



Heavy Duty Bearings in **TOUGHMET** Spinodal Bronze



THE BIGGEST ADVANCE IN PLAIN BEARINGS IN MORE THAN 70 YEARS

Bowman International Ltd, of the UK, have developed the new BowMet® range of rolled bearings manufactured in the material ToughMet® from Materion, which has outstanding bearing properties.

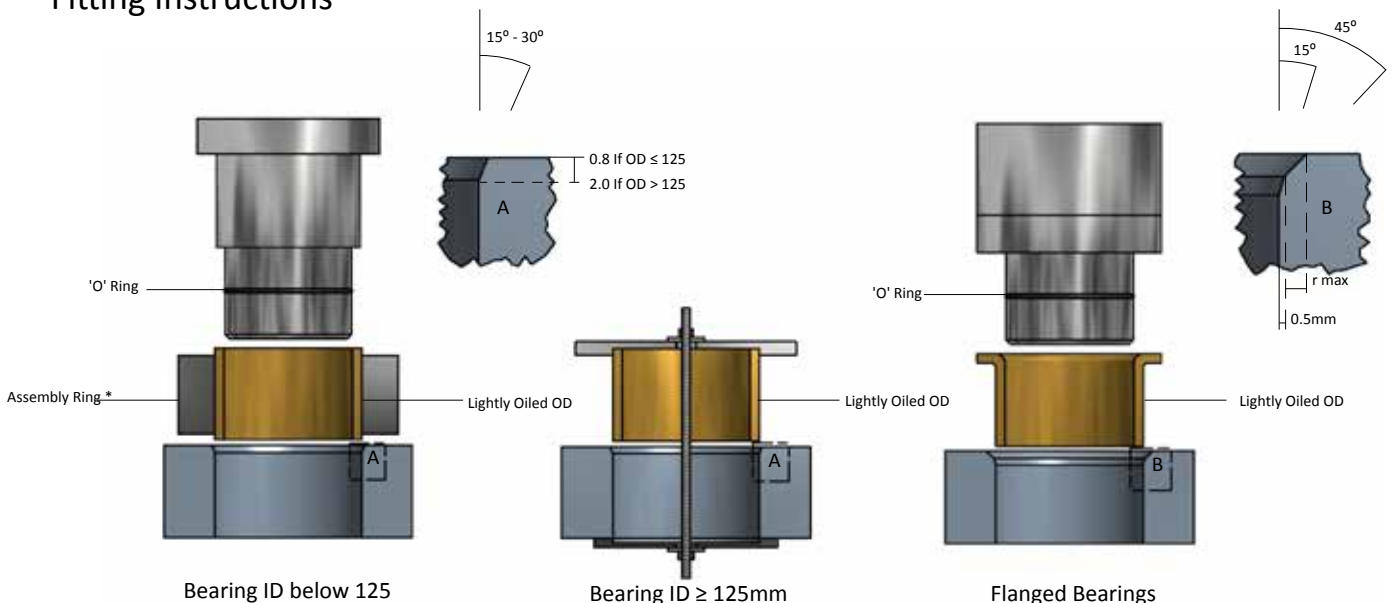
The new range of bearings offers higher load capacity than any other proprietary plain bearing and its heat, speed and corrosion capabilities combine to offer greatly increased life in many applications. Savings in warranty claims, down time, product reliability and maintenance have resulted, and been documented, across a wide range of industries. From heavy duty plant to racing engines, from marine to aircraft applications, benefits are available across a broad range of industries.

The Bowman method of producing bearings using a rolling process gives virtually no wastage and is far more cost effective than machined alternatives using ToughMet®. There is no minimum quantity. Low tooling costs mean that one offs to high volume are economical.

- Direct replacement for existing bushes
- High Load Capacity
- High PV value
- Extended life
- Corrosion resistant
- Suits harsh environments
- Runs in water incl. seawater
- Cost effective
- Low cost specials
- Metric and imperial
- Pockets, holes and lubrication grooves available



Fitting Instructions



*Assembly ring only required for bearing with OD > 55mm

Technical Data

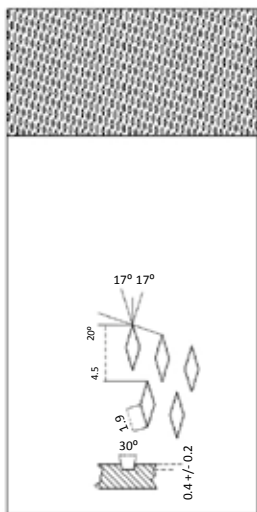
Description	Metric Bearing Data	Imperial Bearing Data
Material	ToughMet® Spinodal Bronze Composition - Cu 77% Ni 15% Sn 8%	
Static load	820 N/mm ²	120,000 Lbs/inch ²
Dynamic load	340 N/mm ²	50,000 Lbs/inch ²
Max sliding speed	3 m/s dry 10 m/s oiled	10 ft/s dry 33ft/s oiled
Operating temp	-250 °C to +300 °C	
Thermal Conductivity	38 W/mk	
Coefficient of friction	0.25 dry 0.04 oiled	0.25 dry 0.04 oiled
Ultimate Tensile Strength	860 MPa	125 Ksi
Yield Strength	725MPa	110 Ksi
Elongation	10%	10%
Elastic Modulus	144 GPa	21 x 10 ⁶ psi
Poisson's Ratio	0.3	0.3
Coefficient of Thermal Expansion	16.4 x 10 ⁻⁶ /°C	9.1 x 10 ⁻⁶ /°F
Recommended shaft finish	Ra ≤ 0.4µm (N5)	16 µinch
Recommended shaft hardness	HRC60	HRC60
PV value	9.6 MPa x m/s	275,000 Psi x ft/min
Hardness	HRC30 min	HRC30 min

Corrosion resistance (NACE level V included)

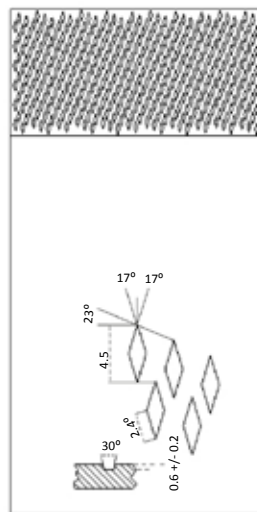
ToughMet® resists saltwater corrosion, hydrogen embrittlement, and chloride stress-corrosion cracking better than most copper-based alloys. In Sulphide environments like sour gas wells, ToughMet® resists stress-corrosion cracking very well, and has an extremely low corrosion rate compared to other copper-based alloys. In some sulphide environments, the corrosion rate is similar to stainless steels and nickel alloys.

Galvanically, ToughMet® is similar to other copper-nickel alloys and is lead free.

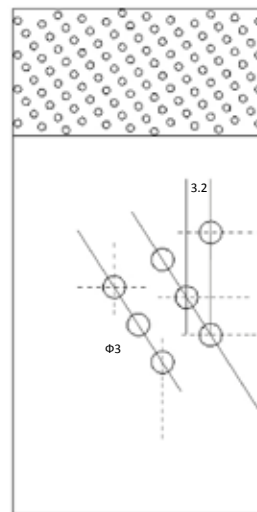
Optional Lubrication Indentations/Holes Design



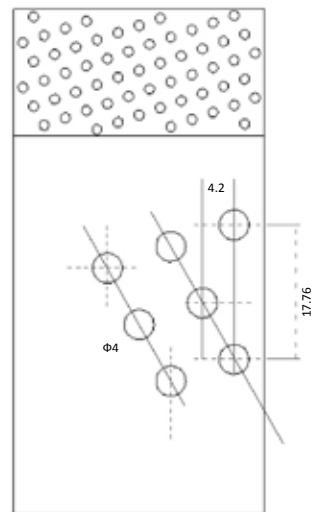
Diamond Indentations
Inside Diameter $\Phi 22$



Diamond Indentations
Inside Diameter >math>\Phi 22</math>



Spherical Holes
Inside Diameter $\le \Phi 25$



Spherical Holes
Inside Diameter >math>\Phi 25</math>

ToughMet® is a registered trademark of Materion Corp. Bowmet® is a registered trademark of Bowman International Ltd.

Metric Plain Heavy Duty Bearings in **TOUGHMET** Spinodal Bronze



ID	ID When in Housing +/- H9	Shaft Diameter +/- f8	OD	Housing Diameter +/- H7	Standard Lengths															
					ID < 80 : Length +/- 0.25					ID ≥ 80 : Length +/- 0.50										
					5	10	15	20	25	30	40	50	60	70	80					
5	+0.030 -0.000	-0.010 -0.028	7	+0.015 -0.000	BMP 050705	BMP 050710														
6			BMP 060805		BMP 060810															
7	+0.036 -0.000	-0.013 -0.035	9		BMP 070905	BMP 070910														
8			BMP 081005		BMP 081010															
10	+0.043 -0.000	-0.016 -0.043	12	+0.018 -0.000		BMP 101210	BMP 101215	BMP 101220												
12					BMP 121410	BMP 121415	BMP 121420													
14					BMP 141610	BMP 141615	BMP 141620	BMP 141625												
15					BMP 151710	BMP 151715	BMP 151720	BMP 151725												
16					BMP 161810	BMP 161815	BMP 161820	BMP 161825												
18					BMP 182010	BMP 182015	BMP 182020	BMP 182025												
20					BMP 202310	BMP 202315	BMP 202320	BMP 202325												
22					BMP 222510	BMP 222515	BMP 222520	BMP 222525	BMP 222530											
24	+0.052 -0.000	-0.020 -0.053	27	+0.021 -0.000		BMP 242715	BMP 242720	BMP 242725	BMP 242730											
25					BMP 252815	BMP 252820	BMP 252825	BMP 252830												
26					BMP 263015	BMP 263020	BMP 263025	BMP 263030												
28					BMP 283215	BMP 283220	BMP 283225	BMP 283230												
30					BMP 303415	BMP 303420	BMP 303425	BMP 303430	BMP 303440											
32					BMP 323615	BMP 323620	BMP 323625	BMP 323630	BMP 323640	BMP 323650										
34	+0.062 -0.000	-0.025 -0.064	38	+0.025 -0.000		BMP 343815	BMP 343820	BMP 343825	BMP 343830	BMP 343840	BMP 343850									
35					BMP 353915	BMP 353920	BMP 353925	BMP 353930	BMP 353940	BMP 353950										
36					BMP 364015	BMP 364020	BMP 364025	BMP 364030	BMP 364040	BMP 364050										
38					BMP 384215	BMP 384220	BMP 384225	BMP 384230	BMP 384240	BMP 384250										
40						BMP 404420	BMP 404425	BMP 404430	BMP 404440	BMP 404450										
45						BMP 455020	BMP 455025	BMP 455030	BMP 455040	BMP 455050										
50	+0.074 -0.000	-0.030 -0.076	55	+0.030 -0.000		BMP 505520	BMP 505525	BMP 505530	BMP 505540	BMP 505550	BMP 505560									
55					BMP 556020	BMP 556025	BMP 556030	BMP 556040	BMP 556050	BMP 556060										
60							BMP 606525	BMP 606530	BMP 606540	BMP 606550	BMP 606560	BMP 606570								
65								BMP 657030	BMP 657040	BMP 657050	BMP 657060	BMP 657070	BMP 657080							
70								BMP 707530	BMP 707540	BMP 707550	BMP 707560	BMP 707570	BMP 707580							
75								BMP 758030	BMP 758040	BMP 758050	BMP 758060	BMP 758070	BMP 758080							
80			85	+0.035 -0.000					BMP 808530	BMP 808540	BMP 808550	BMP 808560	BMP 808570	BMP 808580						

ID	ID When in Housing +/- H9	Shaft Diameter +/- f8	OD	Housing Diameter +/- H7	Standard Lengths							
					ID < 80 : Length +/- 0.25				ID ≥ 80 : Length +/- 0.50			
					30	40	50	60	70	80	90	100
85	+0.087 -0.000	-0.036 -0.090	90	+0.035 -0.000	BMP 859030	BMP 859040	BMP 859050	BMP 859060	BMP 859070	BMP 859080		
90			BMP 909530		BMP 909540	BMP 909550	BMP 909560	BMP 909570	BMP 909580			
95					BMP 9510040	BMP 9510050	BMP 9510060	BMP 9510070	BMP 9510080	BMP 9510090	BMP 9510100	
100						BMP 10010550	BMP 10010560	BMP 10010570	BMP 10010580	BMP 10010590	BMP 100105100	
105						BMP 10511050	BMP 10511560	BMP 10511070	BMP 10511080	BMP 10511590	BMP 105115100	
110						BMP 11011550	BMP 11011560	BMP 11011570	BMP 11011580	BMP 11011590	BMP 110115100	
115						BMP 11512050	BMP 11512060	BMP 11512070	BMP 11512080	BMP 11512090	BMP 115120100	
120	+0.100 -0.000	-0.043 -0.106	125	+0.040 -0.000				BMP 12012560	BMP 12012570	BMP 12012580	BMP 12012590	BMP 120125100
125						BMP 12513060	BMP 12513070	BMP 12513080	BMP 12513090	BMP 125130100		
130						BMP 13013560	BMP 13013570	BMP 13013580	BMP 13013590	BMP 130135100		
135						BMP 13514060	BMP 13514070	BMP 13514080	BMP 13514090	BMP 135140100		
140						BMP 14014560	BMP 14014570	BMP 14014580	BMP 14014590	BMP 140145100		
145						BMP 14515060	BMP 14515070	BMP 14515080	BMP 14515090	BMP 145150100		
150						BMP 15015560	BMP 15015570	BMP 15015580	BMP 15015590	BMP 150155100		
155						BMP 15516060	BMP 15516070	BMP 15516080	BMP 15516090	BMP 155160100		
160						BMP 16016560	BMP 16016570	BMP 16016580	BMP 16016590	BMP 160165100		
165						BMP 16517060	BMP 16517070	BMP 16517080	BMP 16517090	BMP 165170100		
170						BMP 17017560	BMP 17017570	BMP 17017580	BMP 17017590	BMP 170175100		
175						BMP 17518060	BMP 17518070	BMP 17518080	BMP 17518090	BMP 175180100		
180						BMP 18018560	BMP 18018570	BMP 18018580	BMP 18018590	BMP 180185100		
185			+0.115 -0.000		-0.050 -0.122	190	+0.046 -0.000	BMP 18519060	BMP 18519070	BMP 18519080	BMP 18519090	BMP 185190100
190	BMP 19019560	BMP 19019570		BMP 19019580		BMP 19019590		BMP 190195100				
195	BMP 19520060	BMP 19520070		BMP 19520080		BMP 19520090		BMP 195200100				
200	BMP 20020560	BMP 20020570		BMP 20020580		BMP 20020590		BMP 200205100				
205	BMP 20521060	BMP 20521070		BMP 20521080		BMP 20521090		BMP 205210100				
210	BMP 21021560	BMP 21021570		BMP 21021580		BMP 21021590		BMP 210215100				
215	BMP 21522060	BMP 21522070		BMP 21522080		BMP 21522090		BMP 215220100				
220	BMP 22022560	BMP 22022570		BMP 22022580		BMP 22022590		BMP 220225100				
225	BMP 22523060	BMP 22523070		BMP 22523080		BMP 22523090		BMP 225230100				
230	BMP 23023560	BMP 23023570		BMP 23023580		BMP 23023590		BMP 230235100				
240	+0.130 -0.000	-0.056 -0.137	245	+0.052 -0.000	BMP 24024560	BMP 24024570	BMP 24024580	BMP 24024590	BMP 240245100			
250			BMP 25025560		BMP 25025570	BMP 25025580	BMP 25025590	BMP 250255100				
260			BMP 26026560		BMP 26026570	BMP 26026580	BMP 26026590	BMP 260265100				
280			BMP 28028560		BMP 28028570	BMP 28028580	BMP 28028590	BMP 280285100				
300			BMP 30030560		BMP 30030570	BMP 30030580	BMP 30030590	BMP 300305100				

Part numbers shown in table are plain bores
 If diamond pocketed bores are required add D after part number
 If thru holes are required add H after part number

Other features are available on request: ID groove/lubrication configurations
 Non standard dimensions
 Clinch/Jigsaw joints on split

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Metric Flanged Heavy Duty Bearings in **TOUGHMET** Spinodal Bronze



ID	ID when in Housing +/- H9	Shaft Diameter +/- f7	OD	Housing Diameter +/- H7	Flange Dia +/- 0.5	Flange Radius Max	Standard Lengths													
							ID < 80 : Length +/- 0.25					ID ≥ 80 : Length +/- 0.50								
							5	10	15	20	25	30	35	40	50	60				
6	+0.030 -0.000	-0.010 -0.022	8	+0.015 -0.000	12	1	BMF 060512	BMF 061012												
8	+0.036 -0.000	-0.013 -0.028	10		15	1	BMF 080515	BMF 081015												
10			12		18	1		BMF 101018	BMF 101518	BMF 102018										
12			14	+0.018 -0.000	20	1		BMF 121020	BMF 121520	BMF 122020										
14	+0.043 -0.000	-0.016 -0.034	16		22	1		BMF 141022	BMF 141522	BMF 142022										
16			18		24	1		BMF 161024	BMF 161524	BMF 162024										
18			20		26	1		BMF 181026	BMF 181526	BMF 182026	BMF 182526									
20			23	+0.021 -0.000	30	1.5		BMF 201030	BMF 201530	BMF 202030	BMF 202530									
25	+0.052 -0.000	-0.020 -0.041	28		35	1.5			BMF 251535	BMF 252035	BMF 252535	BMF 253035								
30			34		45	2				BMF 302045	BMF 302545	BMF 303045	BMF 303545							
35			39	+0.025 -0.000	50	2				BMF 352050	BMF 352550	BMF 353050	BMF 353550							
40	+0.062 -0.000	-0.025 -0.050	44		55	2					BMF 402555	BMF 403055	BMF 403555	BMF 404055						
45			50		60	2.5						BMF 453060	BMF 453560	BMF 454060	BMF 455060					
50			55		65	2.5						BMF 503065	BMF 503565	BMF 504065	BMF 505065					
55			60	+0.030 -0.000	70	2.5						BMF 553070	BMF 553570	BMF 554070	BMF 555070					
60	+0.074 -0.000	-0.030 -0.060	65		75	2.5						BMF 603075	BMF 603575	BMF 604075	BMF 605075	BMF 606075				
65			70		80	2.5						BMF 653080	BMF 653580	BMF 654080	BMF 655080	BMF 656080				

ID	ID when in Housing +/- H9	Shaft Diameter +/- f7	OD	Housing Diameter +/- H7	Flange Dia +/- 0.5	Flanged Radius Max	Standard Lengths						
							ID < 80 : Length +/- 0.25				ID ≥ 80 : Length +/- 0.50		
							35	40	50	60	70	80	90
70	+0.074 -0.000	-0.030 -0.060	75	+0.030 -0.000	85	2.5	BMF 703585	BMF 704085	BMF 705085	BMF 706085	BMF 707085		
75			+0.035 -0.000	90	BMF 753590		BMF 754090	BMF 755090	BMF 756090	BMF 757090			
80				85			BMF 8040100	BMF 8050100	BMF 8060100	BMF 8070100	BMF 8080100		
90	+0.087 -0.000	-0.036 -0.071	95	+0.035 -0.000	110			BMF 9050110	BMF 9060110	BMF 9070110	BMF 9080110	BMF 9090110	
100			105				BMF 10050120	BMF 10060120	BMF 10070120	BMF 10080120	BMF 10090120		
110			115				BMF 11050130	BMF 11060130	BMF 11070130	BMF 11080130	BMF 11090130		
120			125					BMF 12060140	BMF 12070140	BMF 12080140	BMF 12090140		
130	+0.100 -0.000	-0.043 -0.083	135	+0.040 -0.000	155				BMF 13060155	BMF 13070155	BMF 13080155	BMF 13090155	
140			145				BMF 14060165	BMF 14070165	BMF 14080165	BMF 14090165			
150			155				BMF 15060180	BMF 15070180	BMF 15080180	BMF 15090180			
160			165				BMF 16060190	BMF 16070190	BMF 16080190	BMF 16090190			
170			175				BMF 17060200	BMF 17070200	BMF 17080200	BMF 17090200			
180	+0.115 -0.000	-0.050 -0.096	185	+0.046 -0.000	215				BMF 18060215	BMF 18070215	BMF 18080215	BMF 18090215	
190			195				BMF 19060225	BMF 19070225	BMF 19080225	BMF 19090225			
200			205				BMF 20060235	BMF 20070235	BMF 20080235	BMF 20090235			
225			230				BMF 22560260	BMF 22570260	BMF 22580260	BMF 22590260			
250	+0.130 -0.000	-0.056 -0.108	255	+0.052 -0.000	290				BMF 25060290	BMF 25070290	BMF 25080290	BMF 25090290	
265			270				BMF 26560305	BMF 26570305	BMF 26580305	BMF 26590305			
285			290				BMF 28560325	BMF 28570325	BMF 28580325	BMF 28590325			
300			305		340				BMF 30060340	BMF 30070340	BMF 30080340	BMF 30090340	

Part numbers shown in table are plain bores
If thru holes are required add H after part number

Other features are available on request: ID groove/lubrication configurations
Non standard dimensions
Clinch/Jigsaw joints on split

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Metric Heavy Duty Washer in **TOUGHMET** Spinodal Bronze



Inside Diameter	Outside Diameter	Dowel Hole Diameter		Dowel Hole PCD		Standard Thicknesses	
						Thickness + 0.00 - 0.05	
						1.5	2
10	20	-	-	-	-	BMT 1020015	
12	24	1.75		18		BMT 1224015	
14	26	2.25		22		BMT 1426015	
16	30	2.25		25		BMT 1630015	
18	32	2.25		25		BMT 1832015	
20	36	2.25		30		BMT 2036015	
22	38	3.25		30		BMT 2238015	
24	42	3.25		33		BMT 2442015	
26	44	3.25	+0.125 -0.125	35	+0.12 -0.12	BMT 2644015	
28	48	4.25		38		BMT 2848015	
32	54	4.25		43		BMT 3254015	
38	62	4.25		50		BMT 3862015	
42	66	4.25		54		BMT 4266015	
48	74	4.25		61			BMT 4874020
52	78	4.25		65			BMT 5278020
62	90	4.25		76			BMT 6290020
95	115	4.25		106			BMT 95115020

Part numbers shown in table are plain faces
If diamond pocketed faces are required add D after part number
If thru holes are required add H after part number

Special dimensions and groove/lubrication configurations are available on request

Metric Heavy Duty Plates in **TOUGHMET** Spinodal Bronze



Bearing plates are cut to order. Plates can have diamond pockets added.

Standard Thicknesses +/- 0.01

1.00mm	1.50mm	2.00mm	2.50mm	3.00mm
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Inch Flanged Heavy Duty Bearings in **TOUGHMET** Spinodal Bronze



ID	ID when in Housing +/-	Shaft Diameter +/-	OD	Housing Diameter +/-	Flange Dia +/- 0.020	Flanged Radius Max	Standard Lengths									
							Length +/- 0.030"									
							1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	
3/8 0.375	+0.0029 +0.0002		15/32 0.4688	+0.0004 -0.0004	11/16 0.687		BMFI 0604	BMFI 0606	BMFI 0608							
1/2 0.5	+0.0029 +0.0002	-0.0000 -0.0010	19/32 0.5938	+0.0003 -0.0003	13/16 0.812		BMFI 0804	BMFI 0806	BMFI 0808							
5/8 0.625	+0.0030 +0.0002		23/32 0.7188	+0.0004 -0.0003	15/16 0.937			BMFI 1006	BMFI 1008	BMFI 1010						
3/4 0.75			7/8 0.8750		1 1/8 1.125			BMFI 1206	BMFI 1208		BMFI 1212					
7/8 0.875	+0.0034 +0.0002	-0.0000 -0.0012	1 1.0000	+0.0005 -0.0003	1 1/4 1.250				BMFI 1408		BMFI 1412	BMFI 1416				
1 1.000			1 1/8 1.1250		1 3/8 1.375				BMFI 1608		BMFI 1612	BMFI 1616				
1 1/4 1.250	+0.0040 +0.0002		1 13/32 1.4063	+0.0006 -0.0005	1 3/4 1.750						BMFI 2016	BMFI 2020	BMFI 2024			
1 1/2 1.500		-0.0000 -0.0016	1 21/32 1.6563		2 2.000						BMFI 2416		BMFI 2424	BMFI 2432	BMFI 2432	
1 3/4 1.750	+0.0048 +0.0002		1 15/16 1.9375	+0.0006 -0.0004	2 3/8 2.375						BMFAI 2816		BMFI 2824	BMFI 2832	BMFI 2832	

Part numbers shown in table are plain bores
If thru holes are required add H after part number

Other features are available on request: ID groove/lubrication configurations
Non standard dimensions
Clinch/Jigsaw joints on split

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Inch Heavy Duty Washer in **TOUGHMET** Spinodal Bronze



Inside Diameter		Outside Diameter		Dowel Hole Diameter		Dowel Hole PCD		Standard Thicknesses	
								Thickness + 0.001 - 0.01	
								1/16	3/32
1/2 0.5		7/8 0.865		0.6870		0.077 0.067		BMTI 06	
9/16 0.562		1 1.000		0.7810				BMTI 07	
5/8 0.625		1 1/8 1.125		0.8750				BMTI 08	
11/16 0.687		1 1.187		0.9370		0.109 0.099		BMTI 09	
3/4 0.750		1 1/4 1.250		1.0000				BMTI 10	
13/16 0.812		1 3/8 1.375		1.0940				BMTI 11	
7/8 0.875		1 1/2 1.500		1.1870		0.140 0.130		BMTI 12	
1 1.00		1 3/4 1.750		1.3750				BMTI 14	
1 1/8 1.125	+0.010 -0.000	2 2.000	-0.000 -0.010	1.5620	+0.001 -0.000		+0.000 -0.001	BMTI 16	
1 1/4 1.25		2 1/8 2.125		1.6870		0.171 0.161		BMTI 18	
1 5/8 1.375		2 1/4 2.250		1.8020				BMTI 20	
1 1/2 1.500		2 1/2 2.500		2.0000				BMTI 22	
1 5/8 1.625		2 5/8 2.625		2.1250				BMTI 24	
1 3/4 1.750		2 3/4 2.750		2.2500		0.202 0.192		BMTI 26	
2 2.00		3 3.00		2.5000					BMTI 28
2 1/8 2.125		3 1/8 3.125		2.6250					BMTI 30
2 1/4 2.250		3 1/4 3.250		2.7500					BMTI 32

Part numbers shown in table are plain faces
If diamond pocketed faces are required add D after part number
If thru holes are required add H after part number

Special dimensions and groove/lubrication configurations are available on request

Inch Heavy Duty Plates in **TOUGHMET** Spinodal Bronze



Bearing plates are cut to order. Plates can have diamond pockets added.

Standard Thicknesses +/- 0.0004

3/64" 0.0469	1/16" 0.0625	5/64" 0.0781	3/32" 0.0938
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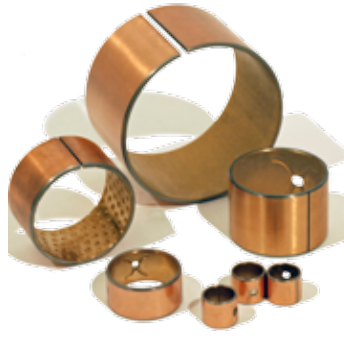
Bowman International Limited reserve the right to change specification without prior notice E & OE

Other **BOWMAN** Products



PTFE Lined Wrapped Bearings

WMU



Sintered Bronze Lined Wrapped Bearings



Acetal Lined Wrapped Bearings

WMX



Plastic Bearings

W/MG



Ball Bearings

WM1/WM3



White Metal Bearings



CuSn8 Hard Bronze Bearings



Full Machining Service



Bronze Bearings Graphite Loaded



Oilite® Sintered Shapes



Oilite® Sintered Bearings

See also: **BOWMAN** Oilite® Sintered Bearings Catalogue
and **BOWMAN** Bearings and Components Catalogue