

MSB-SF系列复合自润滑轴承

SF Series Self-Lubricating Bushes

MSB-SF-1(DU) SF-2(DX)的结构

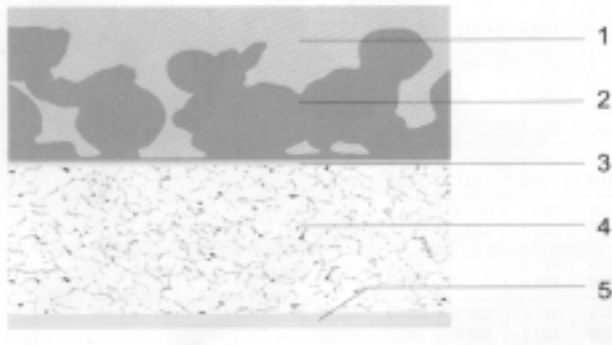
Structure of MSB-SF-1(DU),SF-2(DX) bearing materials

MSB-SF-1是由PTFE材料制成的无油润滑轴承，是将锡青铜球粉烧结到镀铜板上形成多孔屑，然后将PTFE和铅的混合物轧制到烧结层的表面。

SF-1(DU) is a kind of oilless slide Bushing made of the PTFE composite material, Which is a copper-plated steel plate on to which a porous layer of tin bronze powder is sintered and also a mixture of PTFE and lead are filled into and covered the porous layer by a rolling process.

MSB-SF-2是由POM材料制成的无边界油润滑轴承，是以镀铜铜板为基体，中间层为烧结锡青铜粉，表面牢固轧制改性聚甲醛（POM）材料，其上有许多微孔为储存润滑剂。

SF-2 (DX) is a boundary lubricating bushes made of the POM composite material, Which also has a copperplated steel plate on to which a tin bronze powder is sintered, modified polyformaldehyde resin (POM) is firmly anchored in the sintered bronze layer. The surface of covering layer has many pockets to retain lubricating grease.



	MSB-SF-1	MSB-SF-2
1	聚四氟乙烯与铅 PTFE and lead	改性聚甲醛 POM
2	锡青铜粉 Tin Bronze Powder	锡青铜粉 Tin Bronze Powder
3	镀铜层 copper layer	镀铜层 copper layer
4	钢背 steel back	钢背 steel back
5	镀铜层 copper layer	镀铜层 copper layer

MSB-SF-1、SF-2的性能

Properties of MSB-SF-1、SF-2 bearing materials

项 目	抗压强度	工作温度	摩擦系数	磨痕宽度	极限PV值	磨损极限	导热系数	热胀系数
Item Material	Compressive strength (Mpa)	Temperature range ()	Coefficient of friction (脂/grease)	Width of wear (mm) (脂/grease)	PV factor limit (Mpa.m/s) (脂/grease)	wear Depth Limit (mm)	Thermal Comductivity Kcal/M.br.C	Coefficient of Linear expansion (per)
SF-1(DU)	280	-195.+270	< 0.20	< 5.5	3.6	0.05	2.41	2.7X10.5
SF-2(DX)	140	-20.+100	< 0.20 (脂/grease)	< 4.5 (脂/grease)	10 (脂/grease)	0.5	2.03	5.1X10-5

标准衬套公差 TOLERANCE FOR STANDARD BUSH

MSB-SF-1、SF-1F衬套壁厚公差按DIN 1494 第二部分

The wallthickness tolerance of MSB-SF-1,SF-1F is according to DIN 1494 part

unit: mm

轴承内径尺寸 Nominal bush bore	壁厚公称尺寸 Nominal Wall thckness	壁厚公差 Tolerance for Wall thickness
5-19	1	+0.005 -0.020
28-44	2	+0.005 -0.030
45-79	2.5	+0.005 -0.040
80-119	2.5	-0.010 -0.060
120-300	2.5	-0.035 -0.085

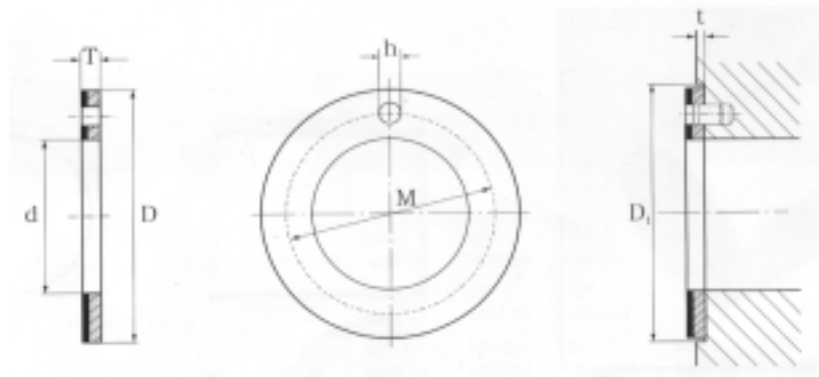
MSB-SF-1、SF-2、SF-1F衬套外径公差按DIN 1494 第二部分

The tolerance for outside diameter of MSB-SF-1,SF-2 and SF-1F bush is according to DIN 1494 part

unit: mm

外径尺寸 nominal outside diameter	壁厚公差 tolerance for outside diamter
10	+0.055 +0.025
10 ~ 18	+0.065 +0.030
18 ~ 30	+0.075 +0.035
30 ~ 40	+0.085 +0.045
40 ~ 50	+0.085 +0.045
50 ~ 80	+0.100 +0.055
80 ~ 105	+0.120 +0.070
105 ~ 180	+0.170 +0.100
180 ~ 250	+0.210 +0.130
250 ~ 305	+0.260 +0.170

MSB-SF 标准止推垫片
MSB-SF Metric Thrust Washer



轴径 Axle	规格标志 Designation	垫片尺寸Size of Washer				安装尺寸Installation size		
		d+0.25	D-0.25	T-0.05	M±0.125	h ^{+0.4} _{-0.1}	t ±0.2	D ₁ +0.12
8	SFWC10	10	20	1.5	15	1.5	1	20
10	SFWC12	12	24		18			24
12	SFWC14	14	26		20	2		26
14	SFWC16	16	30		23			30
16	SFWC18	18	32		25	3		32
18	SFWC20	20	36		28			36
20	SFWC22	22	38		30	4		38
22	SFWC24	24	42		33			42
24	SFWC26	26	44		35	1.5		44
26	SFWC28	28	48		38			48
30	SFWC32	32	54		43	2		54
36	SFWC38	38	62		50			62
40	SFWC42	42	66		54			66
46	SFWC48	48	74		61			74
50	SFWC52	52	78	65	1.5	78		
60	SFWC62	62	90	76		90		

说明：MSB-SF 止推垫片，安装时必须钻孔，用定位销钉固定于基础上。

A dowel or counter sunk screw should be used to prevent rotation, but the head must be recessed at least 0.25mm below the thrust bearing surface.

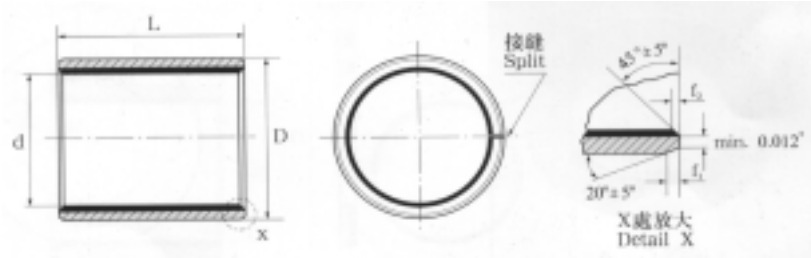
MSB-SF 标准板材尺寸
Standard Series of MSB-SF Strips

unit: mm

型号Type	长度Lenget	宽度Width±1	厚度Thickness-0.04
SF-1 SF-2	500	125	1.0
SF-1 SF-2	500	125	1.5
SF-1 SF-2	500	125	2.0
SF-1 SF-2	500	125	2.5
SF-2	500	125	3.0

英制MSB-SF-1,SF-2标准轴承 (Inch)

(Inch)Standard Series of MSB-SF-1, SF-2 Bushes



unit: inch

推荐 Recommended		安装轴承	长度 Length ±0.015						
轴 Shaft Dia	孔 Housing bore	Installed bearing d							
0.1243	0.1878	0.1268	SF-1	SF-1					
0.1236	0.1873	0.1243	02SF02	02SF03					
0.1554	0.2191	0.1581	SF-1	SF-1					
0.1547	0.2186	0.1556	025SF025	025SF04					
0.1865	0.2503	0.1893	SF-1	SF-1	SF-1				
0.1858	0.2497	0.1867	03SF03	03SF04	03SF06				
0.2490	0.3128	0.2518	SF-1	SF-1					
0.2481	0.3122	0.2492	04SF04	04SF06					
0.3115	0.3753	0.3143	SF-1	SF-1					
0.3106	0.3747	0.3117	05SF06	05SF08					
0.3740	0.4691	0.3769	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
0.3731	0.4684	0.3742	06SF03	06SF04	06SF006	06SF08	06SF10	06SF12	06SF12
0.4365	0.5316	0.4394	SF-1	SF-1					
0.4355	0.5309	0.4367	07SF08	07SF12					
0.4990	0.5941	0.5019	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
0.4980	0.5934	0.4992	08SF04	08SF06	08SF08	08SF10	08SF10	08SF14	08SF14
0.5615	0.6566	0.5644	SF-1	SF-1	SF-1	SF-1			
0.5605	0.6559	0.5617	09SF06	09SF08	09SF10	09SF12			
0.6240	0.7192	0.627	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
0.6230	0.7184	0.6242	10SF04	10SF08	10SF10	10SF12	10SF14	10SF16	10SF16
0.6865	0.7817	0.6895	SF-1						
0.6855	0.7809	0.6867	11SF14						
0.7491	0.8755	0.7525	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
0.7497	0.8747	0.7493	12SF04	12SF06	12SF08	12SF10	12SF12	12SF16	12SF16
0.8116	0.9380	0.8150	SF-1	SF-1					
0.8104	0.9372	0.8118	13SF12	13SF18					
0.8741	1.0005	0.8775	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
0.8729	0.9997	0.8743	14SF04	14SF06	14SF12	14SF16	14SF20	14SF20	14SF20
0.9991	1.1255	1.0025	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
0.9979	1.1247	0.9993	16SF06	16SF08	16SF12	16SF16	16SF20	16SF24	16SF24
1.1238	1.2818	1.1278	SF-1	SF-1	SF-1	SF-1			
1.1226	1.2808	1.1240	18SF06	18SF10	18SF12	18SF16			
1.2488	1.4068	1.2528	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
1.2472	1.4058	1.2490	20SF06	20SF12	20SF14	20SF16	20SF20	20SF28	20SF28
1.3738	1.5318	1.3778	SF-1	SF-1	SF-1	SF-1			
1.3722	1.5308	1.3740	22SF12	22SF14	22SF24	22SF28			
1.4988	1.6568	1.5028	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
1.4972	1.6558	1.4990	24SF08	24SF16	24SF18	24SF20	24SF24	24SF32	24SF32
1.6238	1.7818	1.6278	SF-1	SF-1					
1.6222	1.7808	1.6240	26SF16	26SF24					
1.7487	1.9381	1.7537	SF-1	SF-1	SF-1				
1.7471	1.9371	1.7489	28SF16	28SF24	28SF32				
1.8737	2.0633	1.8787	SF-1	SF-1	SF-1				
1.8721	2.0621	1.8739	30SF12	30SF16	30SF36				
1.9987	2.1883	2.0037	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
1.9969	2.1871	1.9989	32SF08	32SF16	32SF24	32SF28	32SF32	32SF40	32SF40

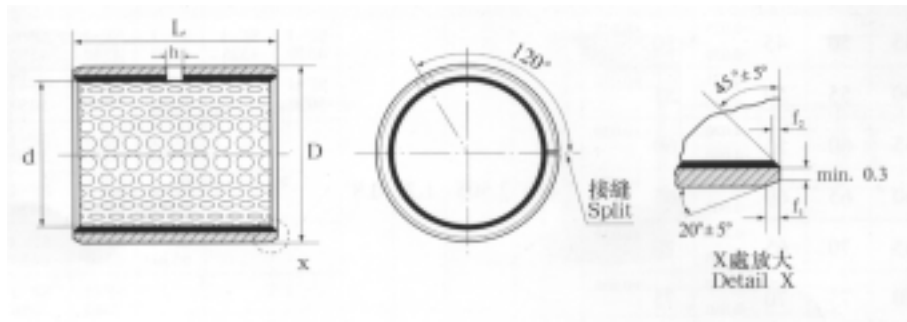
英制MSB-SF-1,SF-2标准轴承 (Inch)

(Inch)Standard Series of MSB-SF-1, SF-2 Bushes

unit: inch

推荐 Recommended		安装轴承	长度 Length ±0.015											
轴 Shaft Dia	孔 Housing bore	Installed bearing d												
2.1257	2.3130	2.1326	SF-1											
2.1239	2.3118	2.1262	34SF48											
2.2507	2.4377	2.2573	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1			
2.2489	2.4365	2.2509	36SF28	36SF32	36SF40	36SF48	36SF56	36SF60	36SF64	36SF72				
2.5011	2.6881	2.5077	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
2.4993	2.6869	2.5013	40SF16	40SF26	40SF32	40SF40	40SF48	40SF56	40SF60	40SF64	40SF72	40SF76	40SF80	
2.7500	2.9370	2.7566	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
2.7482	2.9358	2.7502	44SF32	44SF36	44SF40	44SF48	44SF56	44SF60	44SF64	44SF72	44SF76	44SF80		
2.8752	3.0623	2.8819	SF-1	SF-1	44SF35	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
2.8734	3.0610	2.8754	46SF32	46SF36	46SF40	46SF48	46SF56	46SF60	46SF64	46SF72	46SF76	46SF80		
3.0000	3.1872	3.0068	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
2.9982	3.1858	3.0002	48SF32	48SF36	48SF40	48SF48	48SF56	48SF60	48SF64	48SF72	48SF76	48SF80		
3.2500	3.4372	3.2568	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
3.2480	3.4358	3.2502	52SF32	52SF36	52SF40	52SF48	52SF56	52SF60	52SF64	52SF72	52SF76	52SF80		
3.5000	3.6872	3.5068	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
3.4978	3.6858	3.5002	56SF32	56SF36	56SF40	56SF48	56SF56	56SF60	56SF64	56SF72	56SF76	56SF80		
3.6250	3.8122	3.6318	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
3.6228	3.8108	3.6252	58SF32	58SF36	58SF40	58SF48	58SF56	58SF60	58SF64	58SF72	58SF76	58SF80		
3.7500	3.9372	3.7568	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
3.7478	3.9358	3.7502	60SF32	60SF36	60SF40	60SF48	60SF56	60SF60	60SF64	60SF72	60SF76	60SF80		
4.0000	4.1872	4.0068	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
3.9978	4.1858	4.0002	64SF32	64SF36	64SF40	64SF48	64SF56	64SF60	64SF64	64SF72	64SF76	64SF80		
4.2500	4.4372	4.2568	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
4.2478	4.4358	4.2502	68SF32	68SF36	68SF40	68SF48	68SF56	68SF60	68SF64	68SF72	68SF76	68SF80		
4.3750	4.5622	4.3818	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
4.3728	4.5608	4.3752	70SF32	70SF36	70SF40	70SF48	70SF56	70SF60	70SF64	70SF72	70SF76	70SF80		
4.5000	4.6872	4.5068	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
4.4978	4.6858	4.5002	72SF32	72SF36	72SF40	72SF48	72SF56	72SF60	72SF64	72SF72	72SF76	72SF80		
4.7500	4.9374	4.7572	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
4.7475	4.9358	4.7502	76SF32	76SF36	76SF40	76SF48	76SF56	76SF60	76SF64	76SF72	76SF76	76SF80		
4.9986	5.186	5.0056	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
4.9961	5.01844	4.9988	80SF32	80SF36	80SF40	80SF48	80SF56	80SF60	80SF64	80SF72	80SF76	80SF80		
5.2500	5.4374	5.2570	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
5.2475	5.4358	5.2502	84SF32	84SF36	84SF40	84SF48	84SF56	84SF60	84SF64	84SF72	84SF76	84SF80		
5.5000	5.6874	5.5070	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
5.4975	5.6858	5.5002	88SF32	88SF36	88SF40	88SF48	88SF56	88SF60	88SF64	88SF72	88SF76	88SF80		
5.7500	5.9374	5.7570	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
5.7475	5.9358	5.7502	92SF32	92SF36	92SF40	92SF48	92SF56	92SF60	92SF64	92SF72	92SF76	92SF80		
6.0000	6.1874	6.0070	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
5.9975	6.1858	6.0002	96SF32	96SF36	96SF40	96SF48	96SF56	96SF60	96SF64	96SF72	96SF76	96SF80		
6.2500	6.4374	6.2570	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
6.2475	6.4358	6.2502	100SF32	100SF36	100SF40	100SF48	100SF56	100SF60	100SF64	100SF72	100SF76	100SF80		
6.5000	6.6874	6.5070	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
6.4975	6.6858	6.5002	104SF32	104SF36	104SF40	104SF48	104SF56	104SF60	104SF64	104SF72	104SF76	104SF80		
6.7500	6.9374	6.7570	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
6.7475	6.9358	6.7502	108SF32	108SF36	108SF40	108SF48	108SF56	108SF60	108SF64	108SF72	108SF76	108SF80		
6.9954	7.183	7.0026	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1	SF-1
6.9929	7.1812	6.9956	112SF32	112SF36	112SF40	112SF48	112SF56	112SF60	112SF64	112SF72	112SF76	112SF80		

MSB-SF-2 标准轴承
Standard Series of SF-2 Bushes



d	D	轴径 Axle	座孔 Housing H17	壁厚 Wall thickness		油孔 Oil hole	f ₁	f ₂	长度 L ⁰ _{-0.4} (^{<Φ28 L-0.3} ^{>Φ30 L-0.4})													
				最小 min	最大 max				10	15	20	25	30	35	40	45	50	60				
10	12	10 ^{+0.022}	12 ^{+0.018}	0.955	0.980	4	0.5	0.3	SF-2	SF-2	SF-2											
12	14	12 ^{+0.027}	14 ^{+0.018}											SF-2	SF-2	SF-2						
14	16	14 ^{+0.027}	16 ^{+0.018}												SF-2	SF-2						
15	17	15 ^{+0.027}	17 ^{+0.018}							SF-2	SF-2	SF-2										
16	18	16 ^{+0.027}	18 ^{+0.018}							SF-2	SF-2	SF-2										
18	20	18 ^{+0.027}	20 ^{+0.021}								SF-2	SF-2			SF-2							
20	23	20 ^{+0.033}	23 ^{+0.21}	1.445	1.475	6	0.8	0.4		SF-2	SF-2	SF-2			SF-2							
22	25	22 ^{+0.033}	25 ^{+0.021}												SF-2	SF-2						
25	28	25 ^{+0.033}	28 ^{+0.021}							SF-2	SF-2											
28	32	28 ^{+0.033}	32 ^{+0.025}	1.935	1.1.970	6	1	0.6		SF-2	SF-2	SF-2										
30	34	30 ^{+0.033}	34 ^{+0.025}												SF-2	SF-2	SF-2		SF-2			
35	39	35 ^{+0.039}	39 ^{+0.025}							SF-2		SF-2	SF-2									
40	44	40 ^{+0.039}	44 ^{+0.025}							SF-2		SF-2		SF-2		SF-2						
45	50	45 ^{+0.039}	50 ^{+0.025}	2.415	2.2.460	8	1.2	0.8		SF-2	SF-2	SF-2		SF-2	SF-2							
50	55	50 ^{+0.039}	55 ^{+0.025}													SF-2	SF-2		SF-2	SF-2	SF-2	SF-2
55	60	55 ^{+0.046}	60 ^{+0.025}													SF-2	SF-2		SF-2	SF-2	SF-2	SF-2
60	65	60 ^{+0.046}	65 ^{+0.025}									SF-2	SF-2		SF-2	SF-2	SF-2					

MSB-SF-2 标准轴承

Standard Series of SF-2 Bushes

d	D	轴径 Axle	座孔 housing H7	壁厚 Wall thickness		油孔 Oil hole	f _i	f _i	长度 L ⁰ _{-0.40}														
				最小 min	最大 max				40	50	60	80	90	95	100	110	120						
65	70	65 -0.046	70 ^{+0.030}	2.415	2.460	8	1.2	0.8	SF-2 6540		SF-2 6560												
70	75	70 -0.046	75 ^{+0.030}						SF-2 7040	SF-2 7050		SF-2 7080											
75	80	75 -0.046	80 ^{+0.030}						SF-2 7540		SF-2 7560	SF-2 7580											
80	85	80 -0.046	85 ^{+0.035}	2.385			1.4	0.8	SF-2 8040		SF-2 8060	SF-2 8080											
85	90	85 -0.054	90 ^{+0.035}						SF-2 8540		SF-2 8560	SF-2 8580											
90	95	90 -0.054	95 ^{+0.035}						SF-2 9040		SF-2 9060	SF-2 9080	SF-2 9090										
100	105	100 -0.054	105 ^{+0.035}							SF-2 10050		SF-2 10080		SF-2 10095									
105	110	105 -0.054	110 ^{+0.035}								SF-2 10560	SF-2 10580		SF-2 10595				SF-2 105110					
110	115	110 -0.054	115 ^{+0.035}								SF-2 11060	SF-2 11080		SF-2 11095				SF-2 110110					
120	125	120 -0.054	125 ^{+0.040}									SF-2 12060	SF-2 12080						SF-2 120110				
125	130	125 -0.063	130 ^{+0.040}									SF-2 12560							SF-2 125110				
130	135	130 -0.063	135 ^{+0.040}										SF-2 13050	SF-2 13060	SF-2 13080			SF-2 130100					
140	145	140 -0.063	145 ^{+0.040}										SF-2 14050	SF-2 14060	SF-2 14080			SF-2 140100					
150	155	150 -0.063	155 ^{+0.040}										SF-2 15050	SF-2 15060	SF-2 15080			SF-2 150100					
160	165	160 -0.063	165 ^{+0.040}										SF-2 16050	SF-2 16060	SF-2 16080			SF-2 160100					
170	175	170 -0.063	175 ^{+0.040}										SF-2 17050		SF-2 17080			SF-2 170100					
180	185	180 -0.063	185 ^{+0.046}										SF-2 18050	SF-2 18060	SF-2 18080			SF-2 180100					
190	195	190 -0.072	195 ^{+0.046}										SF-2 19050	SF-2 19060	SF-2 19080			SF-2 190100				SF-2 190120	
200	205	200 -0.072	205 ^{+0.046}					SF-2 20050	SF-2 20060	SF-2 20080			SF-2 200100				SF-2 200120						
220	225	220 -0.072	225 ^{+0.046}					SF-2 22050	SF-2 22060	SF-2 22080			SF-2 220100				SF-2 220120						
240	245	240 -0.072	245 ^{+0.046}					SF-2 24050	SF-2 24060	SF-2 24080			SF-2 240100				SF-2 240120						
250	255	250 -0.072	255 ^{+0.052}					SF-2 25050	SF-2 25060	SF-2 25080			SF-2 250100				SF-2 250120						
260	265	260 -0.081	265 ^{+0.052}					SF-2 26050	SF-2 26060	SF-2 26080			SF-2 260100				SF-2 260120						
280	285	280 -0.081	285 ^{+0.052}					SF-2 28050	SF-2 28060	SF-2 28080			SF-2 280100				SF-2 280120						
300	305	300 -0.081	305 ^{+0.052}					SF-2 30050	SF-2 30060	SF-2 30080			SF-2 300100				SF-2 300120						

注：孔径壁厚符合样本，长度尺寸不在样本范围内，客户要求，制造场可定制加工。

Bushing Length other than listed may also be supplied to special orders