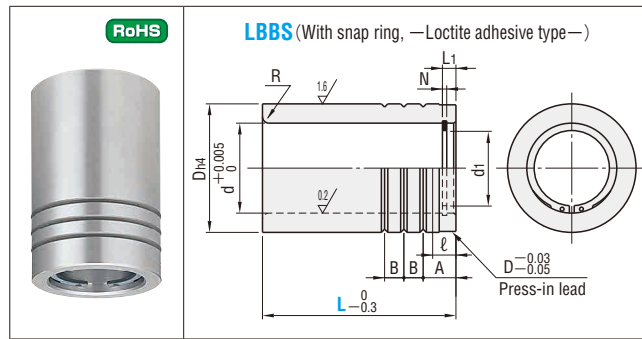


BALL GUIDE BUSHINGS FOR LOWER DIE SETS

BALL CAGES FOR DIE SETS



Order Catalog No. — L
LBBS 50 — 120

Days to Ship Quotation

Price Quotation

M SUJ2 58HRC~
A Snap ring (Spring steel 44~52HRC)

PD Post diameter	d	D14	ℓ	A	B	L1	N	R	d1	Catalog No. Type	PD	L	Base unit price 1~9 pieces
20	+0.020	26	37	4	10	6	4	1.35	2.5	LBBS	20	50	Quotation
22	+0.015	28	40								22	50 60	
25		31	45								25	60 80	
28	+0.025	36	50	5	12	7	4.5	1.65	3		28	60 80	
32	+0.020	40	55								32	80 100	
38	+0.030	48	64								38	80 100	
45	+0.025	55	74	6	15	10	5	2.2	3.5		45	100 120	
50	+0.035	60	83								50	100 120	
60	+0.030	70	95								60	100 120	

Features of ball guide bushings for lower die sets

- Stable guide ... The distance between punch and die blades and the guide (post and bushing) can be shortened. (A<B)
- Easy regrinding of punch & die ... Due to the short distance between the punch/die blade and guide post end, it is possible to perform regrinding without detaching the guide post.

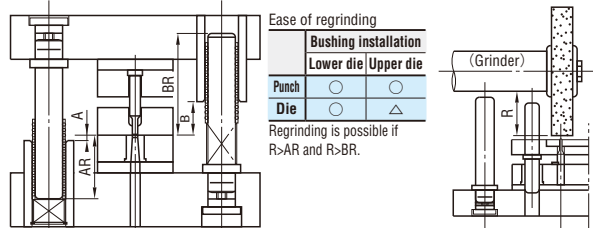


Figure 1: Lower die bushing and normal bushing

Figure 2: Regrinding of punch

Alterations Catalog No. — L(LC)
LBBS 22 — LC45

Alteration	Code	Spec.	1Code
	LC	Full length change L/2 ≤ LC < L 1mm increments	Quotation

Do not use a cooling-fit for the bushings. In the same way as with sub-zero treatment, cooling causes residual austenite to transform into martensite and expand. This expands both the bushing inner and outer diameters, rendering the bushing unusable.

SWPB (Special spring for LBBS)

FL (Free length)

Note: SWPB is a spring specially designed for LBBS (bushing reference). For post-reference springs (SWP, SWPL), refer to P.935.

Order Catalog No. — FL
SWPB 25 — 50

Days to Ship Quotation

Price Quotation

D	D1	d	P	Catalog No. Type	PD	FL 5mm increments	Base unit price 1~9 pieces
25	23.2	0.9	12	SWPB	20	25 ~ 40	Quotation
27	25.0	1.0	13		22	25 ~ 50	
30	27.8	1.1	15		25	25 ~ 60	
35	32.6	1.2	18		28	25 ~ 60	
39	36.0	1.5	20		32	35 ~ 70	
47	43.4	1.8	25		38	35 ~ 70	
54	50.0	2.0	30		45	45 ~ 80	
59	54.4	2.3	35		50	45 ~ 80	
69	63.8	2.6	40		60	45 ~ 80	

Spring solid height

PD	FL (Free length)															
	25	30	35	40	45	50	55	60	65	70	75	80				
20	3.7	4.0	4.4	4.8	—	—	—	—	—	—	—	—				
22	4.1	4.5	4.9	5.3	5.7	6.2	—	—	—	—	—	—				
25	4.3	4.7	5.2	5.6	5.9	6.4	6.8	7.3	—	—	—	—				
28	4.4	4.8	5.2	5.6	6.0	6.4	6.8	7.2	—	—	—	—				
32	—	—	6.4	7.0	7.5	8.0	8.5	9.5	9.4	10.0	—	—				
38	—	—	7.0	7.6	8.0	8.6	9.0	9.5	10.0	10.6	—	—				
45	—	—	—	—	8.6	9.0	9.6	10.0	10.6	11.0	11.6	12.0				
50	—	—	—	—	9.9	10.4	11.0	11.5	12.2	12.6	13.3	13.8				
60	—	—	—	—	11.2	11.7	12.5	13.0	13.8	14.3	15.1	15.6				



Order Catalog No. — L
MBJ 50 — 110

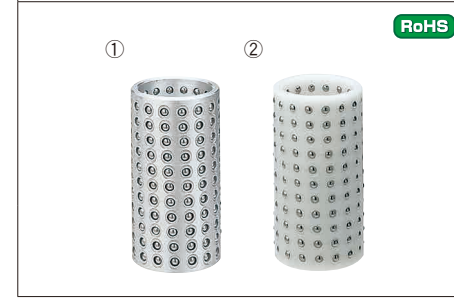
Days to Ship Quotation

Price Quotation

MBSH (①High-rigidity aluminum ball cage)
MBJH (②High-rigidity resin ball cage)

Compared with conventional ball cages (MBS, MBJ), these products contain 1.6 times more balls.

① A5056 (Aluminum)
② POM (Polyacetal resin)
③ SUJ2 Sphericity 0.25 μm
④ ③62~67HRC



Order Catalog No. — L(LC)
MBJH 22 — LC45

Days to Ship Quotation

Price Quotation

MBS (①Aluminum ball cage)
MBJ (②Resin ball cage)

For holder guide posts P.959

① A5056 (Aluminum)
② POM (Polyacetal resin)
③ SUJ2 Sphericity 0.25 μm
④ ③62~67HRC

PD Post diameter	Outer diameter φ D	Inner diameter φ D1	Ball diameter φ d	Number of balls			Catalog No.		Base unit price 1~9 pieces					
				MBSH MBJH	MBS MBJ	Ratio	Type	PD	L	MBSH	MBJH	MBS	MBJ	
20	25.5	20.5	3	165	96	1.72	MBSH (Aluminum) MBJH (Resin) MBS (Aluminum) MBJ (Resin)	20	50	Quotation				
22	+0.020 +0.015	27.5		22.5	180	112		1.61	22					50
					228	140		1.63	22					60
25		30.5	25.5	266	160	1.66		25	60					
				350	208	1.68		25	75					
28	+0.025 +0.020	35.5	28.5	204	112	1.82		28	60					
				252	154	1.64		28	75					
32		39.5	32.5	294	176	1.67		32	75					
				350	208	1.68		32	90					
38	+0.030 +0.025	47.5	38.5	238	144	1.65	38	75						
				280	176	1.67	38	90						
45		54.5	45.5	320	198	1.70	45	90						
				400	234	1.71	45	110						
50	+0.035 +0.030	59.5	50.5	360	220	1.72	50	90						
				450	260	1.73	50	110						
60		69.5	60.5	400	242	1.74	60	90						
				500	286	1.75	60	110						

Order Catalog No. — L
MBJ 50 — 110

Days to Ship Quotation

Price Quotation

Alterations Catalog No. — L(LC)
MBJH 22 — LC45

Price Quotation

Alteration	Code	Spec.	1Code
	LC	Full length change 20 ≤ LC < L 1mm increments Ball holes may remain on the cut surface.	Quotation

MBSH and MBJH are also listed in P.942. (For stripper guides: PD10~25)