

CSB-22 Steel bronze powder with PVDF marginal bearings



Features

The special resin supply with excellent wear resistance and very lower friction, can be keep good work condition even no oil giving. This material can be produce as CSB-20 with the oil pocket for oil/grease containing. To get much high tolerance of the ID, the resin surface can be machine again after the bushes fitting. The applications including metallurgy machines, ming machines, irrigation work, automotive industries, agriculture machines.

Structure

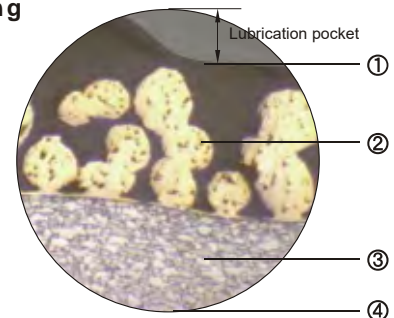
1.PVDF/PTFE 0.30~0.50mm, has high wear resistance and low friction even only minute quantities of lubricant are supplied, this bearing surface carries a pattern of circular indents which should be filled with grease on assembly of the bearing.

2.Sintered bronze powder 0.20-0.35mm, provides max. thermal conductivity away from the bearing surface, also serves as a reservoir for the resin mixture.

3.Low-carbon steel, gives exceptionally high load carrying capacity, excellent heat dissipation.

4.Copper plating

0.002mm, good corrosion resistance



Tech. Data

Max. Load	Static	250N/mm ²	Temp. limit	-50°C~+160°C		
	Very Low speed	140N/mm ²		Max. speed	Pre-lubricated	2m/s
	Rotating oscillating	70N/mm ²			Oiling Grease continuous	>3m/s
Max. PV	3.6N/mm ² *m/s		Thermal conductivity	4 W(m*K) ⁻¹		
Coefficient of thermal expansion	11*10 ⁻⁶ *K ⁻¹		Friction coefficient	0.03~0.20		

Initial pre-lubrication at assembly required...

Typical Application

Recommended for applications involving intermittent operation or boundary lubrication...

Automotive: suspension joints, kingpin assemblies and stub axles of tucks, automobile driving joint hinges, steering and other linkages, articulation joints, rear chassis hinges, fairleader rollers...

Machine tool building industry: spindles in drill, grinding,

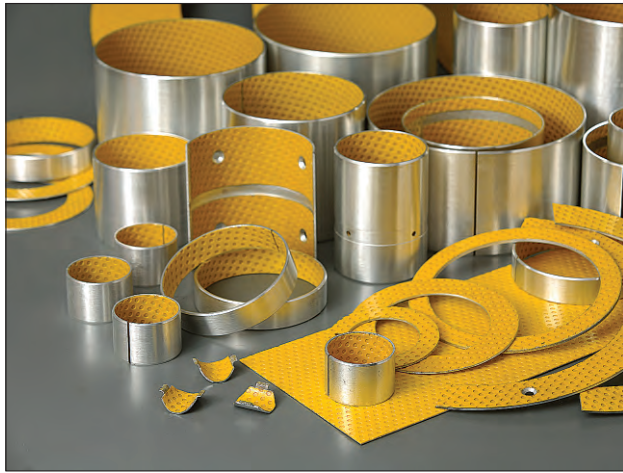
and milling machines, ram guide plates in multiram presses...

Agricultural equipment: gearbox, clutch, bale trips and wheel caster swivels for bale accumulators, front axle pivot bearings, steering idler box bearings and kingpin bearings for harvesters...

Be especially well-suited for applications where lubricant can not be supplied continuously or repeatedly.

CSB-20 Steel Bronze Powder with POM Marginal Bearings

RoHS



Features

Suitable for rotating and oscillating movement, less maintenance requirements due to the long re-lubrication intervals, lower wear, lower susceptibility to edge loading, no absorption of water and therefore no swelling, good damping behaviours, good resistance to shock loads.

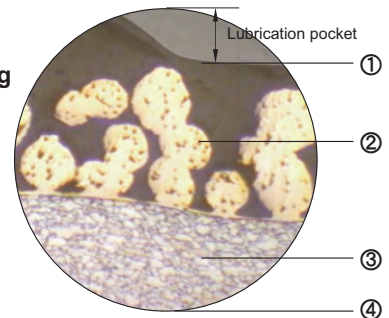
Structure

1. POM thickness 0.30~0.50 mm, it provides high wear resistance and low friction even with only minute volume of lubricant are supplied, this bearing surface carries a pattern of circular indents which should be filled with grease on assembly of the bearing.

2. Sintered bronze powder thickness 0.20-0.35mm, provides max. thermal conductivity away from the bearing surface, also serves as a reservoir for the resin mixture.

3. Low-carbon steel, provides exceptionally high load carrying capacity, excellent heat dissipation.

4. Copper/Tin plating thickness 0.002mm, provides good corrosion resistance.



Tech. Data

Max. load	Static	250N/mm ²	Temp. limit	-40°C~+110°C		
	Very low speed	140N/mm ²		Max. speed	Pre-lubricated	2m/s
	Rotating oscillating	70N/mm ²			Oiling Grease	Continuous
Max. PV		3N/mm ² *m/s	Thermal conductivity		50W(m*K) ⁻¹	
Coefficient of thermal expansion		11*10 ⁻⁶ *K ⁻¹	Friction coefficient		0.05~0.20	

Initial pre-lubrication at assembly is strongly recommended.

Typical Applications

Recommended for applications involving intermittent operation or boundary lubrication...

Automotive: suspension joints, kingpin assemblies and stub axles of trucks, automobile driving joint hinges, steering and other linkages, articulation joints, rear chassis hinges, fair leader rollers...

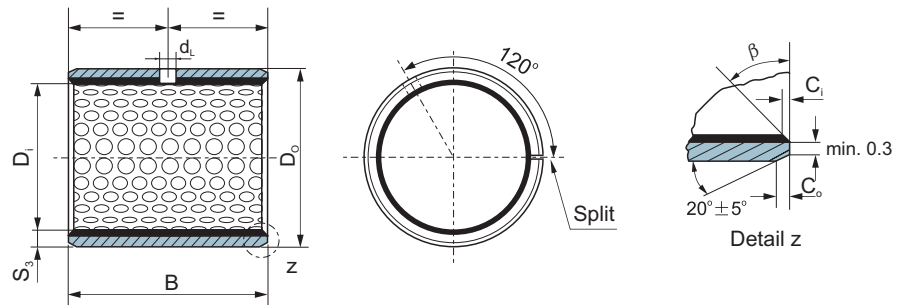
Machine tool building industry: spindles in drill, grinding, and milling machines, ram guide plates in multi-ram

presses...

Agricultural equipment: gearbox, clutch, bale trips and wheel caster swivels for bale accumulators, front axle pivot bearings, steering idler box bearings and kingpin bearings for harvesters...

It is especially well-suited for applications where lubricant can not be supplied continuously or repeatedly.

CSB-20 Metric Cylindrical Bushes



ID and OD chamfers

S ₃	C _o	C _i	β	S ₃	C _o	C _i	β
1.0	0.6±0.3	0.30±0.2	30° ±5°	2.0	1.2±0.4	0.50±0.3	30° ±5°
1.5	0.7±0.3	0.50±0.2	30° ±5°	2.5	1.8±0.6	0.80±0.3	45° ±5°

Unit:mm

Shaft D _s h8	Housing H7 D _H	OD tolerance D _o	ID after fixed D _{i,a}	Clearance C _o	Wall thickness S ₃	Oil hole d _l	B ⁰ _{-0.40}													
							10	15	20	25	30	35	40	45	50	60				
10 _{-0.022}	12 ^{+0.018}	12 ^{+0.065} _{+0.030}	10.108 10.040	0.130 0.040	0.980 0.955	4	CSB-20 1010	CSB-20 1015	CSB-20 1020											
12 _{-0.027}	14 ^{+0.018}	14 ^{+0.065} _{+0.030}	12.108 12.040				CSB-20 1210	CSB-20 1215	CSB-20 1220											
14 _{-0.027}	16 ^{+0.018}	16 ^{+0.065} _{+0.030}	14.108 14.040	0.135 0.040			CSB-20 1415	CSB-20 1420												
15 _{-0.027}	17 ^{+0.018}	17 ^{+0.065} _{+0.030}	15.108 15.040				CSB-20 1515	CSB-20 1520	CSB-20 1525											
16 _{-0.027}	18 ^{+0.018}	18 ^{+0.065} _{+0.030}	16.108 16.040				CSB-20 1615	CSB-20 1620	CSB-20 1625											
18 _{-0.027}	20 ^{+0.021}	20 ^{+0.075} _{+0.035}	18.111 18.040	0.138 0.040			CSB-20 1815	CSB-20 1820	CSB-20 1825											
20 _{-0.033}	23 ^{+0.021}	23 ^{+0.075} _{+0.035}	20.131 20.050	0.164 0.050	1.475 1.445	4	CSB-20 2015	CSB-20 2020	CSB-20 2025	CSB-20 2030										
22 _{-0.033}	25 ^{+0.021}	25 ^{+0.075} _{+0.035}	22.131 22.050				CSB-20 2215		CSB-20 2225											
25 _{-0.033}	28 ^{+0.021}	28 ^{+0.075} _{+0.035}	25.131 25.050	0.188 0.060	1.970 1.935	6	CSB-20 2515	CSB-20 2520	CSB-20 2525	CSB-20 2530										
28 _{-0.033}	32 ^{+0.025}	32 ^{+0.085} _{+0.045}	28.155 28.060				CSB-20 2820		CSB-20 2830											
30 _{-0.033}	34 ^{+0.025}	34 ^{+0.085} _{+0.045}	30.155 30.060				CSB-20 3020	CSB-20 3025	CSB-20 3030		CSB-20 3040									
35 _{-0.039}	39 ^{+0.025}	39 ^{+0.085} _{+0.045}	35.155 35.060	0.194 0.060	1.970 1.935	6	CSB-20 3520		CSB-20 3530	CSB-20 3535	CSB-20 3540									
40 _{-0.039}	44 ^{+0.025}	44 ^{+0.085} _{+0.045}	40.155 40.060				CSB-20 4020		CSB-20 4030		CSB-20 4040		CSB-20 4050							
45 _{-0.039}	50 ^{+0.025}	50 ^{+0.085} _{+0.045}	45.195 45.080	0.234 0.080	2.460 2.415	8	CSB-20 4520		CSB-20 4530		CSB-20 4540	CSB-20 4545	CSB-20 4550							
50 _{-0.039}	55 ^{+0.030}	55 ^{+0.100} _{+0.055}	50.200 50.080				CSB-20 5030		CSB-20 5040		CSB-20 5050	CSB-20 5060								
55 _{-0.046}	60 ^{+0.030}	60 ^{+0.100} _{+0.055}	55.200 55.080				CSB-20 5530		CSB-20 5540		CSB-20 5550	CSB-20 5560								
60 _{-0.046}	65 ^{+0.030}	65 ^{+0.100} _{+0.055}	60.200 60.080	0.246 0.080			CSB-20 6030		CSB-20 6040		CSB-20 6050	CSB-20 6060								

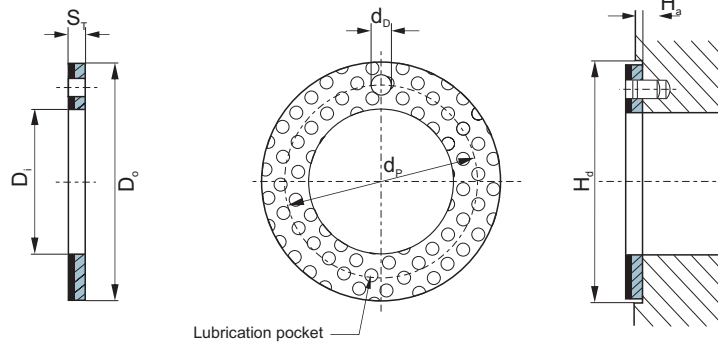
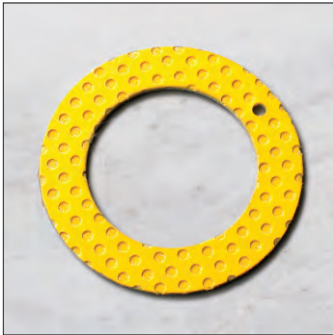
CSB-20 Metric Cylindrical Bushes

Unit:mm

Shaft D _s h8	Housing H7 D _H	OD tolerance D _o	ID after fixed D _{i,a}	Clearance C _o	Wall thickness S ₃	Oil hole d _L	B ⁰ _{-0.40}												
							40	50	60	80	90	95	100	110	120				
65 _{-0.046}	70 ^{+0.030}	70 ^{+0.100} _{+0.055}	65.200 65.080	0.246 0.080	2.460 2.415	8	CSB-20 6540		CSB-20 6560										
70 _{-0.046}	75 ^{+0.030}	75 ^{+0.100} _{+0.055}	70.200 70.080				CSB-20 7040	CSB-20 7050		CSB-20 7080									
75 _{-0.046}	80 ^{+0.030}	80 ^{+0.100} _{+0.055}	75.200 75.080				CSB-20 7540		CSB-20 7560	CSB-20 7580									
80 _{-0.046}	85 ^{+0.035}	85 ^{+0.120} _{+0.070}	80.265 80.100	0.313 0.100		9.5	CSB-20 8040		CSB-20 8060	CSB-20 8080									
85 _{-0.054}	90 ^{+0.035}	90 ^{+0.120} _{+0.070}	85.265 85.100				CSB-20 8540		CSB-20 8560	CSB-20 8580									
90 _{-0.054}	95 ^{+0.035}	95 ^{+0.120} _{+0.070}	90.265 90.100				CSB-20 9040		CSB-20 9060	CSB-20 9080	CSB-20 9090								
100 _{-0.054}	105 ^{+0.035}	105 ^{+0.120} _{+0.070}	100.265 100.100	0.321 0.100		9.5		CSB-20 10050		CSB-20 10080		CSB-20 10095							
105 _{-0.054}	110 ^{+0.035}	110 ^{+0.120} _{+0.070}	105.265 105.110						CSB-20 10560	CSB-20 10580		CSB-20 10595		CSB-20 105110					
110 _{-0.054}	115 ^{+0.035}	115 ^{+0.120} _{+0.070}	110.265 110.110							CSB-20 11060	CSB-20 11080		CSB-20 11095		CSB-20 110110				
120 _{-0.054}	125 ^{+0.040}	125 ^{+0.170} _{+0.100}	120.270 120.110	0.324 0.110		9.5			CSB-20 12060	CSB-20 12080					CSB-20 120110				
125 _{-0.063}	130 ^{+0.040}	130 ^{+0.170} _{+0.100}	125.270 125.110								CSB-20 12560						CSB-20 125110		
130 _{-0.063}	135 ^{+0.040}	135 ^{+0.170} _{+0.100}	130.270 130.110							CSB-20 13050	CSB-20 13060	CSB-20 13080			CSB-20 130100				
140 _{-0.063}	145 ^{+0.040}	145 ^{+0.170} _{+0.100}	140.270 140.110		2.450 2.385	9.5		CSB-20 14050	CSB-20 14060	CSB-20 14080			CSB-20 140100						
150 _{-0.063}	155 ^{+0.040}	155 ^{+0.170} _{+0.100}	150.270 150.110							CSB-20 15050	CSB-20 15060	CSB-20 15080			CSB-20 150100				
160 _{-0.063}	165 ^{+0.040}	165 ^{+0.170} _{+0.100}	160.270 160.110							CSB-20 16050	CSB-20 16060	CSB-20 16080			CSB-20 160100				
170 _{-0.063}	175 ^{+0.040}	175 ^{+0.170} _{+0.100}	170.270 170.110	0.339 0.110		9.5		CSB-20 17050		CSB-20 17080			CSB-20 170100						
180 _{-0.063}	185 ^{+0.046}	185 ^{+0.210} _{+0.130}	180.276 180.110							CSB-20 18050	CSB-20 18060	CSB-20 18080			CSB-20 180100				
190 _{-0.072}	195 ^{+0.046}	195 ^{+0.210} _{+0.130}	190.276 190.110							CSB-20 19050	CSB-20 19060	CSB-20 19080			CSB-20 190100		CSB-20 190120		
200 _{-0.072}	205 ^{+0.046}	205 ^{+0.210} _{+0.130}	200.276 200.110			9.5		CSB-20 20050	CSB-20 20060	CSB-20 20080			CSB-20 200100		CSB-20 200120				
220 _{-0.072}	225 ^{+0.046}	225 ^{+0.210} _{+0.130}	220.276 220.110							CSB-20 22050	CSB-20 22060	CSB-20 22080			CSB-20 220100		CSB-20 220120		
240 _{-0.072}	245 ^{+0.046}	245 ^{+0.210} _{+0.130}	240.276 240.110							CSB-20 24050	CSB-20 24060	CSB-20 24080			CSB-20 240100		CSB-20 240120		
250 _{-0.072}	255 ^{+0.052}	255 ^{+0.260} _{+0.170}	250.282 250.110	0.354 0.110		9.5		CSB-20 25050	CSB-20 25060	CSB-20 25080			CSB-20 250100		CSB-20 250120				
260 _{-0.081}	265 ^{+0.052}	265 ^{+0.260} _{+0.170}	260.282 260.110							CSB-20 26050	CSB-20 26060	CSB-20 26080			CSB-20 260100		CSB-20 260120		
280 _{-0.081}	285 ^{+0.052}	285 ^{+0.260} _{+0.170}	280.282 280.110							CSB-20 28050	CSB-20 28060	CSB-20 28080			CSB-20 280100		CSB-20 280120		
300 _{-0.081}	305 ^{+0.052}	305 ^{+0.260} _{+0.170}	300.282 300.110				CSB-20 30050	CSB-20 30060	CSB-20 30080			CSB-20 300100		CSB-20 300120					

CSB-20 Metric Thrust Washer and Strip

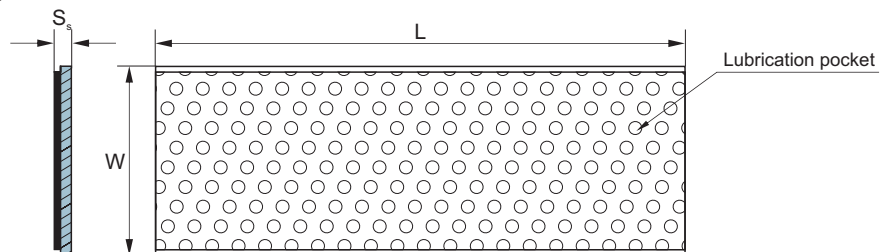
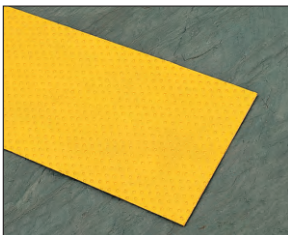
Metric thrust washer



Unit:mm

Shaft D_s	Designation	Washer dimension				Installation size		
		$D_i +0.25$	$D_o -0.25$	$S_r -0.05$	$d_p \pm 0.125$	$d_b^{+0.4}_{+0.1}$	$H_a \pm 0.2$	$H_b +0.12$
8	CSB-20WC10	10	20	1.5	15	1.5	1	20
10	CSB-20WC12	12	24		18			24
12	CSB-20WC14	14	26		20	26		
14	CSB-20WC16	16	30		23	30		
16	CSB-20WC18	18	32		25	32		
18	CSB-20WC20	20	36		28	36		
20	CSB-20WC22	22	38		30	38		
22	CSB-20WC24	24	42		33	42		
24	CSB-20WC26	26	44		35	44		
26	CSB-20WC28	28	48		38	48		
30	CSB-20WC32	32	54	43	54			
36	CSB-20WC38	38	62	50	62			
40	CSB-20WC42	42	66	54	66			
46	CSB-20WC48	48	74	2	61	1.5	74	
50	CSB-20WC52	52	78		65		78	
60	CSB-20WC62	62	90		76	90		

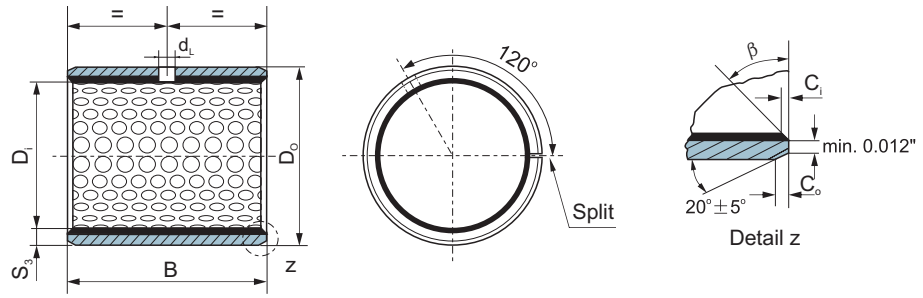
Metric standard strip



Unit:mm

Type	Length ± 1	Width ± 1	Thickness -0.05
CSB-20SP	500	150	1.0
CSB-20SP	500	150	1.5
CSB-20SP	500	150	2.0
CSB-20SP	500	150	2.5

CSB-20 Inch Cylindrical Bushes



ID and OD chamfers

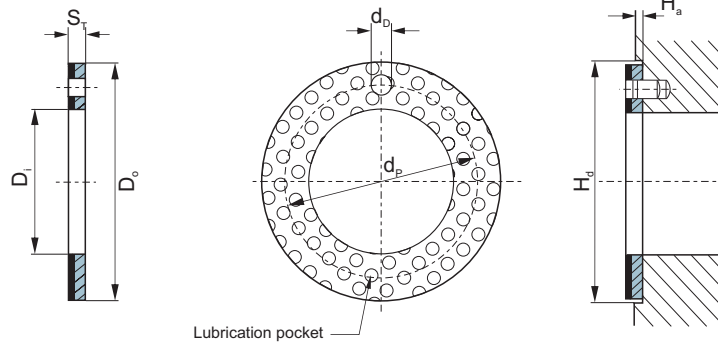
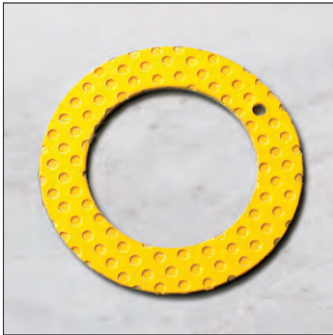
S ₃	C ₀	C ₁	β	S ₃	C ₀	C ₁	β
0.0505	0.012-0.035	0.004-0.020	30° ±5°	0.0971	0.047-0.095	0.020-0.043	45° ±5°
0.0663	0.016-0.040	0.008-0.030	30° ±5°	0.0978	0.047-0.095	0.020-0.043	45° ±5°
0.0817	0.030-0.063	0.008-0.030	30° ±5°				

Unit:inch"

D _i	D _o	Shaft D _s	Housing H7 D _H	ID after fixed D _{i,a}	Clearance C _D	Wall thickness S ₃	Oil hole d _L	Length ± 0.010			
								CSB-20	CSB-20	CSB-20	CSB-20
3/8	15/32	0.3648	0.4694	0.3694	0.0055	0.0510 0.0500	—	CSB-20	CSB-20	CSB-20	
		0.3639	0.4687	0.3667	0.0019			06IB06	06IB08	06IB12	
7/16	17/32	0.4273	0.5319	0.4319	0.0056			CSB-20	CSB-20		
		0.4263	0.5312	0.4292	0.0019			07IB08	07IB12		
1/2	19/32	0.4897	0.5944	0.4944	0.0057			CSB-20	CSB-20	CSB-20	CSB-20
		0.4887	0.5937	0.4917	0.0020			08IB06	08IB08	08IB10	08IB14
9/16	21/32	0.5522	0.6569	0.5569	0.0057			CSB-20	CSB-20		
		0.5512	0.6562	0.5542	0.0020			09IB08	09IB12		
5/8	23/32	0.6146	0.7195	0.6195	0.0059			CSB-20	CSB-20	CSB-20	CSB-20
		0.6136	0.7178	0.6167	0.0021			10IB08	10IB10	10IB12	10IB14
11/16	25/32	0.6770	0.7820	0.6820	0.0060	CSB-20					
		0.6760	0.7812	0.6792	0.0022	11IB14					
3/4	7/8	0.7390	0.8758	0.7444	0.0066	0.0669 0.0657	5/32	CSB-20	CSB-20	CSB-20	
		0.7378	0.8750	0.7412	0.0022			12IB08	12IB12	12IB16	
7/8	1	0.8639	1.0008	0.8694	0.0067			CSB-20	CSB-20	CSB-20	
		0.8627	1.0000	0.8662	0.0023			14IB12	14IB14	14IB16	
1	1 1/8	0.9888	1.1258	0.9944	0.0068			CSB-20	CSB-20	CSB-20	
		0.9876	1.1250	0.9912	0.0024			16IB12	16IB16	16IB24	
1 1/8	1 9/32	1.1138	1.2822	1.1202	0.0076			CSB-20	CSB-20		
		1.1126	1.2812	1.1164	0.0026			18IB12	18IB16		
1 1/4	1 13/32	1.2387	1.4072	1.2452	0.0081			CSB-20	CSB-20	CSB-20	CSB-20
		1.2371	1.4062	1.2414	0.0027			20IB12	20IB16	20IB20	20IB28
1 3/8	1 17/32	1.3635	1.5322	1.3702	0.0083	CSB-20	CSB-20	CSB-20			
		1.3619	1.5312	1.3664	0.0029	22IB16	22IB22	22IB28			
1 1/2	1 21/32	1.4884	1.6572	1.4952	0.0084	CSB-20	CSB-20	CSB-20			
		1.4868	1.6562	1.4914	0.0030	24IB16	24IB20	24IB24			
1 5/8	1 25/32	1.6133	1.7822	1.6202	0.0085	CSB-20	CSB-20		CSB-20		
		1.6117	1.7812	1.6164	0.0031	26IB16	26IB24		24IB32		
1 3/4	1 15/16	1.7383	1.9385	1.7461	0.0094	CSB-20	CSB-20	CSB-20			
		1.7367	1.9375	1.7415	0.0032	28IB16	28IB24	28IB28			
1 7/8	2 1/16	1.8632	2.0637	1.8713	0.0097	CSB-20	CSB-20	CSB-20	CSB-20		
		1.8616	2.0625	1.8665	0.0033	30IB16	30IB30	30IB36	28IB32		
2	2 3/16	1.9881	2.1887	1.9963	0.0100	CSB-20	CSB-20	CSB-20			
		1.9863	2.1875	1.9915	0.0034	32IB16	32IB24	32IB32			
2 1/4	2 7/16	2.2378	2.4387	2.2463	0.0103	CSB-20	CSB-20	CSB-20	CSB-20		
		2.2360	2.4375	2.2415	0.0037	36IB32	36IB36	36IB40	32IB40		
2 1/2	2 11/16	2.4875	2.6887	2.4963	0.0106	CSB-20	CSB-20				
		2.4857	2.6875	2.4915	0.0040	40IB32	40IB40				
2 3/4	2 15/16	2.7351	2.9387	2.7457	0.0124	CSB-20	CSB-20	CSB-20			
		2.7333	2.9375	2.7393	0.0042	44IB32	44IB40	44IB48			
3	3 3/16	2.9849	3.1889	2.9959	0.0128	CSB-20	CSB-20	CSB-20			
		2.9831	3.1875	2.9893	0.0044	48IB32	48IB48	48IB60			
3 1/2	3 11/16	3.4844	3.6889	3.4959	0.0137	CSB-20	CSB-20	CSB-20	CSB-20		
		3.4822	3.6875	3.4893	0.0049	56IB40	56IB48	56IB60	44IB56		
4	4 3/16	3.9839	4.1889	3.9959	0.0142	CSB-20	CSB-20	CSB-20			
		3.9817	4.1875	3.9893	0.0054	64IB48	64IB60	64IB76			

CSB-20 Inch Thrust Washer

Inch Thrust washer



Unit:inch"

Specification	Dimension				installation size		
	inner side $D_i+0.010$	outside $D_o-0.010$	S_T	d_p -0.010	d_b +0.010	H_a ± 0.010	H_d +0.010
CSB-20 WC06IB	0.500	0.875	0.0660 0.0625	0.692	0.067	0.04	0.875
CSB-20 WC07IB	0.562	1.000		0.786			1.000
CSB-20 WC08IB	0.625	1.125		0.880	0.099		1.125
CSB-20 WC09IB	0.687	1.187		0.942			1.187
CSB-20 WC10IB	0.750	1.250		1.005			1.250
CSB-20 WC11IB	0.812	1.375		1.099	0.130		1.375
CSB-20 WC12IB	0.875	1.500		1.192			1.500
CSB-20 WC13IB	0.937	1.625		1.286	0.161		1.625
CSB-20 WC14IB	1.000	1.750		1.380			1.750
CSB-20 WC16IB	1.125	2.000		1.567	0.192		2.000
CSB-20 WC18IB	1.250	2.125		1.692			2.125
CSB-20 WC20IB	1.375	2.250		1.817	0.07		2.250
CSB-20 WC22IB	1.500	2.500		2.005			2.500
CSB-20 WC24IB	1.625	2.625		2.130	0.192		0.07
CSB-20 WC26IB	1.750	2.750	2.255	2.750			
CSB-20 WC28IB	2.000	3.000	2.505	3.000			
CSB-20 WC30IB	2.125	3.125	0.0970 0.0935	2.630	3.125		
CSB-20 WC32IB	2.250	3.250		2.755	3.250		

CSB-80 Steel Bronze Powder with PEEK/PTFE Marginal Bearings RoHS



Features

1. CSB-80 provides maintenance-free operation
2. Operate satisfactorily without lubrication under light duty and low speed
3. CSB-80 has a high PV capability under high temperature
4. Temperature be allowance from -150°C~+250°C
5. Good chemical resistance
6. High static and dynamic load capacity
7. No water absorption
8. Suitable for rotating, oscillating, reciprocating and sliding movement.

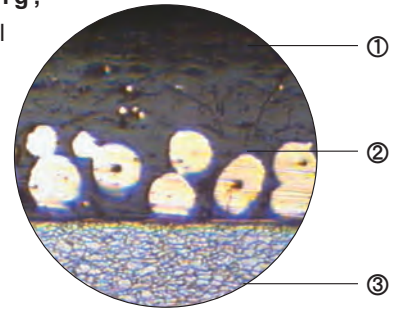
Structure

1. PEEK+PTFE 0.30~0.50mm, gives high wear resistance and low friction even only minute quantities of lubricant are supplied. This bearing surface carries a pattern of circular indents which should be filled with grease on assembly of the bearing.

2. Bronze layer 0.20~0.35mm, provides max. thermal conductivity away from the bearing surface, also serves as a reservoir for the PTFE/PEEK mixture.

3. Steel backing, provides mechanical strength and high load carrying capacity.

4. Copper/Tin plating 0.002mm, provides good corrosion resistance.



Tech. Data						
Max. load	Static	250N/mm ²	Friction coefficient	0.03~0.20		
	Very low speed	140N/mm ²		Max. speed	Pre-lubricated	2m/s
	Rotating oscillating	60N/mm ²			Oiling Grease	Continuous
Max. PV	Short-term operation	3.6N/mm ² *m/s	Thermal conductivity		50 W(m*K) ⁻¹	
	Continuous operation	1.8N/mm ² *m/s	Coefficient of thermal expansion		11*10 ⁻⁶ *K ⁻¹	
Temp. limit		-150°C~+250°C				

Typical Applications

CSB-80 bearings application covered gear pump, ABS system, piston pump, gear motor, machine tools, agricultural machinery and so on. The materials is recommended with initial pre-lubrication at assembly.

Available

- Cylindrical Bushes
- Thrust Washers
- Non-standard parts as design

CSB-80 is supplied by customer order, the tolerance is according to CSB-20 standard dimension.