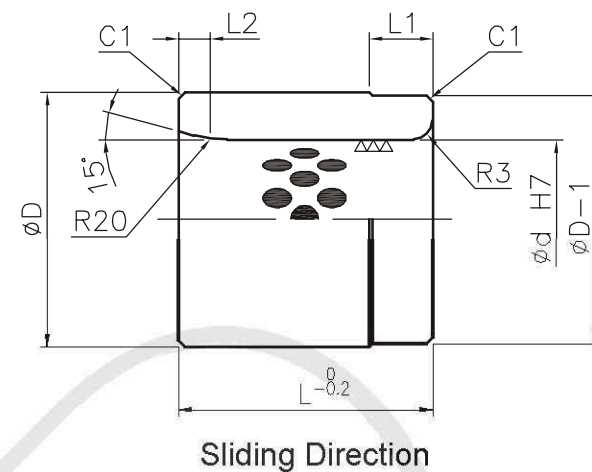
Guide Bushing (Straight and Flange Type)

111.04 (Bronze with Graphite)

112.01 (FC with Graphite)



M Material: 111.04 - Bronze with Graphite
112.01 - FC250 with Graphite

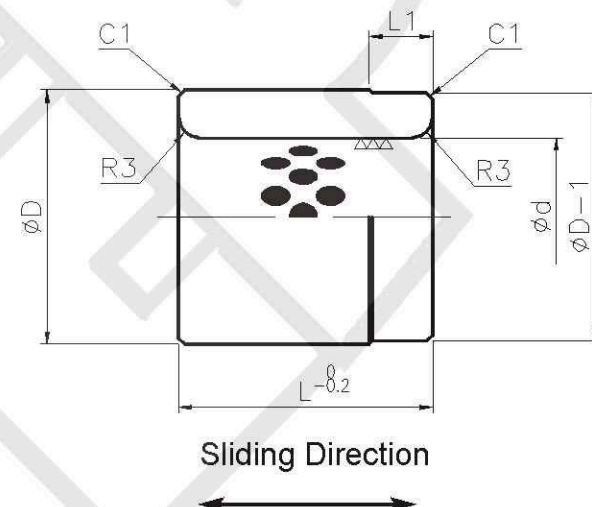


111.05 (Bronze with Graphite)

112.02 (FC with Graphite)



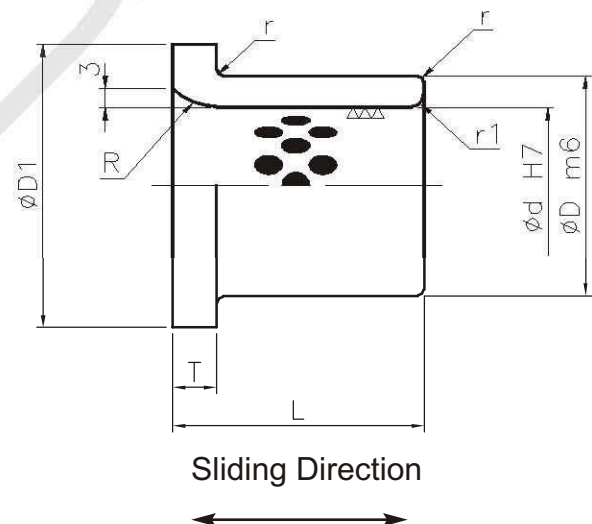
M Material: 111.05 - Bronze with Graphite
112.02 - FC250 with Graphite



121.06 (Flange Type)



M Material: Bronze with Graphite



Guide Bushing (Straight and Flange Type)



d H7		D Tolerance		L	L ₁	L ₂	Part Name	d
25	+0.021 0	40	±0.008	40	10	5	111.04 112.01	25
30		50		50				30
35	+0.025 0	60	±0.0095	55	15			35
40		70		60	10			40
50	+0.030 0	80	±0.011	75	15	10		50
60		100		90	20			60
80	+0.035 0	120	±0.0125	120	25			80
100		140		150				100
120				180				120

O Order
111.04 50

d Tolerance		D Tolerance		L	L ₁	Part Name	d
30	+0.039 0	50	±0.008	60	10	111.05 112.02	30
40		60	±0.0095	80	15		40
50		70		100			50

O Order
111.05 30

d		H7		D		m6		D ₁	T	R	r	r ₁	Part Name	d	L
25	+0.021 0	35	+0.025 +0.009	45	7	10	1	2	121.06	25	40				
30		40		50						30	50				
40	+0.025 0	55	+0.030 +0.011	65	10	20	2			40	70				
50		65		75						50	80				
60	+0.030 0	75	+0.035 +0.013	85	10	20	2			60		100			
65		80		90						65	120				
80	+0.035 0	100	+0.035 +0.013	110	10	20	2			80	140				
100		120		130						100	140				

O Order -
121.06 50 - 80



Guide Bushing (Flange Type)

121.11



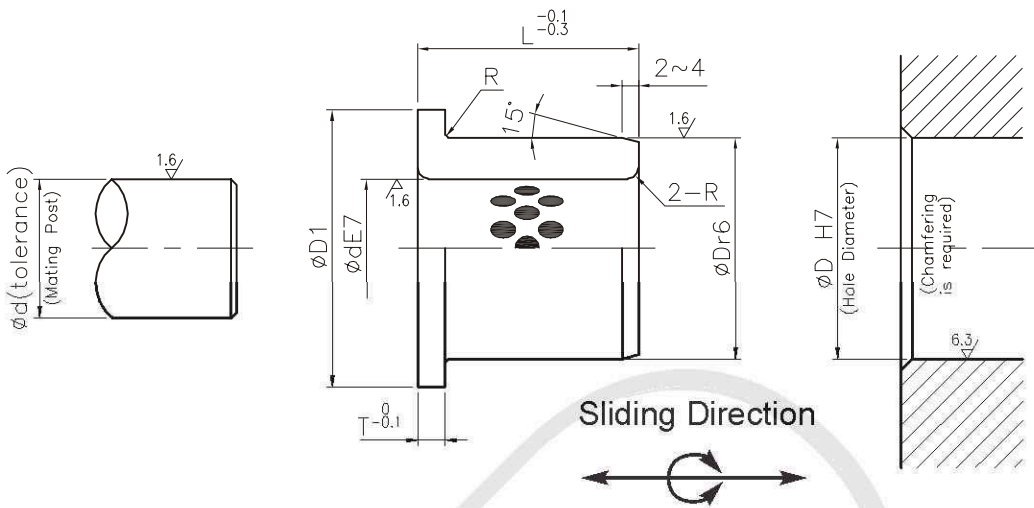
- Mating post tolerance : d8 - General use (high load)
e7 - General use (light load)
f7 - High precision

M Material: SP - #500SP (CAC304+Graphite)

ID		OD		Flange		Length L Tolerance -0.1 -0.3							
Φd	Tolerance	ΦD	Tolerance	ΦF	T	10	12	15	17	18	20	23	25
6	+0.032	10	+0.028 +0.019 +0.040 +0.025	16	2	0610	0612						
8	+0.020	12		20	2	0810	0812	0815					
10	+0.040	14		22	2	1010	1012	1015	1017		1020		
12	+0.025	18		25	3	1210	1212	1215			1220		1225
13	+0.050 +0.032	19	+0.041 +0.028	26	3	1310	1312	1315			1320		1325
14		20		27	3			1415			1420		1425
15		21		28	3	1510	1512	1515			1520		1525
16		22		29	3		1612	1615		1618	1620	1623	1625
18	+0.061 +0.040	24	+0.050 +0.034	32	3			1815			1820		1825
20		30		40	5			2015			2020		2025
25		35		45	5			2515			2520		2525
30		40		50	5						3020		3025
31.5	+0.075 +0.050	40	+0.060 +0.041	50	5						3120		
35		45		60	5						3520		3525
40		50		65	5						4020		4025
45		55		70	5								
50	+0.090 +0.060	60	+0.073 +0.051	75	5								
55		65		80	5								
60		75		90	7.5								
63		75		85	7.5								
65	+0.107 +0.072	80	+0.088 +0.063	95	7.5								
70		85		105	7.5								
75		90		110	7.5								
80		100		120	10								
90	+0.107 +0.072	110	+0.088 +0.063	130	10								
100		120		150	10								
120		140		170	10								



Guide Bushing (Flange Type)



Length L Tolerance -0.1 -0.3									I.D tolerance after press fitting(reference)	ID
30	35	40	50	60	67.5	80	100	120		Φd
									0.016 +0.004 +0.021 +0.006 +0.031 +0.013	6
										8
										10
										12
1230									+0.026 +0.008	13
1330										14
										15
1530										16
1630	1635	1640							+0.037 +0.016	18
1830	1835	1840								20
2030	2035	2040								25
2530	2535	2540	2550							30
3030	3035	3040	3050						+0.046 +0.021	31.5
3130	3135	3140								35
3530	3535	3540	3550							40
4030	4035	4040	4050							45
4530	4535	4540	4550	4560					+0.055 +0.025	50
5030	5035	5040	5050	5060						55
		5540		5560						60
		6040	6050	6060		6080				63
					6367				+0.053 +0.023	65
										70
			7050			7080				75
				7560						80
				8060		8080	80100		+0.046 +0.016	90
				9060		9080				100
						10080	100100			120
						12080	120100			



Guide Bushing (Universal Straight Type)

111.03

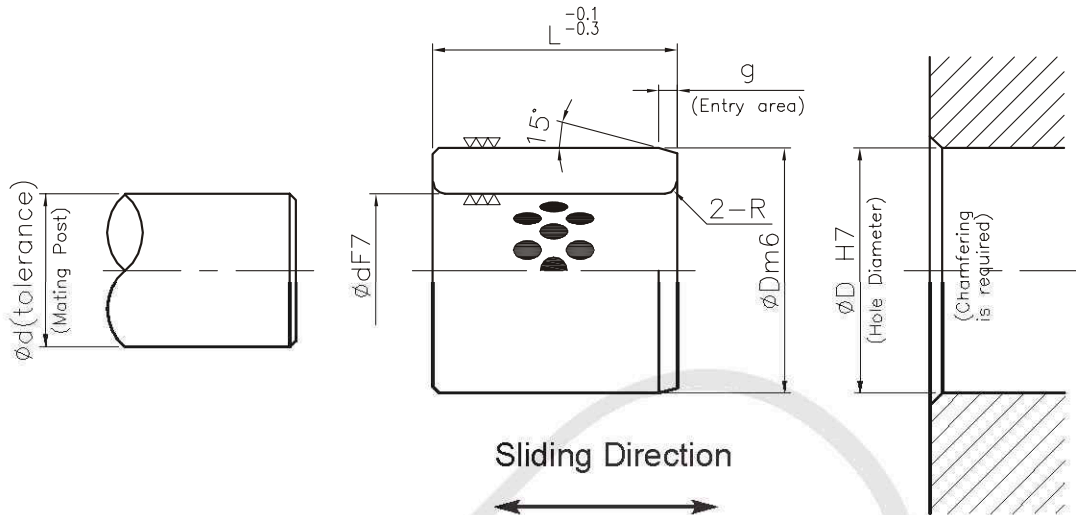


- Mating post tolerance : d8 - General use (high load)
e7 - General use (light load)
f7 - High precision

M Material: SP - #500SP (CAC304+Graphite)

ID		OD		Length L Tolerance -0.1 -0.3							
Φd	Tolerance	ΦD	Tolerance	20	30	35	40	50	60	70	80
50	+0.050 +0.025	60	+0.030 +0.011	506020	506030	506035	506040	506050	506060	506070	506080
50		62			506230	506235	506240	506250	506260	506270	506280
50		65			506530		506540	506550	506560	506570	506580
55	+0.060 +0.030	70			557030	557035	557040	557050	557060	557070	
60		74			607430	607435	607440	607450	607460	607470	607480
60		75			607530	607535	607540	607550	607560	607570	607580
63		75							637560	637570	637580
65		80					658040	658050	658060	658070	658080
70		85			708530	708535	708540	708550	708560	708570	708580
70		90						709050	709060	709070	709080
75	+0.035 +0.013	90	+0.035 +0.013					759050	759060	759070	759080
75		95							759560	759570	759580
80		96					809640	809650	809660	809670	809680
80		100					8010040	8010050	8010060	8010070	8010080
85		100							8510060		8510080
90	+0.071 +0.036	110	+0.040 +0.015					9011050	9011060		9011080
100		120						10012050	10012060	10012070	10012080
110		130						11013050		11013070	11013080
120		140								12014070	12014080
125	+0.083 +0.043	145	+0.040 +0.015								
130		150									13015080
140		160									
150		170									15017080
160		180									16018080
170	+0.046 +0.017	190	+0.046 +0.017								
180		200									
190		210									
200		230									

Guide Bushing (Universal Straight Type)



Length L Tolerance -0.1 -0.3							I.D tolerance after press fitting(reference)	ID
90	100	120	130	140	150	200		Φd
							+0.045 +0.020	50
								50
	5065100							50
							+0.055 +0.025	55
								60
	6075100							60
								63
								65
	7085100						+0.054 +0.024	70
								70
	7590100							75
	7595100							75
	8096100	8096120						80
	80100100	80100120		80100140				80
							+0.065 +0.030	85
9011090	90110100	90110120						90
10012090	100120100	100120120		100120140				100
	110130100	110130120						110
12014090	120140100	120140120		120140140			+0.064 +0.029	120
	125145100	125145120						125
	130150100		130150130					130
	140160100			140160140				140
150170100					150170150			150
	160180100				160180150		+0.076 +0.036	160
	170190100				170190150			170
	180200100				180200150			180
	190210100				190210150			190
					200230150	200230200	+0.088 +0.042	200



Guide Bushing (Universal Straight Type)

111.03



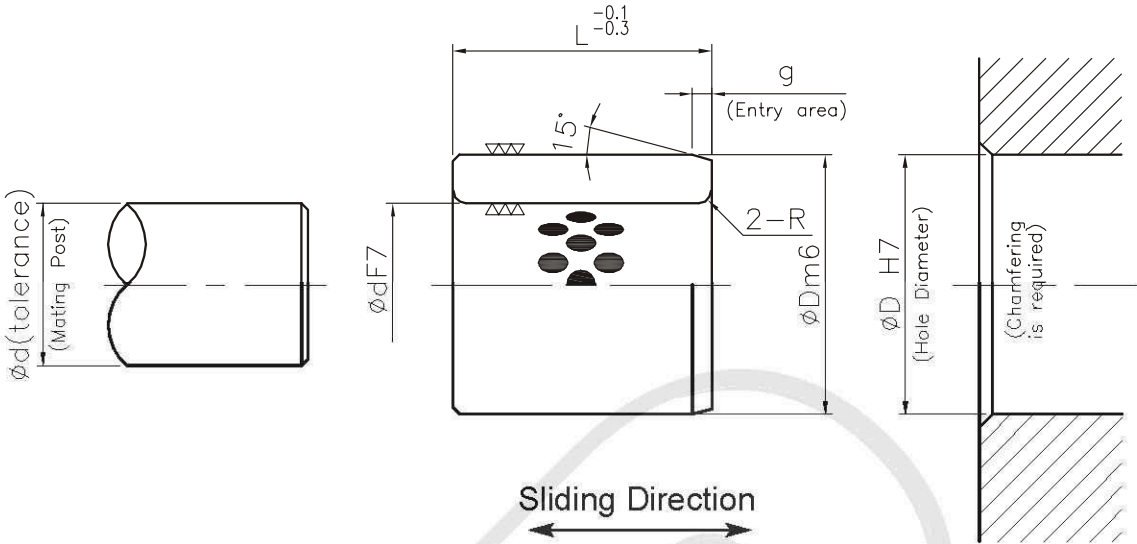
- Mating post tolerance : d8 - General use (high load)
e7 - General use (light load)
f7 - High precision

M Material: SP - #500SP (CAC304+Graphite)

ID		OD		Length L Tolerance -0.1 -0.3							
Φd	Tolerance	ΦD	Tolerance	8	10	12	15	16	19	20	25
6	+0.022 +0.010	10	+0.015 +0.006	061008	061010	061012					
8	+0.028	12	+0.018 +0.007	081208	081210	081212	081215				
10	+0.013	14		101408	101410	101412	101415			101420	
12	+0.034 +0.016	18		121808	121810	121812	121815	121816	121819	121820	121825
13		19	+0.021 +0.008		131910	131912	131915			131920	131925
14		20			142010	142012	142015			142020	142025
15		21			152110	152112	152115	152116		152120	152125
17		23					172315				
18	+0.041 +0.020	24			182410	182412	182415	182416		182420	182425
19		26	+0.025 +0.009				192615			192620	
20		28			202810	202812	202815	202816	202819	202820	202825
20		30			203010	203012	203015	203016		203020	203025
22		32			223212	223215				223220	223225
25	+0.050 +0.025	33	+0.030 +0.011			253312	253315	253316		253320	253325
25		35				253512	253515	253516		253520	253525
28		38								283820	283825
30		38				303812	303815			3038520	303825
30		40				304012	304015			304020	304025
31.5	+0.050 +0.025	40	+0.030 +0.011								
32		42								324220	
35		44								354420	354425
35		45								354520	354525
38		48									
40	+0.050 +0.025	50					405015			405020	405025
40		55					405515				
45		55									
45		56									
45		60									



Guide Bushing (Universal Straight Type)



Length L Tolerance -0.1 -0.3							I.D tolerance after press fitting(reference)	WASHER	ID
30	35	40	50	60	70	80		SPW	Φd
							+0.019 +0.007	0603	6
							+0.025 +0.010	0803	8
							+0.031 +0.013	1003	10
121830								1203	12
131930								1303	13
142030							+0.030 +0.012	1403	14
152130	152135	152140						1503	15
								1803	17
182430	182435	182440						1803	18
								2005	19
202830	202835	202840	202845				+0.037 +0.016	2005	20
203030	203035	203040	203050					2505	20
								2505	22
253330	253335	253340	253350	253360				2505	25
253530	253535	253540	253550	253560				3005	25
283830		283840						3005	28
303830	303835	303840	303850	303860				3005	30
304030	304035	304040	304050	304060			+0.046 +0.021	3505	30
314030		314040						3505	31.5
324230		324240						3505	32
354430	354435	354440	354450	354460				3505	35
354530	354535	354540	354550	354560				4007	35
		384840					+0.045 +0.020	4007	38
405030	405035	405040	405050	405060	405070	405080		4007	40
405530	405535	405540	405550	405560				4507	40
455530	455535	455540	455550	455560				4507	45
455630	455635	455640	455650	455660				4507	45
456030	456035	456040	456050	456060	456070	456080		4507	45



Guide Bushing (Universal Straight Type)

111.03



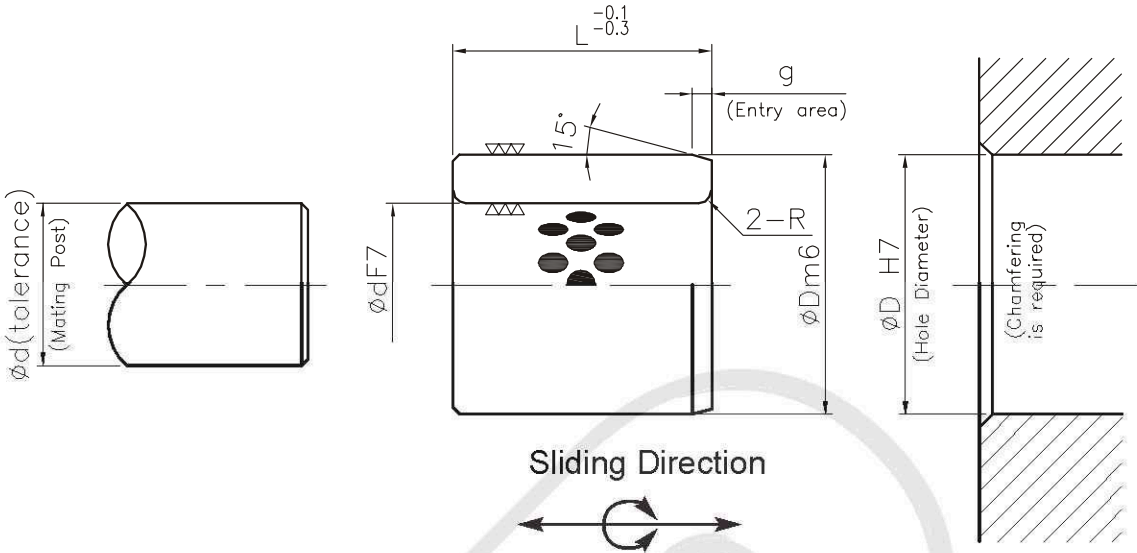
- Mating post tolerance : d8 - General use (high load)
- e7 - General use (light load)
- f7 - High precision

M Material: SP - #500SP (CAC304 + Graphite)

ID		OD		Length L Tolerance -0.1 -0.3							
Φd	Tolerance	ΦD	Tolerance	8	10	12	15	16	19	20	25
6	+0.022 +0.010	10	+0.015 +0.006	061008	061010	061012					
8	+0.028	12	+0.018 +0.007	081208	081210	081212	081215				
10	+0.013	14		101408	101410	101412	101415			101420	
12	+0.034 +0.016	18		121808	121810	121812	121815	121816	121819	121820	121825
13		19	+0.021 +0.008		131910	131912	131915			131920	131925
14		20			142010	142012	142015			142020	142025
15		21			152110	152112	152115	152116		152120	152125
17		23					172315				
18	+0.041 +0.020	24			182410	182412	182415	182416		182420	182425
19		26	+0.025 +0.009				192615			192620	
20		28			202810	202812	202815	202816	202819	202820	202825
20		30			203010	203012	203015	203016		203020	203025
22		32			223212	223215				223220	223225
25		33				253312	253315	253316		253320	253325
25		35	+0.030 +0.012			253512	253515	253516		253520	253525
28		38								283820	283825
30		38				303812	303815			3038520	303825
30		40				304012	304015			304020	304025
31.5	+0.050 +0.025	40	+0.030 +0.011								
32		42								324220	
35		44								354420	354425
35		45								354520	354525
38		48									
40		50					405015			405020	405025
40		55					405515				
45		55									
45		56									
45		60									



Guide Bushing (Universal Straight Type)



Length L Tolerance -0.1 -0.3							I.D tolerance after press fitting(reference)	WASHER	ID
30	35	40	50	60	70	80		SPW	Φd
							+0.019 +0.007	0603	6
							+0.025 +0.010	0803	8
							+0.031 +0.013	1003	10
121830								1203	12
131930								1303	13
142030							+0.030 +0.012	1403	14
152130	152135	152140						1503	15
								1803	17
182430	182435	182440						1803	18
								2005	19
202830	202835	202840	202845				+0.037 +0.016	2005	20
203030	203035	203040	203050					2505	20
								2505	22
253330	253335	253340	253350	253360				2505	25
253530	253535	253540	253550	253560				3005	25
283830		283840						3005	28
303830	303835	303840	303850	303860				3005	30
304030	304035	304040	304050	304060			+0.046 +0.021	3505	30
314030		314040						3505	31.5
324230		324240						3505	32
354430	354435	354440	354450	354460				3505	35
354530	354535	354540	354550	354560				4007	35
		384840					+0.045 +0.020	4007	38
405030	405035	405040	405050	405060	405070	405080		4007	40
405530	405535	405540	405550	405560				4507	40
455530	455535	455540	455550	455560				4507	45
455630	455635	455640	455650	455660				4507	45
456030	456035	456040	456050	456060	456070	456080		4507	45



Guide Bushing (Universal Straight Type)

111.03



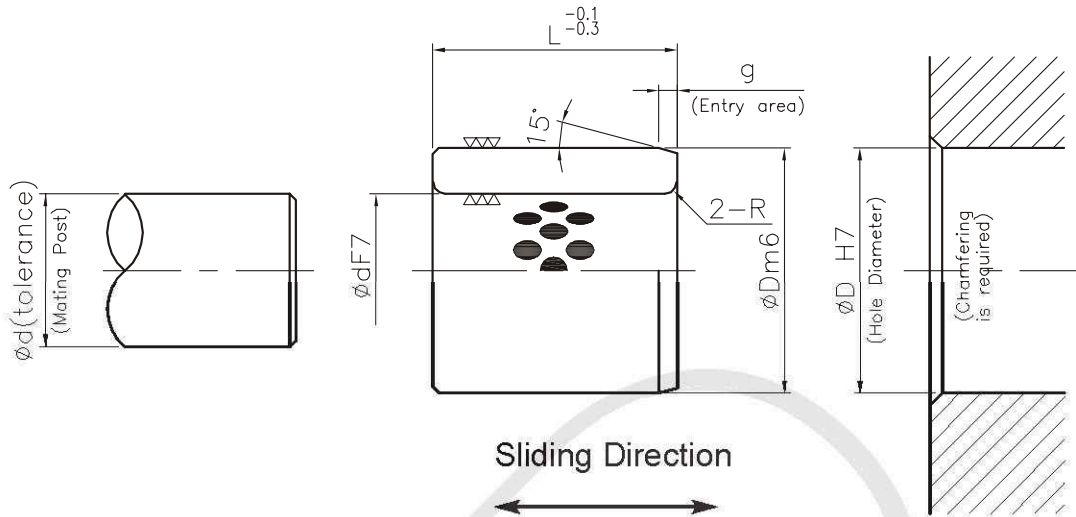
- Mating post tolerance : d8 - General use (high load)
e7 - General use (light load)
f7 - High precision

M Material: SP - #500SP (CAC304 + Graphite)

ID		OD		Length L Tolerance -0.1 -0.3							
Φd	Tolerance	ΦD	Tolerance	20	30	35	40	50	60	70	80
50	+0.050 +0.025	60	+0.030 +0.011	506020	506030	506035	506040	506050	506060	506070	506080
50		62			506230	506235	506240	506250	506260	506270	506280
50		65			506530		506540	506550	506560	506570	506580
55	+0.060 +0.030	70			557030	557035	557040	557050	557060	557070	
60		74			607430	607435	607440	607450	607460	607470	607480
60		75			607530	607535	607540	607550	607560	607570	607580
63		75							637560	637570	637580
65		80					658040	658050	658060	658070	658080
70		85			708530	708535	708540	708550	708560	708570	708580
70		90						709050	709060	709070	709080
75	+0.035 +0.013	90	+0.035 +0.013					759050	759060	759070	759080
75		95							759560	759570	759580
80		96					809640	809650	809660	809670	809680
80		100					8010040	8010050	8010060	8010070	8010080
85		100							8510060		8510080
90	+0.071 +0.036	110	+0.040 +0.015					9011050	9011060		9011080
100		120						10012050	10012060	10012070	10012080
110		130						11013050		11013070	11013080
120		140								12014070	12014080
125	+0.083 +0.043	145	+0.040 +0.015								
130		150									13015080
140		160									
150		170									15017080
160		180									16018080
170	+0.046 +0.017	190	+0.046 +0.017								
180		200									
190		210									
200		230									



Guide Bushing (Universal Straight Type)



Length L Tolerance -0.1 -0.3							I.D tolerance after press fitting(reference)	ID
90	100	120	130	140	150	200		Φd
							+0.045 +0.020	50
								50
	5065100							50
							+0.055 +0.025	55
								60
	6075100							60
								63
								65
	7085100						+0.054 +0.024	70
								70
	7590100							75
	7595100							75
	8096100	8096120						80
	80100100	80100120		80100140			+0.065 +0.030	80
								85
9011090	90110100	90110120						90
10012090	100120100	100120120		100120140				100
	110130100	110130120					+0.064 +0.029	110
12014090	120140100	120140120		120140140				120
	125145100	125145120						125
	130150100		130150130				+0.076 +0.036	130
	140160100			140160140				140
150170100					150170150			150
	160180100				160180150			160
	170190100				170190150			170
	180200100				180200150			180
	190210100				190210150		+0.088 +0.042	190
					200230150	200230200		200



Guide Bushing (Flange Type)

121.11



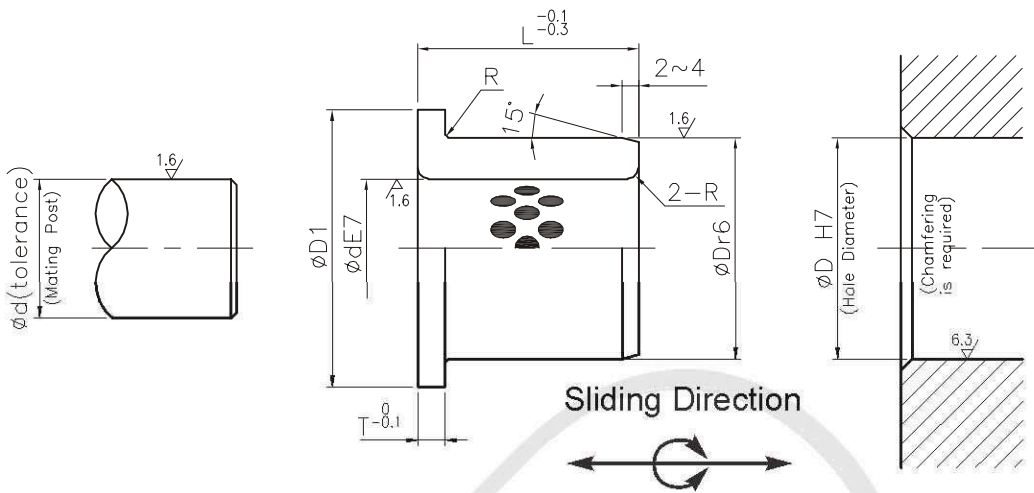
- Mating post tolerance : d8 - General use (high load)
e7 - General use (light load)
f7 - High precision

M Material: SP - #500SP (CAC304 + Graphite)

ID		OD		Flange		Length L Tolerance -0.1 -0.3							
Φd	Tolerance	ΦD	Tolerance	ΦF	T	10	12	15	17	18	20	23	25
6	+0.032	10	+0.028 +0.019 +0.040 +0.025	16	2	0610	0612						
8	+0.020	12		20	2	0810	0812	0815					
10	+0.040	14		22	2	1010	1012	1015	1017		1020		
12	+0.025	18		25	3	1210	1212	1215			1220		1225
13	+0.050 +0.032	19	+0.041 +0.028	26	3	1310	1312	1315			1320		1325
14		20		27	3			1415			1420		1425
15		21		28	3	1510	1512	1515			1520		1525
16		22		29	3		1612	1615		1618	1620	1623	1625
18	+0.061 +0.040	24	+0.050 +0.034	32	3			1815			1820		1825
20		30		40	5			2015			2020		2025
25		35		45	5			2515			2520		2525
30		40		50	5						3020		3025
31.5	+0.075 +0.050	40	+0.060 +0.041	50	5						3120		
35		45		60	5						3520		3525
40		50		65	5						4020		4025
45		55		70	5								
50	+0.090 +0.060	60	+0.073 +0.051	75	5								
55		65		80	5								
60		75		90	7.5								
63		75		85	7.5								
65	+0.107 +0.072	80	+0.088 +0.063	95	7.5								
70		85		105	7.5								
75		90		110	7.5								
80		100		120	10								
90	+0.107 +0.072	110	+0.088 +0.063	130	10								
100		120		150	10								
120		140		170	10								

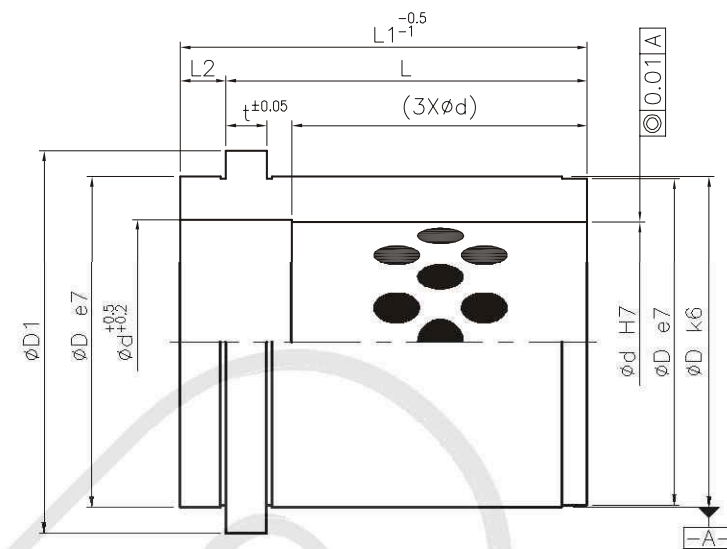


Guide Bushing (Flange Type)



Length L Tolerance -0.1 -0.3									I.D tolerance after press fitting(reference)	ID
30	35	40	50	60	67.5	80	100	120		Φd
									0.016 +0.004 +0.021 +0.006 +0.031 +0.013	6
										8
										10
										12
1230									+0.026 +0.008	13
1330										14
										15
1530										16
1630	1635	1640							+0.037 +0.016	18
1830	1835	1840								20
2030	2035	2040								25
2530	2535	2540	2550							30
3030	3035	3040	3050						+0.046 +0.021	31.5
3130	3135	3140								35
3530	3535	3540	3550							40
4030	4035	4040	4050							45
4530	4535	4540	4550	4560					+0.055 +0.025	50
5030	5035	5040	5050	5060						55
		5540		5560						60
		6040	6050	6060		6080				63
					6367				+0.053 +0.023	65
										70
			7050			7080				75
				7560						80
				8060		8080	80100		+0.060 +0.025	90
				9060		9080				100
						10080	100100			120
						12080	120100			

121.12



M Material: Bronze with Graphite

L ₁	L ₂	t	D	Tolerance		D ₁	d H7		Part Name	d	L			
				e7	k6									
36	9	6	42	-0.050 -0.075	+0.018 +0.002	47	30	+0.021 0	121.12	30	027			
45											036			
55											046			
65											056			
75											066			
85											076			
95											086			
105											096			
125							116							
36							32	+0.021 0		32	+0.021 0	32	32	027
45														036
55														046
65														056
75														066
85														076
95														086
105	096													
125	116													

Guide Bushing

L ₁	L ₂	t	D	Tolerance		D ₁	d H7		Part Name	d	L					
				e7	k6											
68	12	10	54	-0.060 -0.075	+0.018 +0.002	60	40	+0.021 +0	121.12	40	056					
78											066					
88											076					
98											086					
108											096					
128											116					
148											136					
168											156					
68							42	+0.021 +0		121.12	42	+0.021 +0	42	+0.021 +0	42	056
78																066
88																076
98																086
108																096
128																116
148																136
168																156

Order	part name	d	L
121.12		32	- 027