

Boneham and Turner Ltd

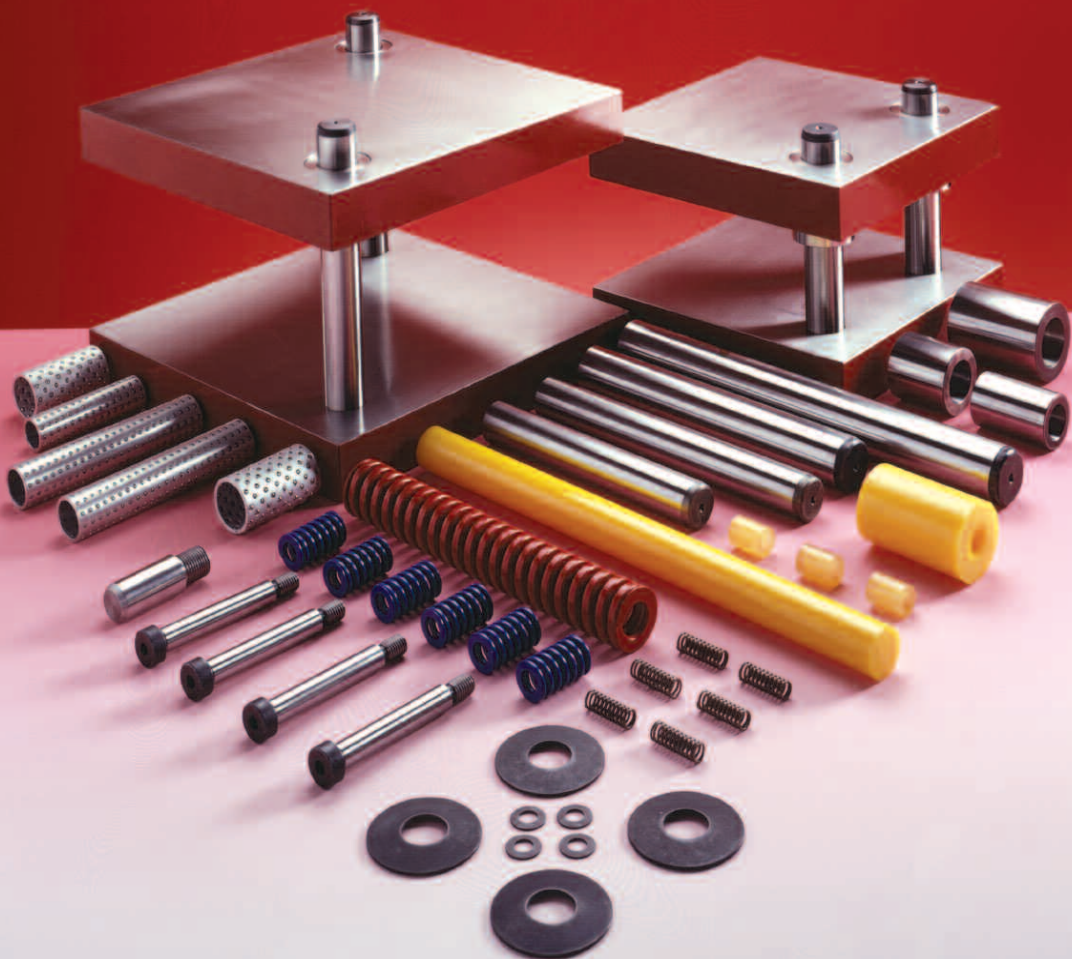
the precision engineers



Press Tool Parts

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Purchasing

Boneham & Turner Ltd accept payment by credit cards.



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This brochure contains a range of Boneham & Turner Die Sets and Press Tool Standard Parts, the majority in accordance with present I.S.O Standards, a direct result of the company's involvement and dedication over recent years in the formulation of this world standard for the Press Tool and related industries.

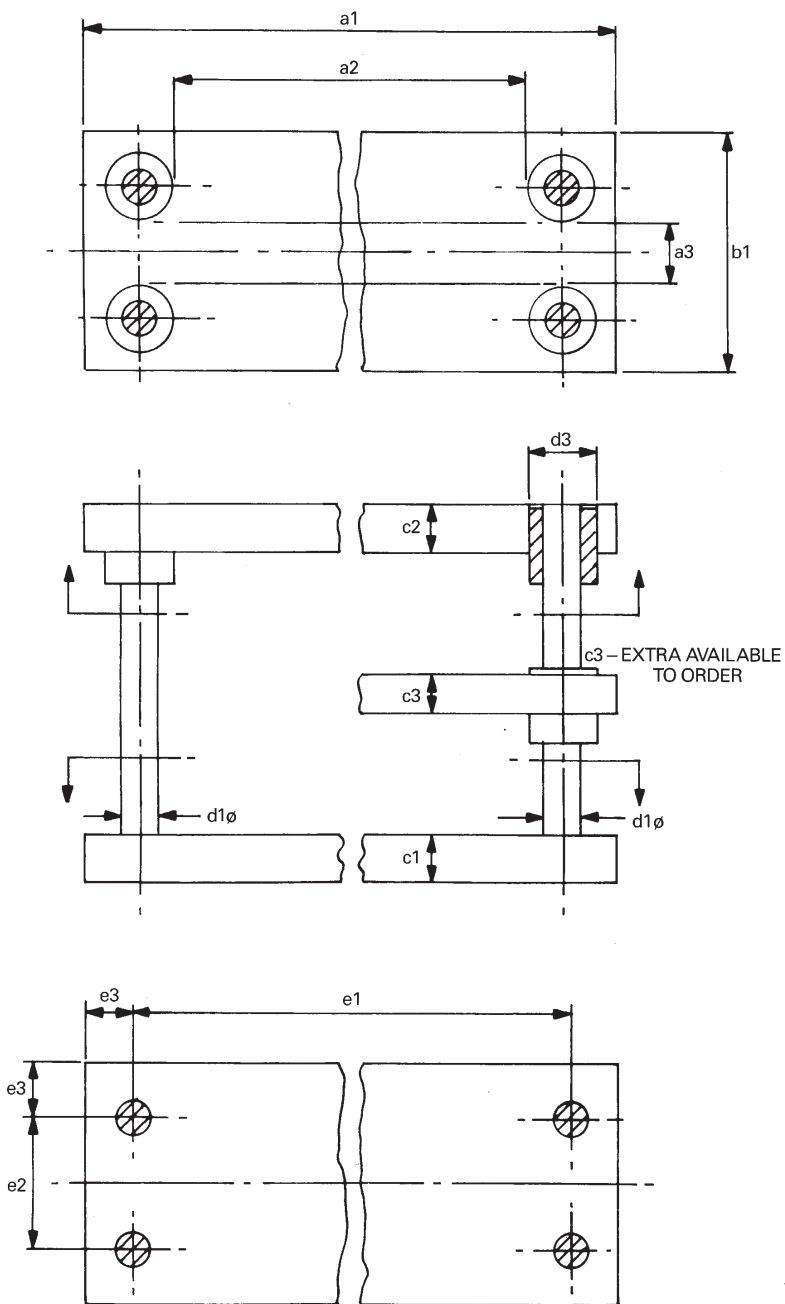
The product range comprises, Die Sets, Pillars and Bush Assemblies, Spring Units and Accessories, all produced from high quality materials and manufactured utilising the latest in machine tool technology and inspection equipment to guarantee end user quality, performance and service life.

Boneham and Turner Ltd

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Die Set Four Pillar

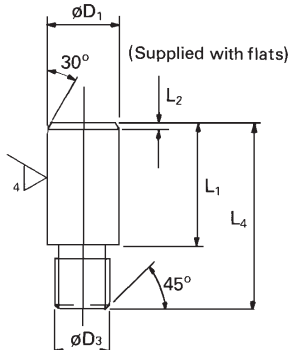
B & T Ref	a1 x b1	Plain Bush a2	Headed Cage Bush a2	Plain Bush a3	Headed Cage Bush a3	+ 0 -2mm c1	+ 0 -2mm c2	c3	d1	d3	e1	e2	e3
MFP 1	x 100	108	100			32	32	25/32	20	32	140		30
MFP 2	x 125												
MFP 3	x 160			68	60							100	
MFP 4	x 200			108	100								
MFP 5	x 125	158	150			32	32	25/32	20	32	190		30
MFP 6	x 160			68	60								
MFP 7	x 200			108	100							140	
MFP 8	x 250			158	150							190	
MFP 9	x 160	195	187			40	40	32/40	25	40	235		40
MFP 10	x 200			80	72							120	
MFP 11	x 250			130	122							170	
MFP 12	x 315			195	187							235	
MFP 13	x 200	280	272	80	72	40	40	32/40	25	40	320	120	40
MFP 14	x 250			130	122							170	
MFP 15	x 315			195	187							235	
MFP 16	x 400			280	272							320	
MFP 17	x 250	362	354	112	104	40	40	32/40	32	48	410	160	45
MFP 18	x 315			177	169							225	
MFP 19	x 400			262	254							310	
MFP 20	x 500			362	354							410	

All Four Pillar die sets are fitted with Plain Ball Cage Bushes.
Plain Guide Bushes can be fitted upon request.

- * c3 (Supplied extra). Standard thicknesses shown in table.
- * d To prevent incorrect assembly when tooled 1 pin will be offset. (Top right by 5mm)

PUNCH SHANKS (I.S.O 10242/ Type B)

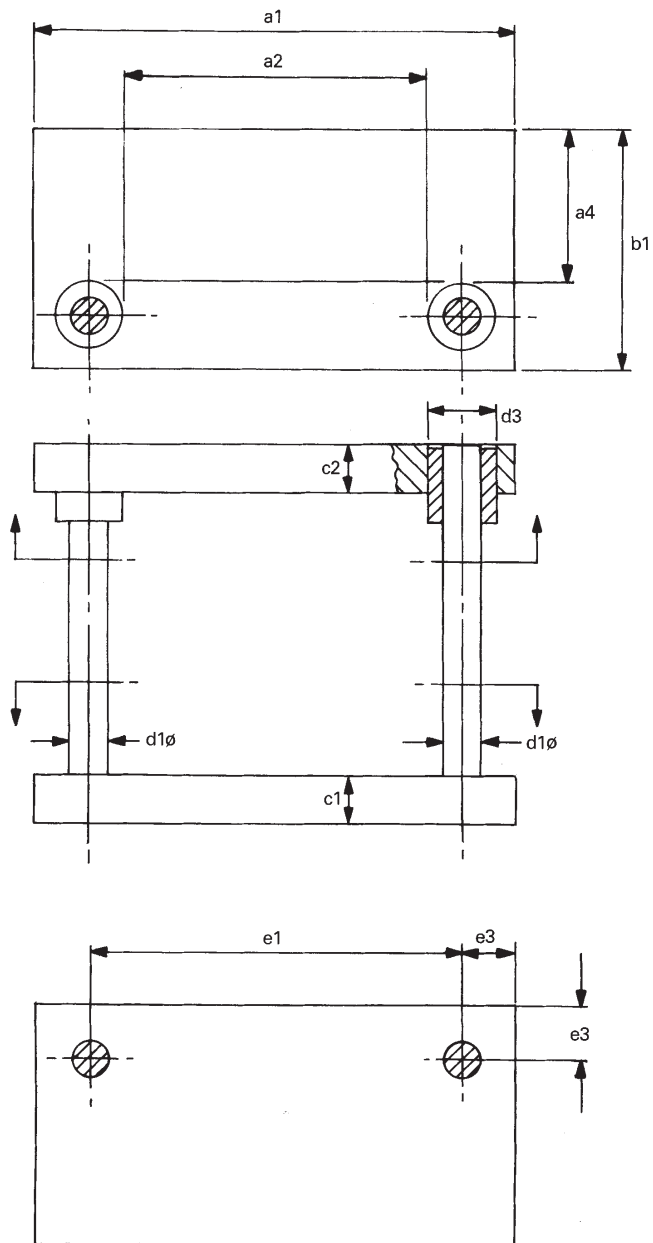
D ₁ f9	D ₃ 6g	L ₁	L ₂	L ₄
20	M 16 x 1.5	40	2	58
25	M 16 x 1.5	45	2.5	68
	M 20 x 1.5			
32	M 20 x 1.5	56	3	79
	M 24 x 1.5			
40	M 24 x 1.5	71	4	93
	M 27 x 2			
50	M 30 x 2	80	5	108
	M 30 x 2			



ORDER INSTRUCTIONS:-

STATE: Reference of Die Set
Daylight - when in closed position
Stroke
Or pin and bush lengths

Also state if alternative Plain Guide Bushes are required and if Punch Shank is required, state size.



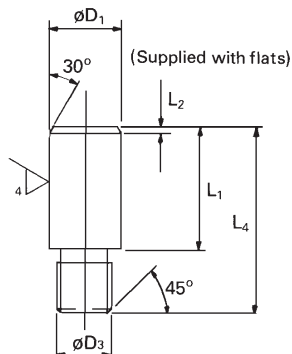
Die Set Rear Pillar

B & T Ref	a1 x b1	Plain	Headed	Plain	Headed	+ 0	+ 0	d1	d3	e1	e3
		Guide Bush	Cage Bush	Guide Bush	Cage Bush	-2mm	-2mm				
		a2	a2	a4	a4	c1	c2				
MRP 1	x 100	78	70			32	32	25	40	120	40
MRP 2	x 125			64	60						
MRP 3	x 160			99	95						
MRP 4	x 200			139	135						
MRP 5	x 125	128	120	64	60	32	32	25	40	170	40
MRP 6	x 160			99	95						
MRP 7	x 200			139	135						
MRP 8	x 250			189	185						
MRP 9	x 160	173	165	89	85	40	40	32	48	225	45
MRP 10	x 200			129	125						
MRP 11	x 250			179	175						
MRP 12	x 315			244	240						
MRP 13	x 200	258	250	129	125	40	40	32	48	310	45
MRP 14	x 250			179	175						
MRP 15	x 315			244	240						
MRP 16	x 400			329	325						
MRP 17	x 250	338	330	169	165	40	40	40	58	400	50
MRP 18	x 315			234	230						
MRP 19	x 400			319	315						
MRP 20	x 500			419	415						

These die sets are fitted as standard with Plain Guide Bushes.
The Die Sets can be fitted with Ball Cage Bushes at extra cost.

PUNCH SHANKS (I.S.O 10242/ Type B)

D ₁ f9	D ₃ 6g	L ₁	L ₂	L ₄
20	M 16 x 1.5	40	2	58
25	M 16 x 1.5	45	2.5	68
	M 20 x 1.5			
32	M 20 x 1.5	56	3	79
	M 24 x 1.5			
40	M 24 x 1.5	71	4	93
	M 27 x 2			
50	M 30 x 2	80	5	108
	M 30 x 2			

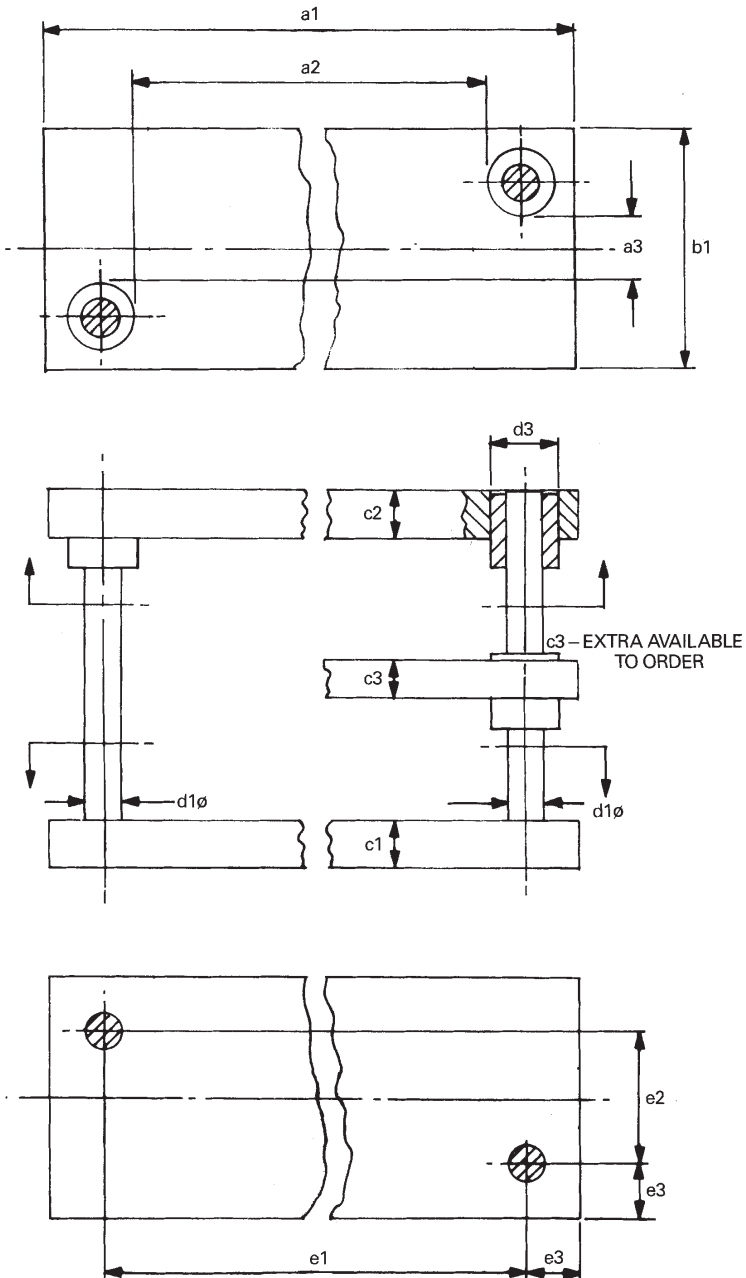


ORDER INSTRUCTIONS:-

STATE: Reference of Die Set
Daylight - when in closed position
Stroke
Or pin and bush lengths

Also state if alternative Headed Ball Cage Bushes are required and if Punch Shank is required, state size.

Die Set Diagonal Pillar



Die Set Diagonal Pillar

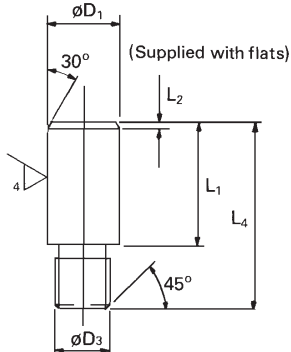
B & T Ref	a1 x b1	Plain Bush a2	Headed Cage Bush a2	Plain Bush a3	Headed Cage Bush a3	+ 0 -2mm c1	+ 0 -2mm c2	c3	d1	d3	e1	e2	e3
MDP 1	x 100	78	70			32	32	25/32	24/25	40	120		40
MDP 2	x 125												
MDP 3	x 160												
MDP 4	x 200			78	70							120	
MDP 5	x 125	128	120			32	32	25/32	24/25	40	170		40
MDP 6	x 160												
MDP 7	x 200			78	70							120	
MDP 8	x 250			128	120							170	
MDP 9	x 160	173	165			40	40	32/40	30/32	48	225		45
MDP 10	x 200			58	50							110	
MDP 11	x 250			108	100							160	
MDP 12	x 315			173	165							225	
MDP 13	x 200	258	250			40	40	32/40	30/32	48	310		45
MDP 14	x 250			58	50							110	
MDP 15	x 315			108	100							160	
MDP 16	x 400			173	165							225	
MDP 17	x 250	338	330			40	40	32/40	38/40	58	400		50
MDP 18	x 315			88	80							150	
MDP 19	x 400			153	145							215	
MDP 20	x 500			238	230							300	
				338	330							400	

These die sets are fitted as standard with Plain Guide Bushes.
The Die Sets can be fitted with Ball Cage Bushes at extra cost.

- * d1 1 pin of each diameter will be used to prevent incorrect assembly when tooled.
- * c3 Supplied extra, standard thicknesses shown in table.

PUNCH SHANKS (I.S.O 10242/ Type B)

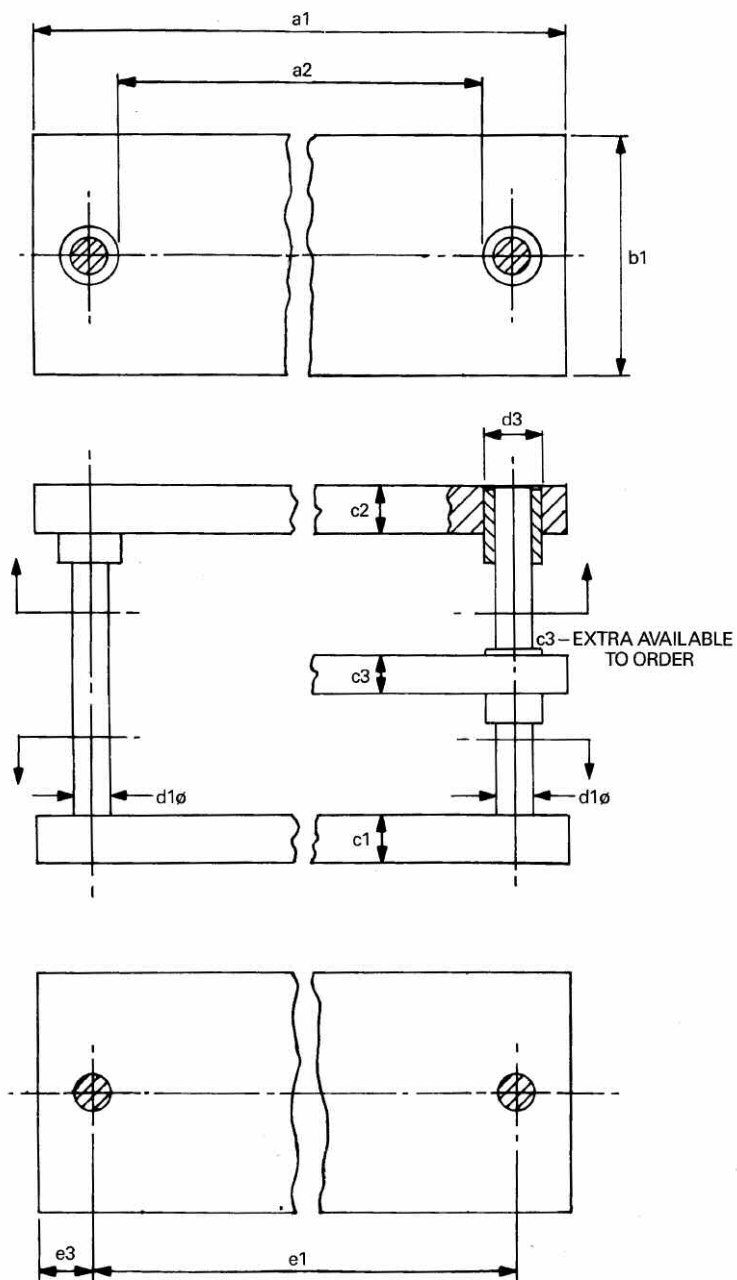
D ₁ f9	D ₃ 6g	L ₁	L ₂	L ₄
20	M 16 x 1.5	40	2	58
25	M 16 x 1.5	45	2.5	68
	M 20 x 1.5			
32	M 20 x 1.5	56	3	79
	M 24 x 1.5			
40	M 24 x 1.5	71	4	93
	M 27 x 2			
50	M 30 x 2	80	5	108
	M 30 x 2			



ORDER INSTRUCTIONS:-

STATE: Reference of Die Set
Daylight - when in closed position
Stroke
Or pin and bush lengths

Also state if alternative Headed Ball Cage Bushes are required and if Punch Shank is required, state size.



Die Set Centre Pillar

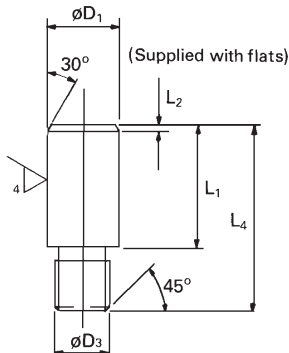
B & T Ref	a1 x b1	Plain Bush a2	Headed Cage Bush a2	+ 0 -2mm c1	+ 0 -2mm c2	c3	d1	d3	e1	e3
MCP 1	x 100	78	70	32	32	25/32	24/25	40	120	40
MCP 2	x 125									
MCP 3	200 x 160									
MCP 4	x 200									
MCP 5	x 125	128	120	32	32	25/32	24/25	40	170	40
MCP 6	x 160									
MCP 7	250 x 200									
MCP 8	x 250									
MCP 9	x 160	173	165	40	40	32/40	30/32	48	225	45
MCP 10	315 x 200									
MCP 11	x 250									
MCP 12	x 315									
MCP 13	x 200	258	250	40	40	32/40	30/32	48	310	45
MCP 14	400 x 250									
MCP 15	x 315									
MCP 16	x 400									
MCP 17	x 250	338	330	40	40	32/40	38/40	58	400	50
MCP 18	500 x 315									
MCP 19	x 400									
MCP 20	x 500									

These die sets are fitted as standard with Plain Guide Bushes.
The Die Sets can be fitted with Ball Cage Bushes at extra cost.

- * d1 1 pin of each diameter will be used to prevent incorrect assembly when toolled.
- * c3 Supplied extra, standard thicknesses shown in table.

PUNCH SHANKS (I.S.O 10242/ Type B)

D ₁ f9	D ₃ 6g	L ₁	L ₂	L ₄
20	M 16 x 1.5	40	2	58
25	M 16 x 1.5	45	2.5	68
	M 20 x 1.5			
32	M 20 x 1.5	56	3	79
	M 24 x 1.5			
40	M 24 x 1.5	71	4	93
	M 27 x 2			
50	M 30 x 2	80	5	108
	M 30 x 2			



ORDER INSTRUCTIONS:-

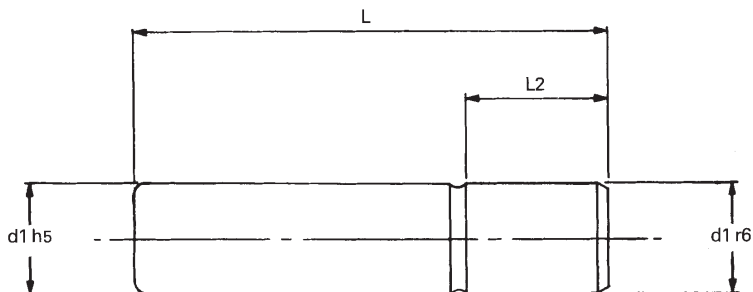
STATE: Reference of Die Set

Daylight - when in closed position

Stroke

Or pin and bush lengths

Also state if alternative Headed Ball Cage Bushes are required and if Punch Shank is required, state size.



The length shown as L_2 is oversize (r_6) to provide a press fit in the nominal machined bore of the plate.

	d1 Diameter									
	16	20	24	25	30	32	38	40	48	50
	L2									
	25	32	32	32	40	40	40	40	50	50
L 90										
L 100										
L 112										
L 125										
L 140										
L 160										
L 180										
L 200										
L 224										
L 250										
L 280										
L 315										
L 355										
L 400										
L 450										
L 500										

The following diameters are used to prevent incorrect assembly of the Die Set upper and lower plates 24mm, 30mm, 38mm, 48mm.

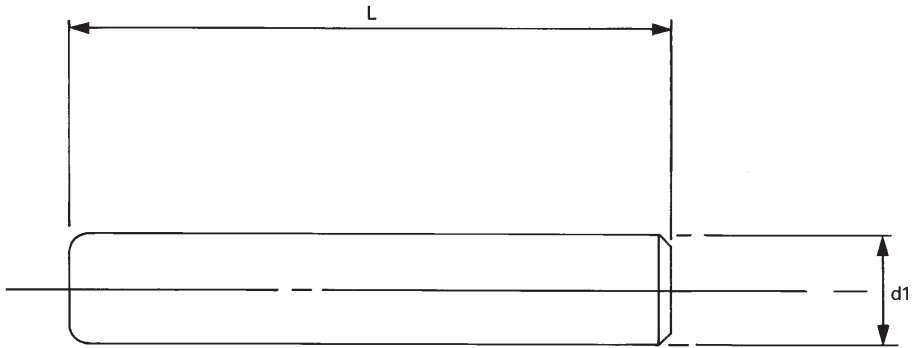
Guide Pins are manufactured from hardened mild steel and precision ground.

ORDERING:- State MGP, together with d_1 diameter and length.

Guide Pins Parallel


BS 7568 PT 26

I.S.O 9182/2 Type A1



Guide Pins on this page are ground to h5 limits to ensure a sliding fit onto the bore of the Guide Bush.

L	d1 = h5 Tolerance									
	16	20	24	25	30	32	38	40	48	50
90	Shaded									
100	Shaded	Shaded		Shaded						
112	Shaded	Shaded		Shaded						
125	Shaded	Shaded		Shaded		Shaded				
140	Shaded	Shaded		Shaded		Shaded				
160	Shaded	Shaded		Shaded		Shaded		Shaded		
180	Shaded	Shaded		Shaded		Shaded		Shaded		Shaded
200	Shaded	Shaded		Shaded		Shaded		Shaded		Shaded
224		Shaded		Shaded		Shaded		Shaded		Shaded
250				Shaded		Shaded		Shaded		Shaded
280				Shaded		Shaded		Shaded		Shaded
315						Shaded		Shaded		Shaded
355								Shaded		Shaded
400								Shaded		Shaded
450										Shaded
500										Shaded

 The following diameters are used to prevent incorrect assembly of the Die Set upper and lower plates 24mm, 30mm, 38mm, 48mm.

Parallel Guide Pins are manufactured from hardened mild steel and precision ground.

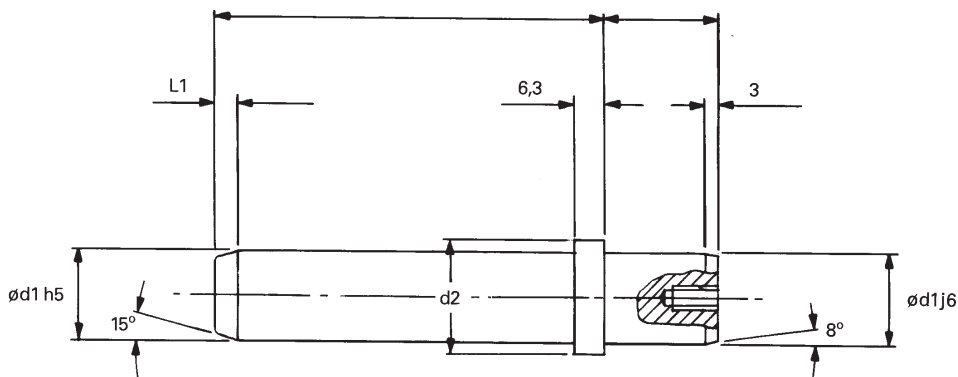
ORDERING:- State MGP, together with d1 diameter and length.



Guide Pins with Shoulder, End Locking

I.S.O 9182/5 Type D

BS 7568 PT 29



The length shown as L2 is oversize (j6) to provide a press fit in the nominal machined bore of the plate.

d1	16	20	24	25	30	32	38	40	48	50
d2	20	25	32	32	40	40	50	50	63	63
L2	16	20	25	25	32	32	40	40	50	50
L80										
L 90										
L 100										
L 112										
L 125										
L 140										
L 160										
L 180										
L 200										
L 224										
L 250										
L 280										
L 315										
L 355										
L 400										
L 450										
L 500										

The following diameters are used to prevent incorrect assembly of the Die Set upper and lower plates 24mm, 30mm, 38mm, 48mm.

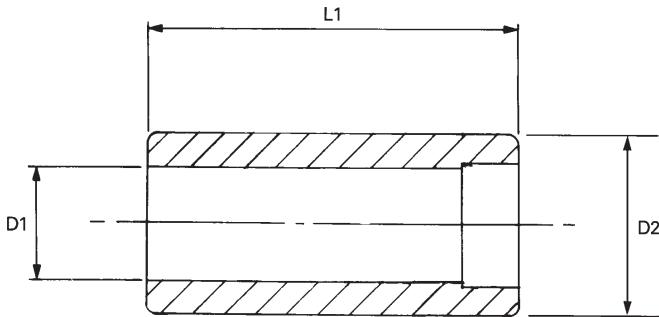
Guide Pins with shoulder are manufactured from hardened mild steel and precision ground.

ORDERING:- State MSGP, together with d1 diameter and length L.
Standard Screw and Washer included. Retainers can be supplied to order.

Guide Bushes

BS 7568 PT 17 1992

I.S.O 9448/2 Form A



These Bushes incorporate counter bore of I.S.O form G type Bushes, to act as an oil reservoir.

D1	D1 = G6 Tolerance									
	16	20	24	25	30	32	38	40	48	50
L1	D2 = n6 Tolerance									
	28	32	40	40	48	48	58	58	70	70
25										
32										
40										
50										
63										
80										
100										
125										
160										

The following diameters are used to prevent incorrect assembly of the Die Set upper and lower plates 24mm, 30mm, 38mm, 48mm.

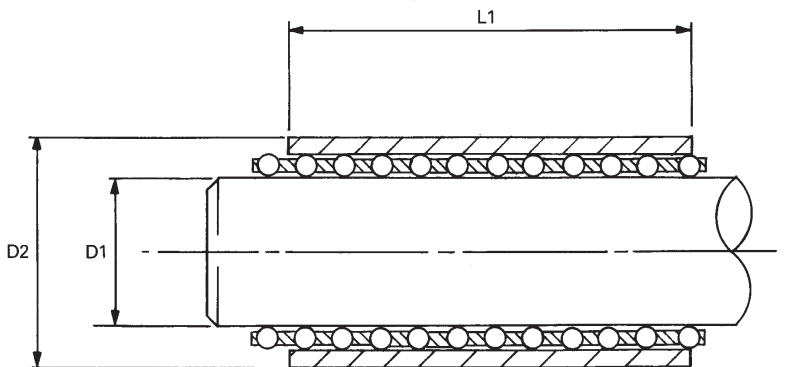
Guide Bushes are manufactured from hardened mild steel and precision ground.
The Bushes are intended to fit in a hole with an H7 tolerance.

ORDERING:- State MGPB, with bore and length required.



Ball Cage Bushes Plain

I.S.O 9448/3 Form B



Cage Retainers available if required.
The Linear Cage only, can be supplied to order.

D1	16	20	24	25	30	32	38	40	48	50
	D2 = n6 Tolerance									
D2	28	32	40	40	48	48	58	58	70	70
L1 25										
L1 32										
L1 40										
L1 50										
L1 63										
L1 80										
L1 100										
L1 125										
L1 160										

The following diameters are used to prevent incorrect assembly of the Die Set upper and lower plates 24mm, 30mm, 38mm, 48mm.

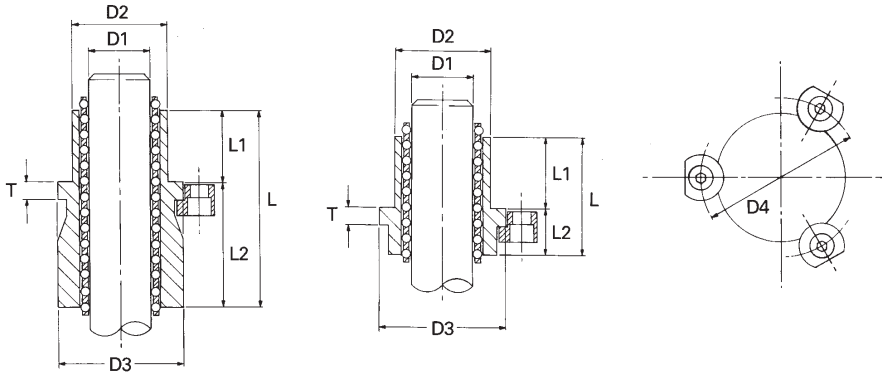
The Standard Plain and Headed Ball Cage Bushes are used when improved accuracy is required. They are interchangeable with Plain Guide Bushes.

The Bushes are suitable for fitting in a receiving hole having an H7 tolerance.

ORDERING:- State PBCB, plus D1 diameter and length.

Ball Cage Bushes Headed

I.S.O 9448/7 Form F



Cage Retainers available if required.
The Linear Cage only, can be supplied to order.
Retaining Clamps available to order.

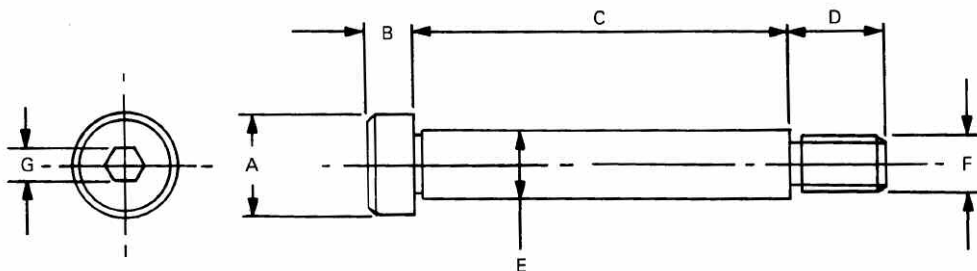
D1	16	20	24	25	30	32	38	40	48	50											
D2	28	32	40	40	48	48	58	58	70	70											
D3	36	40	48	48	56	56	66	66	80	80											
D4	53	57	65	65	73	73	83	83	97	97											
T	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3											
	L	L2	L	L2	L	L2	L	L2	L	L2	L	L2	L	L2	L	L2	L	L2	L	L2	
L1	35	10	37	12	37	12	37	12													
	25	57	32	45	20	61	36	61	36												
L1			61	36	81	56	81	56													
	32	42	10	44	12	57	25	57	25	44	12	44	12								
		64	32	68	36	82	50	82	50	77	45	77	45								
L1									95	63	95	63									
	40	50	10	52	12	52	12	52	12	72	32	72	32	55	15	55	15				
L1			76	36	80	40	80	40	96	56	96	56	85	45	85	45					
													111	71	111	71					
	50			62	12	62	12	62	12	65	15	65	15	82	32	82	32	68	18	68	18
L1					90	40	90	40	95	45	95	45	113	63	113	63	100	50	100	50	
																	130	80	130	80	
L1				75	12	75	12	78	15	78	15	78	15	78	15	78	15	99	36	99	36
	63							108	45	108	45	113	50	113	50	134	71	134	71		
L1													95	15	95	15	98	18	98	18	
	80												130	50	130	50	143	63	143	63	
L1																	118	18	118	18	
	100																163	63	163	63	

The following diameters are used to prevent incorrect assembly of the Die Set upper and lower plates 24mm, 30mm, 38mm, 48mm.

The Standard Plain and Headed Ball Cage Bushes are used when improved accuracy is required. They are interchangeable with Plain Guide Bushes. The Bushes are suitable for fitting in a receiving hole having an H7 tolerance.

ORDERING:- State HBCB, plus D1 diameter, length L and length L1.

BS 4168



E	C Length										A	B	D	F	G
	25	30	40	50	60	70	80	90	100	120					
8											13	5.5	11	6 x 1	4
10											16	7	13	8 x 1.25	5
12											18	8	16	10 x 1.5	6
16											24	11	18	12 x 1.75	8
20											30	14	22	16 x 2	10
24											36	16	27	20 x 2.5	12

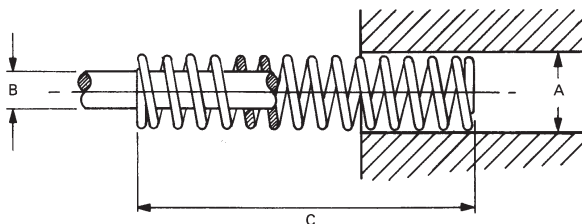
Material on our range of Stripper Bolts is high grade alloy steel.

ORDERING:- State diameter E and length required.

Die Springs

BS 7568 PT 4 1992

Colour Coded I.S.O. 10243



Die Springs are precision manufactured and have ends which are ground square to ensure even compression of spring.

We offer four strengths of Springs which are colour coded.

Green - Light Load:	Ref LDS	(see page 19)
Blue - Medium Load:	Ref MDS	(see page 19)
Red - Heavy Load:	Ref HDS	(see page 20)
Yellow - Extra Heavy Load:	Ref EHDS	(see page 20)

Rectangular Section
Rectangular Section
Rectangular Section
Rectangular Section



Die Springs

Colour Coded I.S.O. 10243

GREEN - LIGHT LOAD

Hole Size A	Rod Dia B	C Free Lengths													
		25	32	38	51	64	76	89	102	115	127	152	178	203	254
12.5	6.3	LDS 1	LDS 2	LDS 3	LDS 4	LDS 5	LDS 6								
		1.83	1.67	1.39	1.16	.95	.72								
16	8	LDS 7	LDS 8	LDS 9	LDS 10	LDS 11	LDS 12	LDS 13	LDS 14						
		2.39	2.34	1.97	1.60	1.09	1.02	.88	.80						
20	10	LDS 15	LDS 16	LDS 17	LDS 18	LDS 19	LDS 20	LDS 21	LDS 22	LDS 23	LDS 24	LDS 25			
		5.69	4.59	3.40	2.50	2.04	1.63	1.43	1.22	1.11	.97	.77			
25	12.5	LDS 26	LDS 27	LDS 28	LDS 29	LDS 30	LDS 31	LDS 32	LDS 33	LDS 34	LDS 35	LDS 36	LDS 37	LDS 38	
		10.2	8.19	6.32	4.49	3.59	2.86	2.45	2.15	1.91	1.70	1.43	1.28	1.06	
32	16			LDS 39	LDS 40	LDS 41	LDS 42	LDS 43	LDS 44	LDS 45	LDS 46	LDS 47	LDS 48	LDS 49	LDS 50
				9.59	6.83	5.40	4.49	3.79	3.26	2.96	2.55	2.19	1.86	1.61	1.28
40	20				LDS 51	LDS 52	LDS 53	LDS 54	LDS 55	LDS 56	LDS 57	LDS 58	LDS 59	LDS 60	LDS 61
					9.38	7.45	6.43	5.20	4.39	4.04	3.77	2.86	2.57	2.31	1.73
50	25					LDS 62	LDS 63	LDS 64	LDS 65	LDS 66	LDS 67	LDS 68	LDS 69	LDS 70	LDS 71
						15.91	12.75	11.12	9.59	8.26	7.24	6.12	5.30	4.49	3.57

Table shows rate of deflection kilograms per 1mm of deflection.

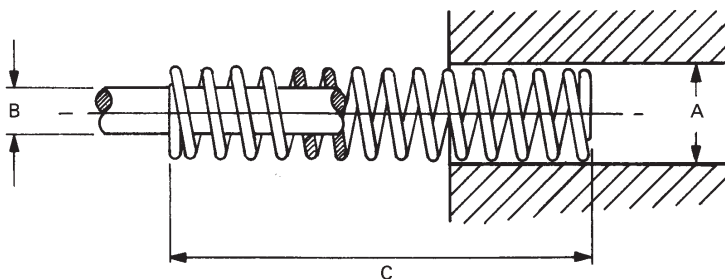
ORDERING:- State references only.

BLUE - MEDIUM LOAD

Hole Size A	Rod Dia B	C Free Lengths													
		25	32	38	51	64	76	89	102	115	127	152	178	203	254
12.5	6.3	MDS 1	MDS 2	MDS 3	MDS 4	MDS 5	MDS 6								
		3.06	2.53	2.18	1.58	1.23	1.04								
16	8	MDS 7	MDS 8	MDS 9	MDS 10	MDS 11	MDS 12	MDS 13	MDS 14						
		5.04	3.78	3.46	2.69	2.09	1.82	1.55	1.38						
20	10	MDS 15	MDS 16	MDS 17	MDS 18	MDS 19	MDS 20	MDS 21	MDS 22	MDS 23	MDS 24	MDS 25			
		10.00	7.41	5.71	4.25	3.29	2.56	2.24	2.02	1.85	1.69	1.35			
25	12.5	MDS 26	MDS 27	MDS 28	MDS 29	MDS 30	MDS 31	MDS 32	MDS 33	MDS 34	MDS 35	MDS 36	MDS 37	MDS 38	
		14.99	12.04	9.49	7.00	5.41	4.41	3.90	3.37	2.86	2.64	2.12	1.82	1.61	
32	16			MDS 39	MDS 40	MDS 41	MDS 42	MDS 43	MDS 44	MDS 45	MDS 46	MDS 47	MDS 48	MDS 49	MDS 50
				18.87	13.67	10.10	8.21	7.05	6.00	5.25	4.57	3.86	3.32	2.95	2.18
40	20				MDS 51	MDS 52	MDS 53	MDS 54	MDS 55	MDS 56	MDS 57	MDS 58	MDS 59	MDS 60	MDS 61
					18.52	14.28	11.02	9.25	8.26	7.32	6.40	5.26	4.50	3.74	3.07
50	25					MDS 62	MDS 63	MDS 64	MDS 65	MDS 66	MDS 67	MDS 68	MDS 69	MDS 70	MDS 71
						21.32	17.14	14.28	12.14	10.81	9.89	8.16	7.09	6.10	4.48

Table shows rate of deflection kilograms per 1mm of deflection.

ORDERING:- State references only.



RED - HEAVY LOAD

Hole Size A	Rod Dia B	C Free Lengths													
		25	32	38	51	64	76	89	102	115	127	152	178	203	254
12.5	6.3	HDS 1	HDS 2	HDS 3	HDS 4	HDS 5	HDS 6								
		4.29	3.39	2.99	2.00	1.53	1.35								
16	8	HDS 7	HDS 8	HDS 9	HDS 10	HDS 11	HDS 12	HDS 13	HDS 14						
		7.72	5.39	4.95	3.78	3.09	2.62	2.21	2.00						
20	10	HDS 15	HDS 16	HDS 17	HDS 18	HDS 19	HDS 20	HDS 21	HDS 22	HDS 23	HDS 24	HDS 25			
		22.03	17.14	13.16	9.59	7.35	6.09	5.15	4.51	3.92	3.48	2.88			
25	12.5	HDS 27	HDS 28	HDS 29	HDS 30	HDS 31	HDS 32	HDS 33	HDS 34	HDS 35	HDS 36	HDS 37	HDS 38		
		30.29	22.34	15.91	12.55	10.10	8.57	7.45	6.63	5.89	4.88	4.18	3.65		
32	16	HDS 39	HDS 40	HDS 41	HDS 42	HDS 43	HDS 44	HDS 45	HDS 46	HDS 47	HDS 48	HDS 49	HDS 50		
		39.58	27.74	21.62	17.54	14.38	12.44	10.91	9.49	7.96	6.85	6.03	4.73		
40	20	HDS 51	HDS 52	HDS 53	HDS 54	HDS 55	HDS 56	HDS 57	HDS 58	HDS 59	HDS 60	HDS 61			
		35.70	27.44	22.34	19.38	16.63	14.48	13.06	10.71	9.08	7.85	6.22			
50	25	HDS 62	HDS 63	HDS 64	HDS 65	HDS 66	HDS 67	HDS 68	HDS 69	HDS 70	HDS 71				
		42.13	34.58	29.38	24.99	21.93	19.58	15.71	13.67	11.93	9.08				

Table shows rate of deflection kilograms per 1mm of deflection. **ORDERING:-** State references only.

YELLOW - EXTRA HEAVY LOAD

Hole Size A	Rod Dia B	C Free Lengths													
		25	32	38	51	64	76	89	102	115	127	152	178	203	254
12.5	6.3	EHDS 1	EHDS 2	EHDS 3	EHDS 4	EHDS 5	EHDS 6								
		5.96	4.48	3.67	2.67	2.16	1.74								
16	8	EHDS 7	EHDS 8	EHDS 9	EHDS 10	EHDS 11	EHDS 12	EHDS 13	EHDS 14						
		12.03	9.08	7.35	5.33	4.20	3.47	3.00	2.61						
20	10	EHDS 15	EHDS 16	EHDS 17	EHDS 18	EHDS 19	EHDS 20	EHDS 21	EHDS 22	EHDS 23	EHDS 24	EHDS 25			
		29.88	22.84	18.05	13.05	10.09	8.33	7.09	6.18	5.40	4.85	3.98			
25	12.5	EHDS 27	EHDS 28	EHDS 29	EHDS 30	EHDS 31	EHDS 32	EHDS 33	EHDS 34	EHDS 35	EHDS 36	EHDS 37	EHDS 38		
		38.18	35.29	21.16	16.42	13.34	11.27	9.82	8.74	7.78	6.48	5.50	4.79		
32	16	EHDS 39	EHDS 40	EHDS 41	EHDS 42	EHDS 43	EHDS 44	EHDS 45	EHDS 46	EHDS 47	EHDS 48	EHDS 49	EHDS 50		
		53.88	36.00	27.45	22.28	18.39	15.81	14.28	12.65	10.40	8.99	7.75	6.20		
40	20	EHDS 51	EHDS 52	EHDS 53	EHDS 54	EHDS 55	EHDS 56	EHDS 57	EHDS 58	EHDS 59	EHDS 60	EHDS 61			
		64.05	49.67	38.65	32.74	28.66	24.99	22.54	17.14			13.46	10.91		
50	25	EHDS 62	EHDS 63	EHDS 64	EHDS 65	EHDS 66	EHDS 67	EHDS 68	EHDS 69	EHDS 70	EHDS 71				
		72.32	58.34	48.45	41.31	35.90	32.23	24.37			19.07	15.60			

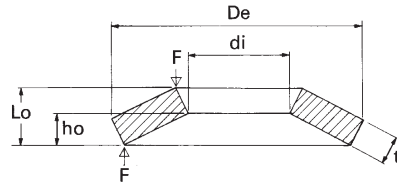
Table shows rate of deflection kilograms per 1mm of deflection. **ORDERING:-** State references only.

Disc Springs

D.I.N 2093

Recommended Clearance (Total) for Guide Pins

Hole Size	Clearance
8.3mm to 13.1mm	.15mm
16.3mm to 19.4mm	.20mm
22.6mm to 25.8mm	.25mm



For non-static applications maximum deflection 0.75 Lo.

Table details:- $F = \text{Load (N/mm}^2) = S \text{ deflection in mm.}$

Pin Size	De	di	t	ho	Lo	When $S = 0.4 \text{ ho}$		When $S = 0.6 \text{ ho}$		When $S = 0.75 \text{ ho}$		When $S = \text{ho}$	
						F	S	F	S	F	S	F	S
						8	16	8.2	0.4	0.5	0.9	116	0.20
8	16	8.2	0.6	0.45	1.05	255	0.18	349	0.27	412	0.34	503	0.45
8	16	8.2	0.9	0.35	1.25	566	0.14	825	0.21	1000	0.26	1320	0.35
10	20	10.2	0.5	0.65	1.15	194	0.26	237	0.39	254	0.49	268	0.65
10	20	10.2	0.8	0.55	1.35	456	0.22	631	0.33	745	0.41	929	0.55
10	20	10.2	1.1	0.45	1.55	854	0.18	1240	0.27	1530	0.34	1980	0.45
12	25	12.2	0.7	0.9	1.6	456	0.36	558	0.54	601	0.68	635	0.90
12	25	12.2	0.9	0.7	1.6	542	0.28	737	0.42	868	0.53	1050	0.70
12	25	12.2	1.5	0.55	2.05	1630	0.22	2380	0.33	2910	0.41	3820	0.55
16	31.5	16.3	0.8	1.05	1.85	527	0.42	642	0.63	687	0.79	722	1.05
16	31.5	16.3	1.25	0.90	2.15	1180	0.36	1620	0.54	1920	0.68	2360	0.90
16	31.5	16.3	1.75	0.70	2.45	2170	0.28	3160	0.42	3900	0.53	5040	0.70
20	40	20.4	1.00	1.30	2.30	777	0.52	948	0.78	1020	0.98	1070	1.30
20	40	20.4	1.50	1.15	2.65	1640	0.46	2240	0.69	2620	0.86	3200	1.15
20	40	20.4	2.25	0.90	3.15	3640	0.36	5300	0.54	6540	0.68	8460	0.90
25	50	25.4	1.25	1.60	2.85	1180	0.64	1440	0.96	1550	1.20	1650	1.60
25	50	25.4	2.00	1.40	3.40	2910	0.56	4020	0.84	4760	1.05	5900	1.40
25	50	25.4	3.00	1.10	4.10	6660	0.44	9740	0.66	12000	0.83	15600	1.10

Technical information can be obtained upon receipt of full details.

All specifications subject to change without notice.

ORDERING:- State disc spring together with De size and thickness.

Methods of Stacking

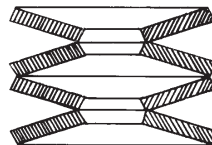
Methods of Stacking

Parallel

Series



Total Deflections = Deflection of one spring.
Total Force $F = \text{Force per spring} \times \text{number of springs in parallel.}$



Total Deflections = Deflection per spring \times number of springs in stack

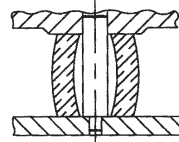
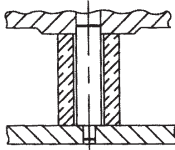
A combination of Series and Parallel Stacking can be used.



Elastomer Springs

I.S.O 10069-1

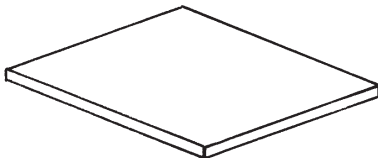
Our range of polyurethane Springs has a nominal hardness of 90 Shore A, with a temperature resistance up to 80° c. They can be used for various applications on press tool work. Also we can supply as 305mm square slabs in various thicknesses and 305mm long rods of various diameters.



B & T Ref.	Outside Diameter	Length	Inside Diameter	Maximum Compression
ES 1	16	16	6.5	4
ES 2		20		5
ES 3		25		6.25
ES 4	20	16	8.5	4
ES 5		20		5
ES 6		25		6.25
ES 7		32		8
ES 8	25	20	10.5	5
ES 9		25		6.25
ES 10		32		8
ES 11		40		10
ES 12	32	32	13.5	8
ES 13		40		10
ES 14		50		12.5
ES 15		63		15.75
ES 16		32		8
ES 17	40	40	13.5	10
ES 18		50		12.5
ES 19		63		15.75
ES 20		80		20
ES 21		32		8
ES 22	50	40	17	10
ES 23		50		12.5
ES 24		63		15.75
ES 25		80		20
ES 26		100		25

B & T Ref.	Outside Diameter	Length	Inside Diameter	Maximum Compression
ES 27	63	32	17	8
ES 28		40		10
ES 29		50		12.5
ES 30		63		15.75
ES 31		80		20
ES 32	80	100	21	25
ES 33		125		31.25
ES 34		32		8
ES 35		40		10
ES 36		50		12.5
ES 37		63		15.75
ES 38		80		20
ES 39	100	100	21	25
ES 40		125		31.25
ES 41		32		8
ES 42		40		10
ES 43	100	50	21	12.5
ES 44		63		15.75
ES 45		80		20
ES 46		100		25
ES 47		125		31.25

ORDERING:- State reference required.



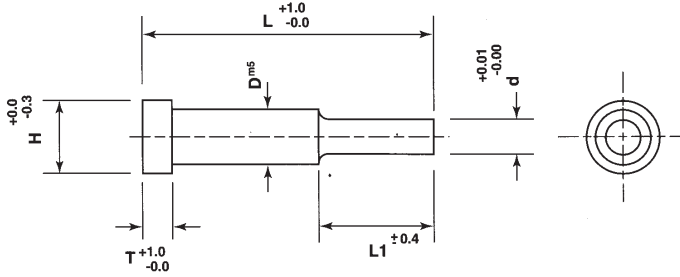
Flat Squares 305mm Square:
Thicknesses 12.5 - 25 - 32 - 38 - 50

Solid Round 305mm Long:
Diameters 16 - 20 - 25 - 32 - 40 - 50 - 63 - 80 - 100

Punches

BS 7568 PT 5

I.S.O 8020 Type B



Ref.	Body Diam.	D		L Lengths						H	L1
		From	To	56	63	71	80	90	100		
MHP 1	5	1.0	4.5							8	12
MHP 2	6	1.5	5.5							9	13
MHP 3	8	2.5	7.5							11	14
MHP 4	10	4.5	9.5							13	16
MHP 5	13	6.5	12.5							16	21
MHP 6	16	9.5	15.5							19	24
MHP 7	20	12.5	19.5							24	27
MHP 8	25	16.5	24.5							29	32
MHP 9	32	22.5	31.5							36	32

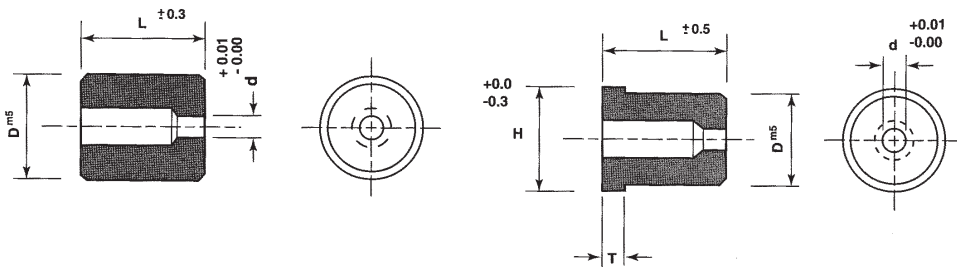
T = All 5mm

Please Note: Point Diameters in 0.5mm increments.

Material Chrome Steel D₂.

Clearance between Punch and Die to be machined by customer.

Specials including other materials and sizes, price and delivery upon application.



PLAIN

Ref.	D	d		L Lengths		
		From	To	17	24	30
MPD 1	6	1	3			
MPD 2	10	2	5			
MPD 3	13	3	7			
MPD 4	16	4	8			
MPD 5	20	6	11			
MPD 6	22	9	13			
MPD 7	25	12	16			
MPD 8	32	13	20			
MPD 9	38	16	26			

HEADED

Ref.	D	d		L Lengths				H
		From	To	19	22	25	35	
MHD 1	6	1	3					9
MHD 2	10	2	5					13
MHD 3	13	3	7					16
MHD 4	16	4	8					19
MHD 5	20	6	11					23
MHD 6	22	9	13					25
MHD 7	25	12	16					28

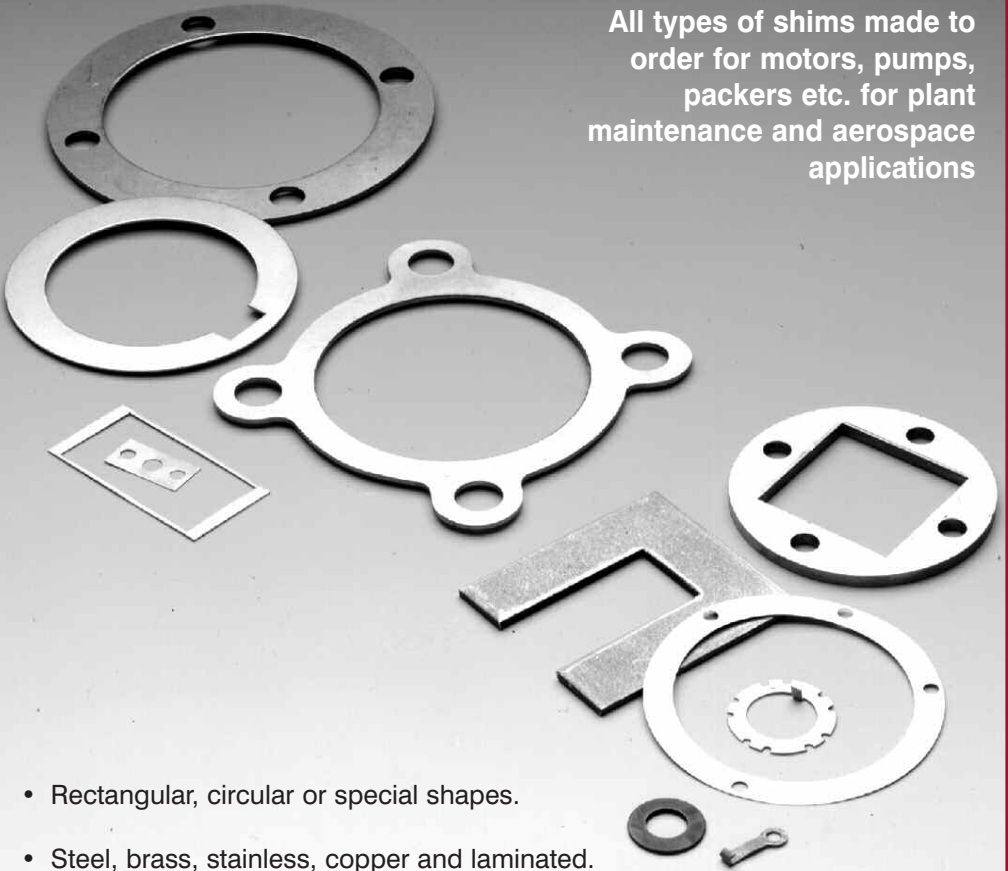
T = All 5mm

Please Note: Standard increments 0.5mm. Customer to machine for clearance.
 Specials including other materials and sizes, price and delivery upon application.

SPECIAL SHIMS FOR ALL APPLICATIONS

A Quality Precision Engineering Service

All types of shims made to order for motors, pumps, packers etc. for plant maintenance and aerospace applications



- Rectangular, circular or special shapes.
- Steel, brass, stainless, copper and laminated.
- Thickness range .001" (0,025 mm) to .125" (3.125 mm) dependant on material
- Rapid quotation and manufacturing service

Boneham & Turner Ltd

GENERAL CONDITIONS OF SALE

1 GENERAL

- (a) Save as otherwise agreed in writing by Boneham & Turner Limited ("The Company"), these conditions shall govern the contract to the entire exclusion of any other express or implied conditions.
- (b) Descriptions, illustrations and particulars of goods contained in the Company's price lists catalogues or other advertising material shall not form part of the contract unless specifically included.
- (c) If the goods required for any special use not reasonably to be inferred by the Company, the customer shall disclose such use before the Contract is entered into.

2 PERFORMANCE

- (a) The Company warrants that the goods shall at the time of delivery correspond with the specifications agreed (subject to any specified tolerance limits) and be free from defects in workmanship and materials. If any goods do not conform to this warranty the Company will at its option:-
 - (i) replace the goods found not to conform to the warranty or
 - (ii) take such steps as the Company deems necessary to bring goods into conformity with the agreed specifications (subject as aforesaid) and into a state where they are free from such defects; or
 - (iii) take back the goods found not to conform to the warranty and refund the appropriate part of the purchase price.Provided that the liability of the Company shall in no event exceed the purchase price of the goods, and performance of any one of the above options shall constitute an entire discharge of the Company's liability under this warranty.
- (b) The foregoing warranty is conditional upon:-
 - (i) the customer giving notice to the Company of the alleged defect or failure to correspond with specification immediately the customer discovers or ought to have discovered the same;
 - (ii) the customer affording the Company a reasonable opportunity to inspect the goods; and
 - (iii) the customer making no further use of the goods that are alleged to be defective or which do not correspond with specification after the time agreed the customer discovers or ought to have discovered the same.
- (c) Save as provided in paragraph (a) of this Condition:-
 - (i) all conditions and warranties, express or implied, as to the quality or fitness for any purpose of the goods are hereby expressly excluded; and
 - (ii) the Company shall be under no liability for any loss or damage (whether direct, indirect or consequential) however arising which may be suffered by the customer.
- (d) In the event that, notwithstanding the foregoing provisions of this Condition, the Company is found liable for any loss or damage suffered by the customer, that liability shall in no event exceed the purchase price of the goods.
- (e) The foregoing provisions of this Condition shall not apply to sales which are made to persons who deal as consumers (as the expression is defined in Section 12 of the Unfair Contract Terms Act 1977).

3 PRICE

- (a) The price payable for each consignment of goods exstock will be the Company's list price last published on the date on which that consignment is delivered to the customer.
- (b) In the case of goods which are not exstock the Company reserves the right to increase the contract price at any time after the date of the contract by such additional sums as may from time to time be necessary to cover increased costs due to:-
 - (i) alteration of the customer's requirements;
 - (ii) suspension of work due to lack of or on the customer's instructions;
 - (iii) any variation in costs of materials, labour, overheads or transport, or in conforming to any Act of Parliament or Order, Regulation or bye-laws made by any competent National or Local Authority arising after the date of the contract. Further in the case of specials the Company shall be entitled to deliver up to 110% of the quantity ordered and to increase the contract price accordingly.
- (c) The contract price is exclusive of Value Added Tax or any similar taxes, levies or duties, which will be added to or charged on invoices at the appropriate rate.
- (d) There is no minimum order value, but credit sales of goods having a total net value (exclusive of VAT, carriage, packing or postage) will be subject to an administration charge to cover the relatively high cost of processing such orders. See catalogue for details.

4 PAYMENT

- Unless otherwise agreed in writing, the customer shall pay for the goods by cash on delivery. Where an order is designated as a credit order, payment shall be made on or before the tenth day of the month following the month of the invoice date. If the customer fails to make any payment in accordance with the agreed terms, the Company shall be entitled to charge interest at the rate of 3% per annum over the base rate of National Westminster Bank Limited on a day to day basis for the time being an all overdue payments.

5 DELIVERY

- (a) A date or period of delivery agreed by the Company shall be an estimate only. Every effort will be made to adhere to delivery dates, but the Company accepts no liability for any direct or any consequential loss or damage arising from delay in delivery or despatch, in particular where such delay is caused by lack of instructions from the customer, strikes, lock-outs, other industrial action, failure of the Company's suppliers to fulfill their obligations, or any other cause beyond the Company's reasonable control.
- (b) Unless otherwise stated, the price quoted is for the supply of the goods exworks and unpacked. All packing, postage and other costs of delivery, and costs of storage following any failure by the customer to take delivery, will be subject to an extra charge.
- (c) If the customer being a company shall pass a resolution or suffer an order of a court to be made for its winding-up, or if a receiver shall be appointed, or being an individual or partnership shall suspend payment or propose or enter into any composition with creditors or suffer a receiving order in bankruptcy, then the Company may without prejudice to any other right rescind the contract, or suspend or cancel delivery or recover the possession of any goods for which payment in full has not been received.

6 RISK AND PROPERTY

- (a) The risk in the goods shall pass to the customer upon delivery of the goods to him or any carrier acting on his behalf.
- (b) The property in the goods shall not pass to the customer until the price of the goods and any other goods delivered by the Company to the customer is paid. In the event of the customer failing to pay for the goods, then all such goods of the Company not paid for shall be handed over to the Company on demand and the Company is hereby granted a licence to enter into the customer's premises for the purposes of recovering such property. Without prejudice to the generality of the foregoing, if the said goods are sold by the customer then the Company's beneficial interest shall attach to any proceeds of such sale and the customer shall forthwith hand over to the Company any proceeds of such sale and the Company shall be entitled to call upon the customer to assign all claims that the customer may have in respect of such sale.

7 COPYRIGHT

- All designs, drawings, plans or models prepared by the Company for the customer's information remain the Company's property and copyright, and neither they nor any copies thereof must be made use of by any person without the Company's written consent. In respect of any goods supplied to the customer the design or specification whereof shall have been supplied by the customer, the customer accepts responsibility for any claims which may arise in respect of the making, supplying or using for the purposes of the contract of any patented invention or process or registered design, and the customer agrees to indemnify the company against any action, claim or proceeding for infringement or alleged infringement in respect thereof.

8 CANCELLATION

- Contracts are not subject to cancellation without the Company's written consent. Where cancellation is accepted, the Company shall in addition to any express terms of acceptance of cancellation be entitled to reimbursement of any costs incurred by the Company in connection with the contract.

9 FORCE MAJEURE

- The Company shall have the right to cancel or to reduce the volume of the goods delivered if it is prevented from or hindered in delivering the goods through any circumstances beyond its control including (but not limited to) industrial action, war, fire, or prohibition or enactment of any kind, without incurring any liability for any loss or damage whatsoever resulting therefrom.

10 ARBITRATION

- At the option of either party in writing, any question, dispute or difference arising between the Company and the customer in relation to the contract shall be referred to the arbitration in England of a person to be mutually agreed upon, or failing arrangement of some person appointed by the London Chamber of Commerce and Industry and the City Corporation in accordance with, and subject to the provisions of the Arbitration Act 1934 or any statutory modifications or re-enactment thereof.

11 LOSS OR DAMAGE IN TRANSIT

- Where the price includes delivery other than at our works we will repair or at our option replace free of charge within a reasonable time all goods lost or damaged in transit, provided we are given written notice of such loss or damage within such time as will enable us to comply with the carriers conditions of carriage or where delivery is made by our own transport within seven days (exclusive of Public Holidays) after receipt of the Advice Note. If so requested by you prior to the despatch of the goods we will notify you of the name and address of the carrier (if any) and any time limit laid down by such carriers conditions of carriage.

12 GOVERNING LAW

- The contract shall be governed by English Law.

NOTE:

- The Company's prices are calculated on the basis that the above Conditions will apply. Customers requiring prices to be quoted on a different basis should inform the Company. Information regarding any of our components that bears reference to the Health and Safety at Work Act 1974 will be available upon request.



“World Class Precision”



www.boneham.co.uk



DOWEL PINS



JIG BUSHES



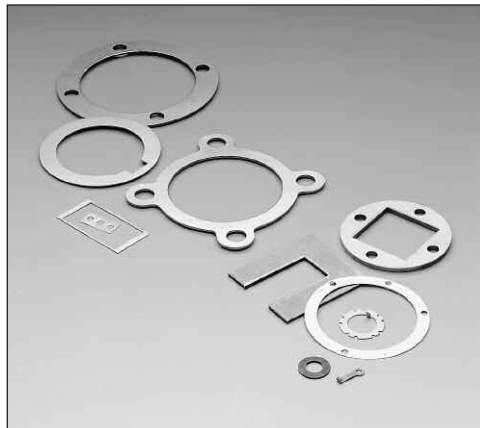
JIG & FIXTURE PARTS



AIR/HYD SEALING PLUGS



SPECIAL PRODUCTS



SHIMS

Boneham and Turner Ltd

the precision engineers



EST 1918



ISO9001:2000



JIG BUSHES



KOENIG EXPANDER
PLUGS



DOWEL &
CLEVIS PINS



PRESS TOOL PARTS



SHIMS



JIG & FIXTURE PARTS

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