

LEMPCO[®]

“Manufacturer of Die Sets and Components”



Available from:

H&O DIE SUPPLY, INC.
PRECISION FABRICATING MACHINERY

7200 INTERSTATE 20 • KENNEDALE, TX 76060
PH: 817-985-0040 or 800-222-5441 • FAX: 817-985-0046
EMAIL: sales@hodie.com • WEBSITE: www.hodie.com

DIE SET ENGINEERING HANDBOOK and CATALOG

COMPLETE WITH METRIC DIMENSIONS

SERVICING INDUSTRY SINCE 1918

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LEMPCO



★ Assurance Policy ★

Lempco's Ball Bearing Die Set equipped with the patented rotainer often outlasts the life of the die.

It's this reliability and assurance that production specialists buy from the "innovator" of the ball bearing die set.

Uninterrupted high press production is a tradition with Lempco. A Lempco Ball Bearing **Rotainer® Equipped** Die Set has guide posts and bushings made from 52100 tool steel, through hardened to withstand the dependable Lempco preload. Careful tests have yielded many case histories showing that even after 25 million or more strokes a preload still exists. The life you may expect depends upon your application and other variable circumstances.

THIS IS PRODUCTION!

*The amount of downtime chargeable to regrinding, die set maintenance and repairs must also be held to a minimum. Lempco's **Rotainer® Equipped** Ball Bearing Die Set offers this opportunity under a heading of "accuracy." Because a Lempco **Rotainer® Equipped** Ball Bearing Die Set is so accurate there is less die wear, less scrap, less chance of seizure. Cost records show that 30% to 50% of the die maker's time is consumed at the bench - fitting, mounting, aligning. The accuracy of a Lempco **Rotainer® Equipped** Ball Bearing Die Set reduces this expense.*

THESE ARE PROFIT FACTORS!

The time-tested Lempco Ball Bearing **Rotainer® Equipped** Die Set means RELIABILITY, PRODUCTION, ACCURACY AND PROFIT! Check the results. TRY A LEMPCO BALL BEARING **ROTAINER® EQUIPPED** DIE SET AND INCREASE YOUR PRODUCTIVITY AND PROFIT.

For more information contact the Lempco distributor in your area or call TOLL FREE 800-321-8632.

The Dependable Die Set Company



CORPORATE HEADQUARTERS
6779 ENGLE ROAD, SUITE A-F • CLEVELAND, OHIO 44130-7926 U.S.A.
TELEPHONE: (216) 898-6270 • TOLL FREE: (800) 321-8632

QUALITY • DEPENDABILITY • SERVICE • SINCE 1918

To the Metalworking Industry:

More than four decades ago we first offered you a Lempco ball bearing die set as an engineering achievement to help you manufacture a better product and to keep abreast of increasing production costs.

We pledge that all of our products – innovative or conventional – will be manufactured to the same high quality level throughout the coming years.

We present this Engineering Handbook and Catalog to you, as a convenient time saver and technical guide. It lists the only truly complete offering of die sets and components, and provides you with more technical assistance than ever before made available in this form. Lempco and its nationwide network of representatives, distributors and warehouses will assist you in any way possible to make your product a better and more profitable one.

Very truly yours,

A handwritten signature in cursive script that reads "Lempco".

LEMPCO



DIE SETS AND DIE MAKERS' SUPPLIES QUICK REFERENCE INDEX

Preface - Factors in Die Set Design	Pages I - III
Flanged Stock Two Post Die Sets	Pages 1 - 7
Rectangular Stock Two Post Die Sets	Pages 9 - 19
Rectangular Stock Four Post Die Sets	Pages 21 - 35
Lempcoshank	Pages 37 - 40
C.A.D. E-Mail Instructions	Page 41
Special Die Sets	Pages 43 - 57
Forming Machine Die Sets	Pages 59 - 65
Aluminum Precision Die Sets	Page 66
Bolsters And Steel Plate	Pages 67 - 74
Customized Guidance System	Pages 75 - 77
Lubrication Instructions For Ball Assembly	Page 78
Die Set Components - Inch	Pages 79 - 102
Die Set Components & Die Sets - Metric	Pages 103 - 123
Plain Bearing Die Set Components/Interchangeable	Pages 125 - 130
Pressure Control Devices:	
Nitrogen Gas Springs	Page 131
Special Springs Worksheet	Page 132
Alphabetical Index	Pages 133 - 134

Lempco Ball Bearing Die Sets are manufactured under U.S. Patent No. 2,774,430.

Lempco will not be responsible for any malfunction or substandard performance of any Die Set or any Guide Pin or Guide Bushing or Ball Bearing Retainer or Rotainer® when run with Guide Components not of Lempco Manufacture.

FACTORS IN DIE SET DESIGN



Today's fierce competition for the diminishing profit return means increasing attention to factors affecting profit and loss. This is true in small and large die shops, in tool rooms, in the stamping industry generally.

Have you reviewed the economic factors in die design and operation recently? And do you know that substantial savings often still can be made on the die designer's bench, in die tryout, in production?

To prove to you how this can be done, we offer information which has accounted for profitable savings to production stampers and die makers alike.

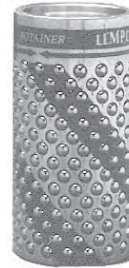
The stamper is interested in uninterrupted high press production. He wants held to a minimum the amount of downtime chargeable to regrinding and die set maintenance and repairs. He also wants scrap held to a minimal level.

Lempco's Ball Bearing Die Sets offer him this opportunity under a general heading of "accuracy". Because a Lempco Ball Bearing Die Set is so accurate there is less die wear, less scrap, less chance of seizure. These are profit factors.

The stamper also should know that less time consumed fitting in the die shop means cost reduction which can result in more favorable pricing. The die maker also should know this because such a saving makes him more competitive. Cost records show that from 30% to 50% of the die maker's time is consumed at the bench-fitting, mounting, aligning. The accuracy of a Lempco Ball Bearing Die Set reduces this time.

Then there's the ease of assembly and disassembly offered by a Lempco Ball Bearing Die Set. How many times are punch holder and die holder assembled, disassembled, reassembled before a new set of dies is ready for trying? Time consumed, times the number of men involved, times the labor cost, can represent important money. If you can reduce this amount substantially, as you can the Lempco ball bearing way, then why not take advantage of your opportunity?

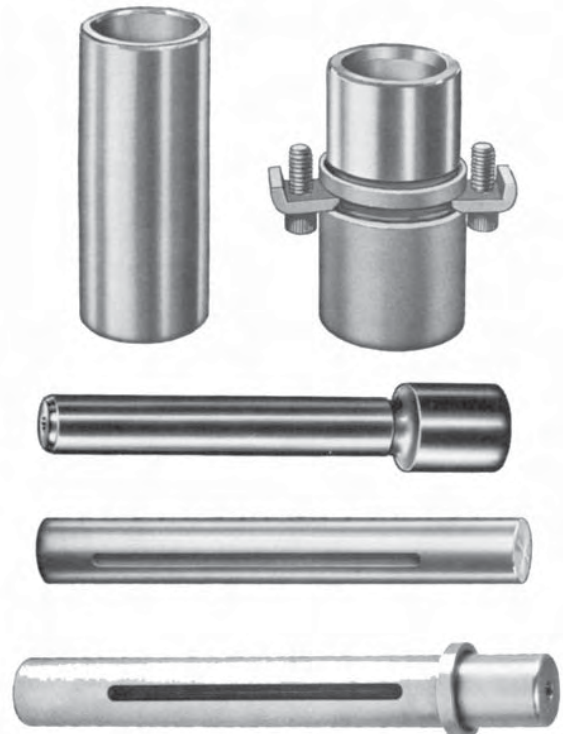
SIMPLY THE BEST MOST COMPLETE BALL BEARING COMPONENTS AVAILABLE



PRECISION ROTAINER

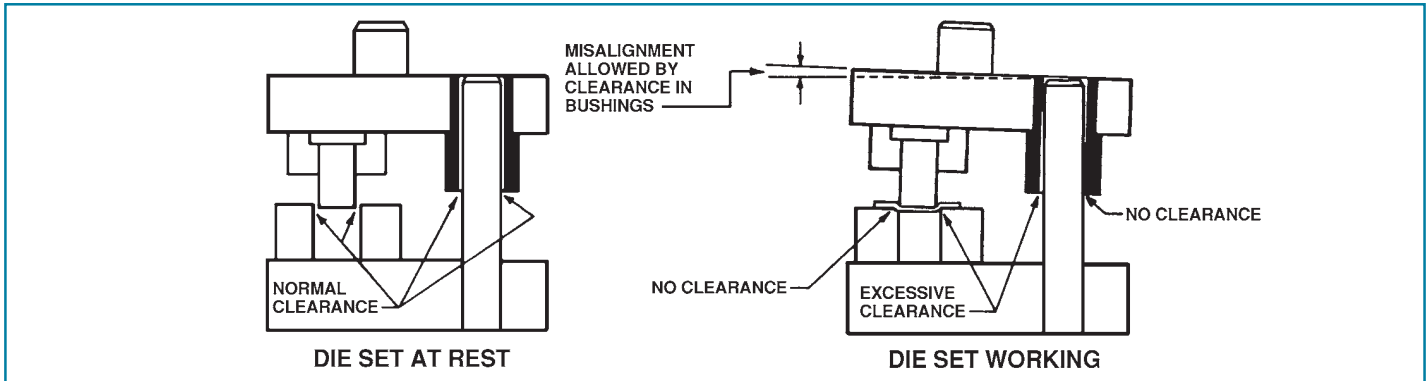


PRECISION RETAINER





FACTORS IN DIE SET DESIGN



Normal clearance in a plain bearing die set can allow misalignment, as these sketches show. When working load is applied, normal clearance becomes “redistributed”, ranging from zero to an excess. A slight lateral

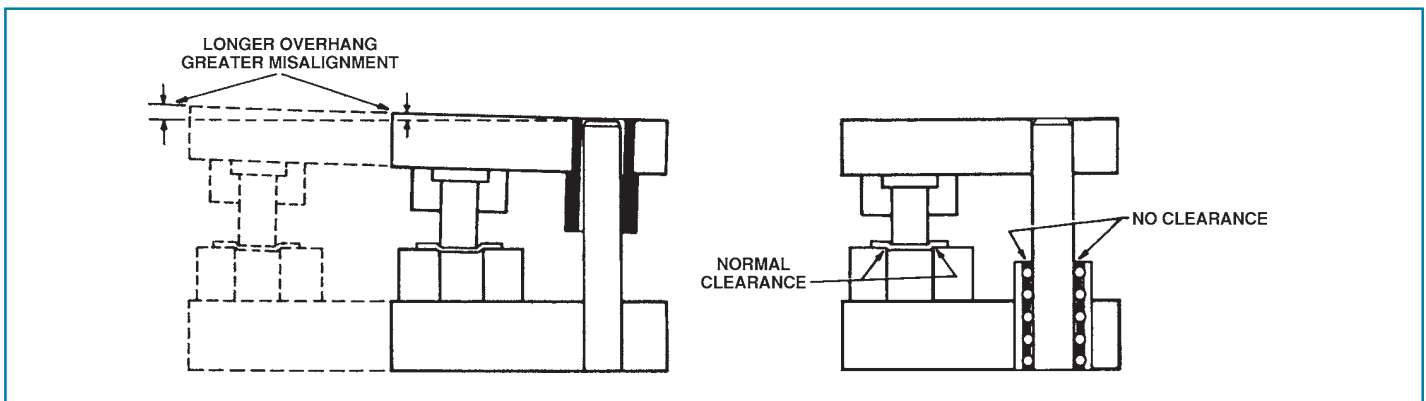
movement results which causes the die to wear faster in one direction. At points of zero clearance, there is danger of lubrication breakdown with resulting excessive wear and increasing misalignment.

Alignment of guide posts and bushings, and the clearances provided in fitting them, contribute as much as any other factors to the efficient operation and economic life of a die. The ideal condition would involve a press fit of guide post and bushing (negative clearance), so that the resulting rigidity would assure perfect parallelism between upper and lower die set members under all working stresses.

possesses at the same time an ease of operation which could otherwise be attained only by an impractically large clearance between plain bearing guide post and bushing. Further, the ball bearing assembly presents no lubrication problem such as exists when plain bearing assemblies are fitted with clearances too small for the maintenance of adequate lubrication films. Thus there is less dependence on the press operator for successful die performance since seizure due to inability of lubricant to cover all surfaces is completely eliminated.

The pre-loaded ball bearing guide post and bushing offer the accuracy of a press fit, and the die set

(continued next page)



Guide post diameter and punch holder weight determine the overhang that can be tolerated before development of undue binding on plain bearing type posts and bushings. Overhang complicates punch and die alignment. A ball bearing die set maintains perfect closing action without binding, even under excessive

overhang conditions. No misalignment due to clearance or overhang is found in a Lempco Ball Bearing Die Set. A ball bearing set offers free rolling movement vertically, and, therefore, the punch holder can be raised and lowered manually, weight permitting.



FACTORS IN DIE SET DESIGN

When plain bearing assemblies are fitted to closer tolerances, there is an increasing tendency toward binding and galling; this difficulty affects the accuracy with which the punch enters the die. A slight cocking in any direction develops excessive die wear in the direction of displacement. The result is reduced die life overall and more frequent interruptions for regrinding.

Clearance increases with wear in plain bearing assemblies. In a long run involving frequent resharpenings, the total time consumed in resetting becomes a costly nonproductive part of the job. A corollary evil stems from the higher rate of rejection due to burrs, mispunches and distortions.

The ball bearing assembly helps solve the problem of alignment which results from situations where large overhangs are required. Under conditions of severe and disproportionate overhang, the "rolling press fit" of the ball bearing assembly enables the upper and lower members of the die set to maintain parallelism at the extremities. In the case of the plain bearing die set, a temporary, although troublesome, solution consists of increasing the diameters of guide posts and bushings. Slowing down the press production rate and exercising greater care to avoid mis-hits also offer additional alleviation of this problem inherent to plain bearing assemblies.

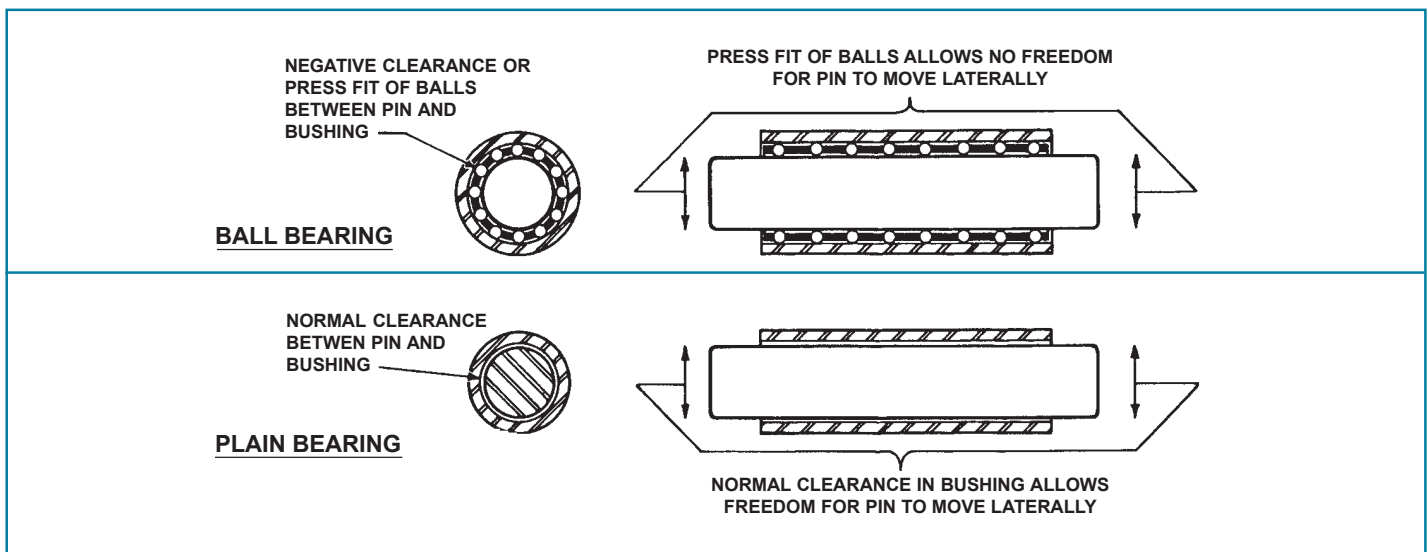
When small shut height reduces the thickness of die shoes, flexing of these members may result with consequent excessive wear on the dies. The ball

bearing assembly offsets to a marked degree the lack of desirable rigidity in die shoes.

Ordinarily a pre-load (negative clearance) would seem conducive to binding, but because of the rolling action of the ball bearings, no such binding exists. The initial pre-load is maintained throughout the longest runs; careful tests have yielded many case histories showing that even after 25 million or more strokes a measureable pre-load still exists.

The success stampers and die makers have had with Lempco's ball bearing assemblies over the course of many years, together with an increasing demand for still greater parts accuracy, have resulted now in introduction of a new and even higher standard of ball bearing die set, Lempco's Precision Grade.

Acceptance of the anti-friction design has established Lempco as a prime source of supply to the stamping industry. In an effort to be of even greater service to the industry, Lempco makes available a line of Precision Grade Plain Bearing Die Sets. Lempco's Plain Bearing Die Sets are produced with the same quality of manufacture as its Ball Bearing Die Sets. The accuracies of Lempco's Plain Bearing Die Sets are at least equivalent to those obtained from the best competitive materials available. Lempco continues to recommend earnestly its Ball Bearing Die Sets for universal application by reason of the economic factors discussed in this article.



There is no lateral movement in a Lempco Ball Bearing Assembly because of the "rolling press-fit" action.

This is not the case with the plain bearing assembly which requires clearance to function.

H&O DIE SUPPLY, INC.

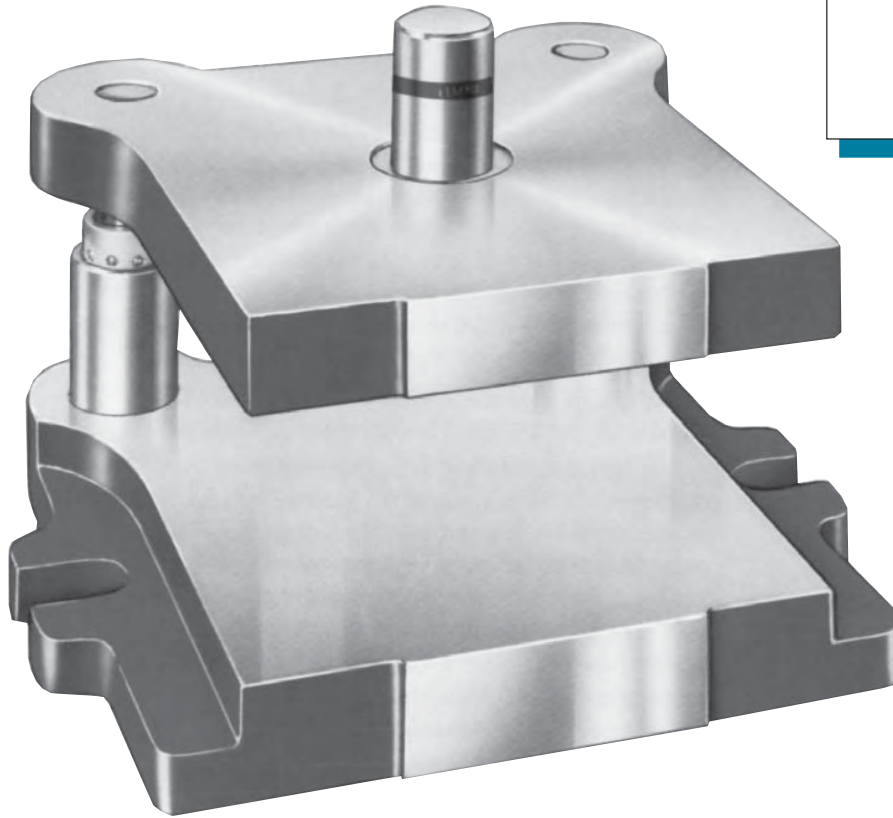
sales@hodie.com • 800-222-5441





FLANGED STOCK DIE SETS

-Two Post Style



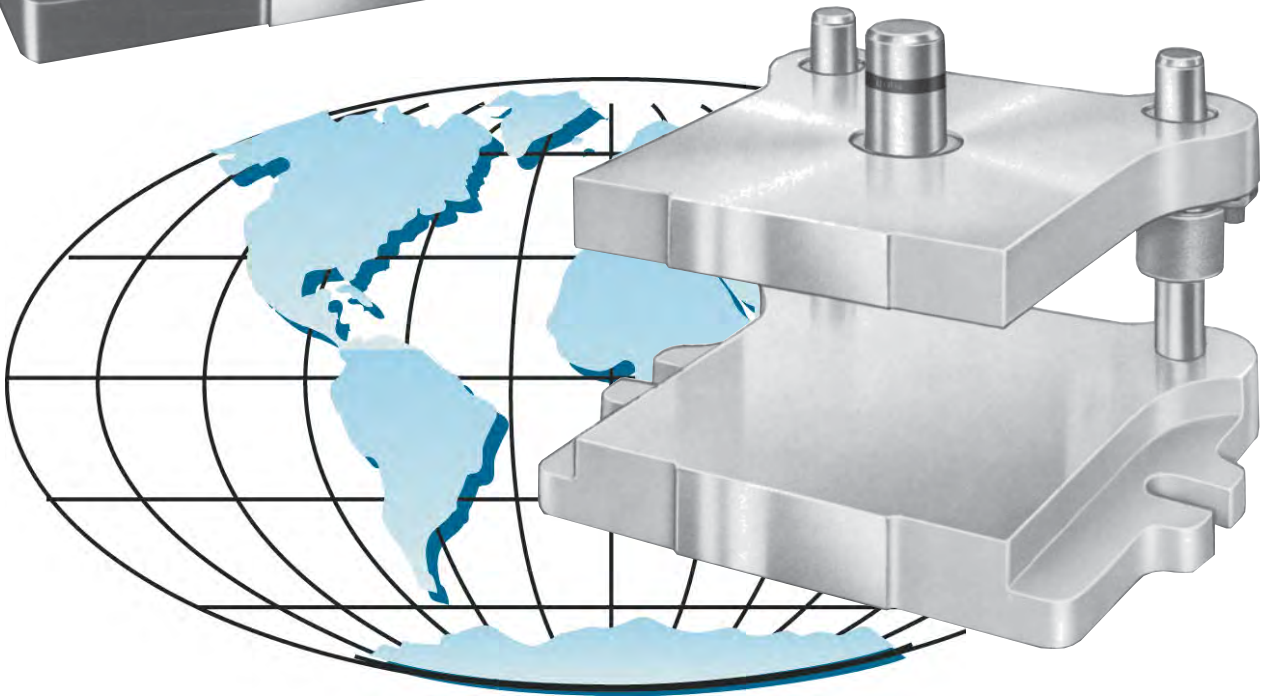
BALL BEARING SETS
(Painted Blue)

- ◆ Precision
- ◆ All Steel

*With
Annotations in
"Soft" Metric*

PLAIN BEARING SETS
(Painted Yellow)

- ◆ Precision
- ◆ All Steel

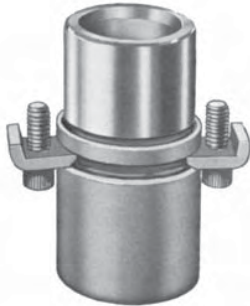
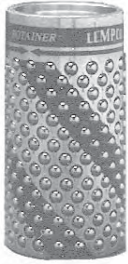


Lempco will not be responsible for any malfunction or substandard performance of any Die Set or any Guide Pin or Guide Bushing or Ball Bearing Retainer or Rotainer® when run with Guide Components not of Lempco manufacture.





THE ONLY COMPLETE BALL BEARING



For many years Lempco's Ball Bearing Die Set has paced the precision needs of production engineers demanding finer parts tolerances, longer die life, minimum down time for maintenance. Lempco's precision quality ball bearing die set consistently has met these needs by matching improvements in design, materials and manufacture with demand.

Lempco offers a Precision Ball Bearing Die Set for even more accuracy in operation, even smoother performance, more resistance to wear, longest die life, even more customer convenience. This results only from years of experience in designing and building die sets solely to the highest precision level available to industry.

PRECISION OFFERS MORE LOAD CAPACITY

The tiny ball bearing in a Rotainer® illustrates the rigid quality control program under which Lempco die sets are manufactured. It has been tested for sphericity, hardness, elasticity, and dimensional tolerance. It is in a given set because not only it but also every other bearing in the same rotainer has passed all tests. Several sources of supply are needed since no manufacturer can meet Lempco's huge quantity, ultra quality demands.

The Precision Rotainer® sleeve is an even tougher alloy for additional wear resistance. A Lempco die set of the Precision design provides longer operating life and smoother performance through increased load capacity and resistance to adverse forces. For greater convenience in disassembly a set screw keys the Rotainer® to the guide post slot. The Precision Rotainer® sleeve is a silver color with blue stripes for quick visual identification.

BALL BEARING LINE INCLUDES COMPLETE ASSORTMENT OF GUIDE POSTS, BUSHINGS

Three kinds of guide posts for Ball Bearing die sets are offered: the *straight* type for most die set assemblies such as standard stock sets; the *removable* for quick release of the post to expedite disassembly; the *shoulder* post for special die set construction where it is considered desirable to through bore both die holder and punch holder to a single diameter.

Bushings for Ball Bearing Assemblies are offered in four types: the *press fit steel sleeve* with which stock sets are equipped as standard; *steel demountable shoulder bushing*; *steel demountable boss bushing*; *steel demountable shoulder guide post bushing*.

AND PLAIN BEARING DIE SET LINE



All Lempco® Ball Bearing Guide Posts, Bushings and Rotainers are completely interchangeable without any necessity whatsoever for select fitting of any kind and, if mounted in accordance with boring and assembly instructions on page numbers 89 and 90, do not require any grinding, honing, lapping, or any other modification of any kind.

PLAIN BEARING USERS HAVE FULL CHOICE OF STOCK AND CUSTOM SETS, ACCESSORIES

In addition to the Ball Bearing line, Lempco offers the most complete line of Plain Bearing design die sets available. In this catalog you will find a complete dimensional description of all Ball Bearing and Plain Bearing stock die sets.

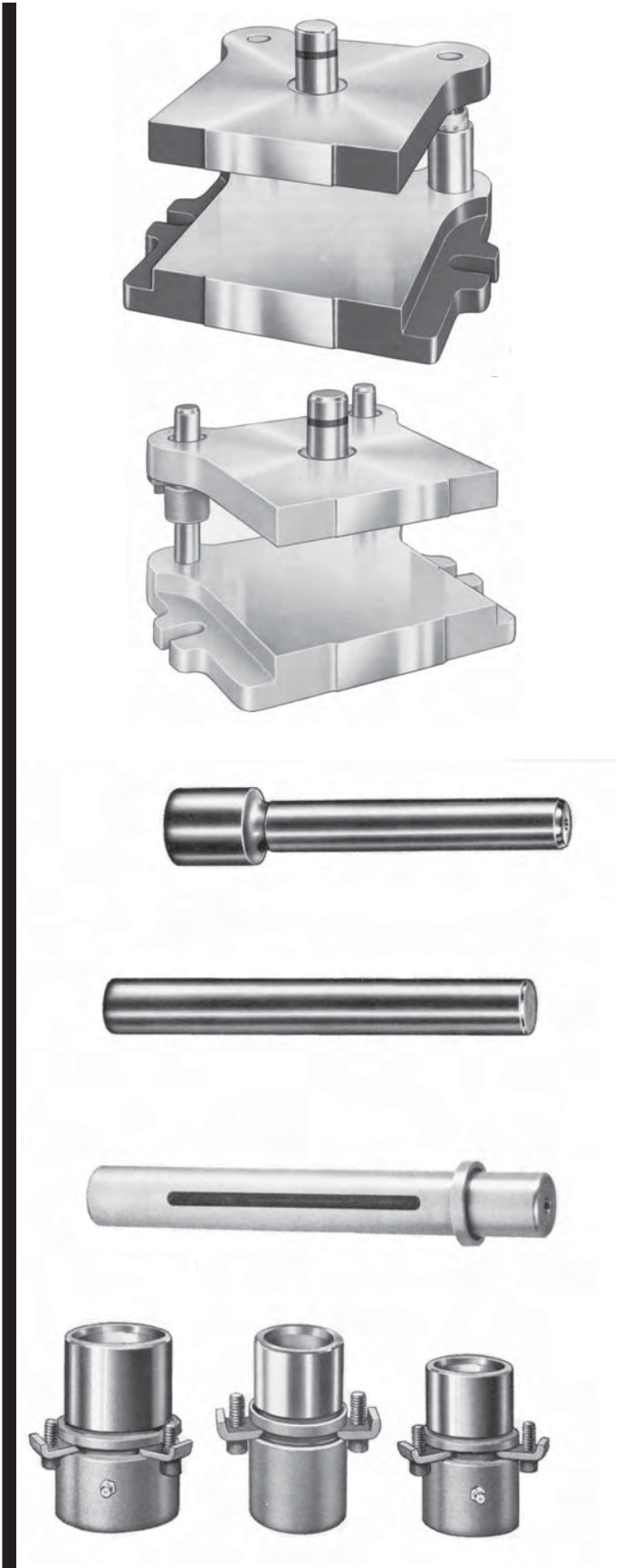
Lempco offers three types of Plain Bearing Guide Posts. Straight type, flanged demountable, to expedite disassembly of the completed die for repairs; and the shoulder guide post.

The most complete line of Plain Bearing bushings ever offered by a single manufacturer are available to Lempco customers. Your choice can be made from five types of Precision *demountable*, bronze, bronze plate and steel; five types of Precision *press fit*, bronze, bronze plate and steel; five types of *shoulder guide post* bushings, bronze, bronze plate and steel; three designs of *demountable bosses and boss bushings*.

SAVE TIME, ASSURE YOURSELF OF TOP QUALITY FROM THE ONLY COMPLETE LINE-LEMPCO

The components described previously are available to you as constituent parts, or already assembled into complete stock, special or special purpose die sets. Lempco's Die Set Engineering Handbook and Catalog, offers easy-to-find information, whatever your immediate interest: stock or large set, component, bolster, spring, or special purpose die set or forming machine types.

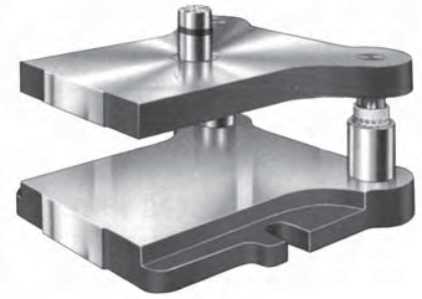
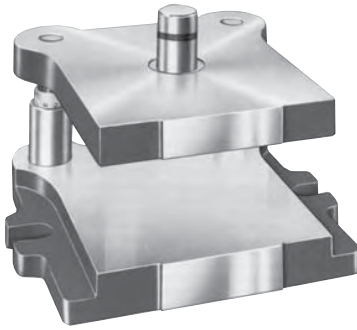
Lempco's Die Set Engineering Handbook and Catalog has been designed for maximum convenience and utility to you, the customer. Its use not only will save you time while assuring you of only the highest quality product, but also it will assist you to evaluate your needs in terms of the only complete offering of die sets and components, both Ball Bearing and Plain Bearing designs, available from a single source.





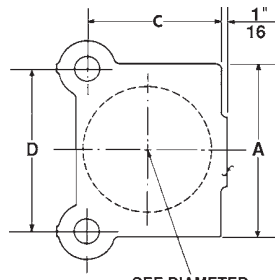
BALL BEARING STOCK DIE SETS

-Flanged Two Post

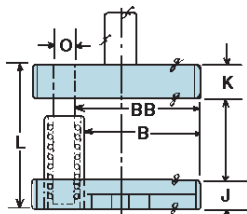
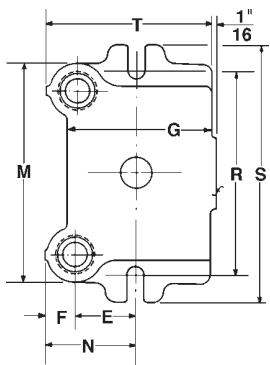


ALL STEEL

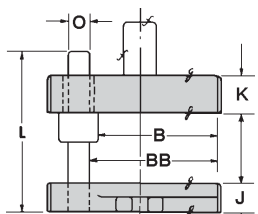
"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



SEE DIAMETER IN TABLES



BALL BEARING

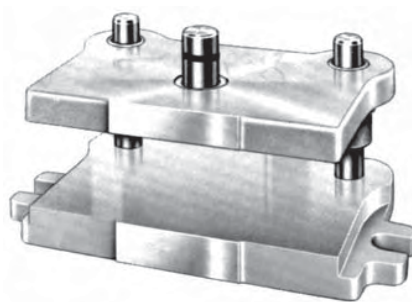
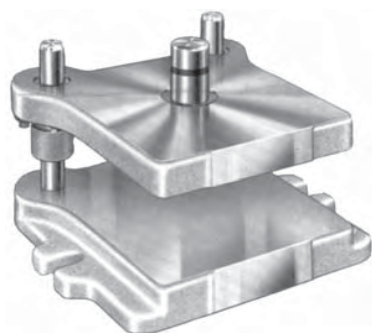


PLAIN BEARING

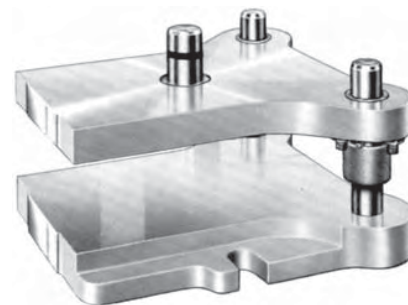
NOMINAL DIMENSIONS																							
Left to Right		Front to Back		For Round Dies		Die Holder		Punch Holder															
A		B (BB)				J		K		C		D		E		F		G					
4	101	4	101	4	101	1 ³ / ₈	34	1 ¹ / ₄	32	4 ⁷ / ₈	123	3 ¹ / ₄	82	2 ⁷ / ₁₆	61	1 ¹ / ₂	38	5 ¹ / ₂	139				
reg.		(4 ³ / ₈)	111																				
4	101	5	127			1 ³ / ₈	34	1 ¹ / ₄	32	5 ⁷ / ₈	149	4	101	2 ¹¹ / ₁₆	68	1 ¹ / ₂	38	6 ¹ / ₂	165				
rev.		(5 ³ / ₈)	136																				
4	101	6	152			1 ¹ / ₂	38	1 ¹ / ₄	32	6 ⁷ / ₈	175	5 ¹ / ₈	130	3 ¹ / ₄	82	1 ¹ / ₂	38	7 ¹ / ₂	190				
rev.		(6 ³ / ₈)	162																				
5	127	4	101	4 ¹ / ₂	114	1 ³ / ₈	34	1 ¹ / ₄	32	4 ⁷ / ₈	123	4	101	2 ³ / ₁₆	55	1 ¹ / ₂	38	5 ¹ / ₂	139				
reg.		(4 ³ / ₈)	111																				
5	127	5	127	5	127	1 ¹ / ₂	38	1 ¹ / ₄	32	5 ⁷ / ₈	149	4	101	2 ¹¹ / ₁₆	68	1 ¹ / ₂	38	6 ¹ / ₂	165				
reg.		(5 ³ / ₈)	136																				
5 ¹ / ₂	140	3 ⁷ / ₈	98	4	101	1 ⁵ / ₁₆	23	7 ⁷ / ₈	22	4 ¹ / ₂	114	5 ¹ / ₈	130	1 ¹⁵ / ₁₆	49	1 ⁵ / ₃₂	29	5	127				
kick		(4 ¹ / ₈)	104																				
6 ¹ / ₂	165	4	101	5	127	1 ¹ / ₂	38	1 ¹ / ₄	32	4 ⁷ / ₈	123	5 ¹ / ₈	130	2 ¹ / ₈	53	1 ¹ / ₂	38	5 ¹ / ₂	140				
reg.		(4 ³ / ₈)	111																				
6 ¹ / ₂	165	6	152	6 ¹ / ₂	165	1 ¹ / ₂	38	1 ¹ / ₄	32	1 ¹ / ₂	38	1 ³ / ₄	44	6 ⁷ / ₈	175	5 ¹ / ₈	130	3 ³ / ₁₆	81	1 ¹ / ₂	38	7 ¹ / ₂	190
reg.		(6 ³ / ₈)	162																				
						2	50	1 ¹ / ₄	32														
						2	50	1 ³ / ₄	44														
7 ¹ / ₂	190	5	127	5 ³ / ₄	146	1 ¹ / ₂	38	1 ¹ / ₄	32	1 ¹ / ₂	38	1 ³ / ₄	44	5 ⁷ / ₈	149	6 ¹ / ₂	165	2 ³ / ₄	69	1 ¹ / ₂	38	6 ¹ / ₂	165
reg.		(5 ³ / ₈)	136																				
						2	50	1 ¹ / ₄	32														
						2	50	1 ³ / ₄	44														
7 ¹ / ₂	190	7	177	7 ¹ / ₂	190	1 ¹ / ₂	38	1 ¹ / ₄	32	1 ¹ / ₂	38	1 ³ / ₄	44	7 ⁷ / ₈	200	6 ¹ / ₂	165	3 ¹¹ / ₁₆	93	1 ¹ / ₂	38	8 ¹ / ₂	216
reg.		(7 ³ / ₈)	187																				
						2	50	1 ¹ / ₄	32														
						2	50	1 ³ / ₄	44														
8 ¹ / ₂	206	4	101			1 ¹ / ₂	38	1 ¹ / ₄	32	4 ⁷ / ₈	123	7 ³ / ₄	196	2 ⁵ / ₁₆	58	1 ¹ / ₂	38	5 ¹ / ₂	140				
long		(4 ³ / ₈)	111																				
						2	50	1 ¹ / ₄	32														

PLAIN BEARING STOCK DIE SETS

-Flanged Two Post



ALL STEEL



"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.

NOMINAL DIMENSIONS							PREC.							
M	N	O	R	S	T	L	All Steel							
6 1/4	158	3 15/16	100	1	25	6	152	7 1/2	190	6 3/8	162	5 1/4	133	0404-C1
7	177	4 3/16	106	1	25	6	152	7 3/4	196	7 3/8	187	5 1/4	133	0405-C1
8 1/8	206	4 3/4	120	1	25	6	152	8 1/8	206	8 3/8	212	5 1/4	133	0406-C1
7	177	3 11/16	93	1	25	6 3/4	171	8 1/4	209	6 3/8	162	5 1/4	133	0504-C1
7	177	4 3/16	106	1	25	6 3/4	171	8 1/4	209	7 3/8	187	5 1/4	133	0505-C1
7 7/16	189	3 3/32	78	3/4	19	6 3/4	171	7 3/4	196	5 21/32	144	4 1/2	114	0604-GA1
8 1/8	206	3 5/8	92	1	25	8 5/8	218	10 1/2	266	6 3/8	162	5 1/4	133	0604-C1
												5 1/2	140	0604-C4
												5 1/4	133	0606-C1
8 1/8	206	4 11/16	119	1	25	8 5/8	218	10 1/2	266	8 3/8	212	5 3/4	146	0606-C2
												5 3/4	146	0606-C4
												6	152	0606-C5
9 1/2	241	4 1/4	107	1	25	9 1/4	235	11	279	7 3/8	187	5 1/4	133	0705-C1
												5 3/4	146	0705-C2
												5 3/4	146	0705-C4
9 1/2	241	5 3/16	131	1	25	9 1/4	235	11	279	9 3/8	238	5 1/4	133	0707-C1
												5 3/4	146	0707-C2
												5 3/4	146	0707-C4
10 3/4	273	3 13/16	96	1	25	10 5/8	269	12 1/2	317	6 3/8	162	5 1/4	133	0804-C1
												5 3/4	146	0804-C4

HOW TO ORDER . . .

. . . BALL BEARING SETS

1. Select required type, size, grade, material and thickness combination.
2. **Prefix** to the basic catalog number and symbol **BB**.

Example: BB-0404-C1.

3. Specify quantity.
4. Specify type of bushing.
5. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
6. Specify "no shank" or "Lempcoshank". If "Lempcoshank" give catalog number of kit desired. For 0604-GA-1 and GD-1 kick press sets specify one of these: 1" diameter x 2 1/8" long or 1 9/16" x 2 1/8".

7. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
8. Tell us how to ship. Otherwise we will ship "Best Way" in our judgment.

. . . PLAIN BEARING SETS

1. Select required type, size, grade, material and thickness combination.
2. **Prefix** to the basic catalog number and symbol **P**.

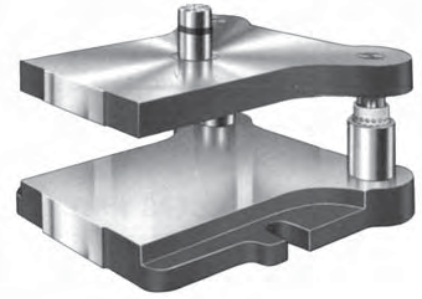
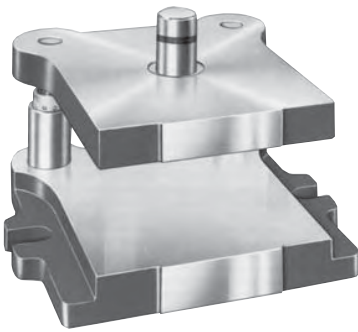
Example: P-0404-C1.

Follow steps 3 through 8, above.



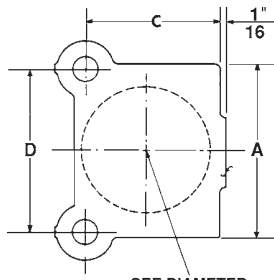
BALL BEARING STOCK DIE SETS

-Flanged Two Post

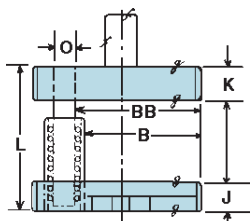
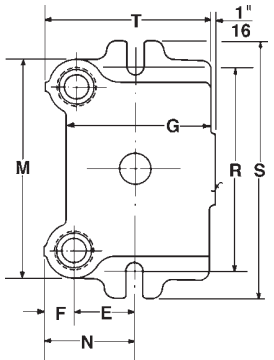


ALL STEEL

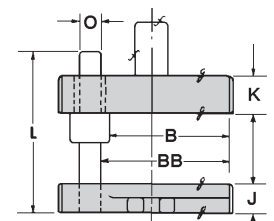
"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



SEE DIAMETER IN TABLES



BALL BEARING



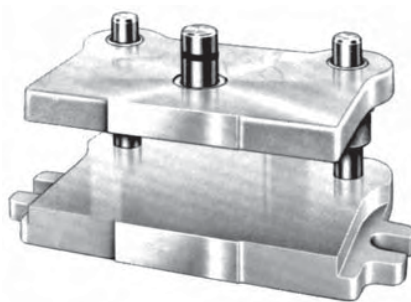
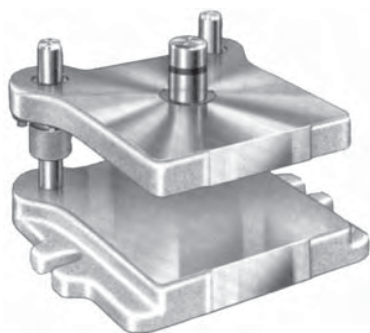
PLAIN BEARING

NOMINAL DIMENSIONS

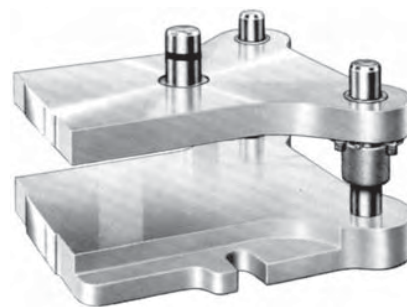
Left to Right	Front to Back	For Round Dies	Die Holder	Punch Holder					
A	B (BB)		J	K	C	D	E	F	G
8 1/2 206	6 152	7 177	1 1/2 38	1 1/4 32	6 7/8 174	7 3/4 196	3 1/8 79	1 1/2 38	7 1/2 190
reg.	(6 3/8) 162		1 1/2 38	1 3/4 44					
			2 1/4 57	1 1/4 32					
			2 1/4 57	1 3/4 44					
8 1/2 206	8 203	8 1/2 206	1 1/2 38	1 1/4 32	8 7/8 225	7 3/4 196	4 3/16 106	1 1/2 38	9 1/2 241
reg.	(8 3/8) 212		1 1/2 38	1 3/4 44					
			2 50	1 1/4 32					
			2 50	1 3/4 44					
10 254	5 127		1 1/2 38	1 3/8 34	6 152	9 1/8 231	3 3/16 81	1 13/16 45	6 3/4 171
long	(5 3/8) 136		1 1/2 38	1 3/4 44					
			2 50	1 3/8 34					
			2 50	1 3/4 44					
10 254	7 177		1 5/8 41	1 3/8 34	8 203	9 1/8 231	3 9/16 79	1 13/16 45	8 3/4 222
reg.	(7 3/8) 187		1 5/8 41	1 3/4 44					
			2 1/4 57	1 3/8 34					
			2 1/4 57	1 3/4 44					
10 254	10 254	10 254	1 5/8 41	1 3/8 34	11 279	10 1/4 260	5 1/4 133	1 13/16 45	11 3/4 298
reg.	(10 3/8) 263		1 5/8 41	1 3/4 44					
			2 1/4 57	1 3/8 34					
			2 1/4 57	1 3/4 44					
11 1/4 285	7 177	8 203	1 3/4 44	1 1/2 38	8 1/8 206	10 1/4 260	4 101	1 13/16 45	8 7/8 225
reg.	(7 1/2) 190								
12 1/2 317	4 101		1 1/2 38	1 1/2 38	5 127	10 1/4 260	2 9/16 65	1 13/16 45	5 3/4 146
long	(4 3/8) 111								
			1 1/2 38	1 1/2 38	7 1/8 181	10 1/4 260	4 101	1 13/16 45	7 7/8 200
12 1/2 317	6 152		1 1/2 38	2 50					
long	(6 1/2) 165		2 50	1 1/2 38					
			2 50	2 50					
12 1/2 317	10 254	10 3/4 273	1 3/4 44	1 5/8 41	11 1/8 282	14 355	5 3/8 136	2 1/16 52	12 304
reg.	(10 3/8) 263								
15 381	7 177		1 1/2 38	1 1/2 38	8 1/8 206	14 355	4 3/8 111	2 1/16 52	9 228
long	(7 3/8) 187		2 50	1 1/2 38					

PLAIN BEARING STOCK DIE SETS

-Flanged Two Post



ALL STEEL



"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.

NOMINAL DIMENSIONS							PREC.				
M	N	O	R	S	T	L	All Steel				
10 ³ / ₄	273	4 ⁵ / ₈	117	1	25	10 ⁵ / ₈ 269	12 ¹ / ₂ 317	8 ³ / ₈ 212	5 ¹ / ₄ 133	0806-C1	
									5 ³ / ₄ 146	0806-C2	
									6 152	0806-C4	
									6 ¹ / ₂ 165	0806-C5	
10 ³ / ₄	273	5 ¹¹ / ₁₆	144	1	25	10 ⁵ / ₈ 269	12 ¹ / ₂ 317	10 ³ / ₈ 263	5 ¹ / ₄ 133	0808-C1	
									5 ³ / ₄ 146	0808-C2	
									5 ³ / ₄ 146	0808-C4	
									6 152	0808-C5	
12 ³ / ₄	323	5	127	1 ¹ / ₄	32	12 ¹ / ₄ 311	14	355	7 ¹³ / ₁₆ 198	6 152	1005-C1
										6 152	1005-C2
										6 ¹ / ₂ 165	1005-C4
										6 ¹ / ₂ 165	1005-C5
12 ³ / ₄	323	5 ³ / ₈	136	1 ¹ / ₄	32	12 ¹ / ₄ 311	14	355	9 ¹³ / ₁₆ 249	6 152	1007-C1
										6 ¹ / ₂ 165	1007-C2
										6 ¹ / ₂ 165	1007-C4
										7 177	1007-C5
13 ⁷ / ₈	352	7 ¹ / ₁₆	179	1 ¹ / ₄	32	12 ¹ / ₄ 311	13 ⁷ / ₈ 352	12 ¹³ / ₁₆ 325	6 152	1010-C1	
									6 ¹ / ₂ 165	1010-C2	
									6 ¹ / ₂ 165	1010-C4	
									7 177	1010-C5	
13 ⁷ / ₈	352	5 ¹³ / ₁₆	147	1 ¹ / ₄	32	13 ¹ / ₂ 342	15 ¹ / ₂ 393	9 ¹⁵ / ₁₆ 252	6 152	1107-C1	
13 ⁷ / ₈	352	4 ³ / ₈	111	1 ¹ / ₄	32	14 ³ / ₄ 374	16 ⁵ / ₈ 422	6 ¹³ / ₁₆ 173	6 152	1204-C1	
									6 152	1206-C1	
									6 ¹ / ₂ 165	1206-C2	
									6 ¹ / ₂ 165	1206-C4	
13 ⁷ / ₈	352	5 ¹³ / ₁₆	147	1 ¹ / ₄	32	14 ³ / ₄ 374	16 ⁵ / ₈ 422	8 ¹⁵ / ₁₆ 227	7 177	1206-C5	
18 ¹ / ₈	460	7 ⁷ / ₁₆	188	1 ¹ / ₂	38	14 ³ / ₄ 374	16 ³ / ₄ 425	13 ³ / ₁₆ 335	7 177	1210-C1	
18 ¹ / ₈	460	6 ⁷ / ₁₆	163	1 ¹ / ₂	38	17 ¹ / ₄ 438	19 ¹ / ₂ 495	10 ³ / ₁₆ 259	6 ¹ / ₂ 165	1507-C1	
									7 177	1507-C4	

HOW TO ORDER . . .

. . . BALL BEARING SETS

1. Select required type, size, grade, material and thickness combination.
2. **Prefix** to the basic catalog number and symbol **BB**.

Example: BB-0404-C1.

3. Specify quantity.
4. Specify type of bushing.
5. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
6. Specify "no shank" or "Lempcoshank". If "Lempcoshank" give catalog number of kit desired.
7. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
8. Tell us how to ship. Otherwise we will ship "Best Way" in our judgment.

. . . PLAIN BEARING SETS

1. Select required type, size, grade, material and thickness combination.
2. **Prefix** to the basic catalog number and symbol **P**.

Example: P-0404-C1.

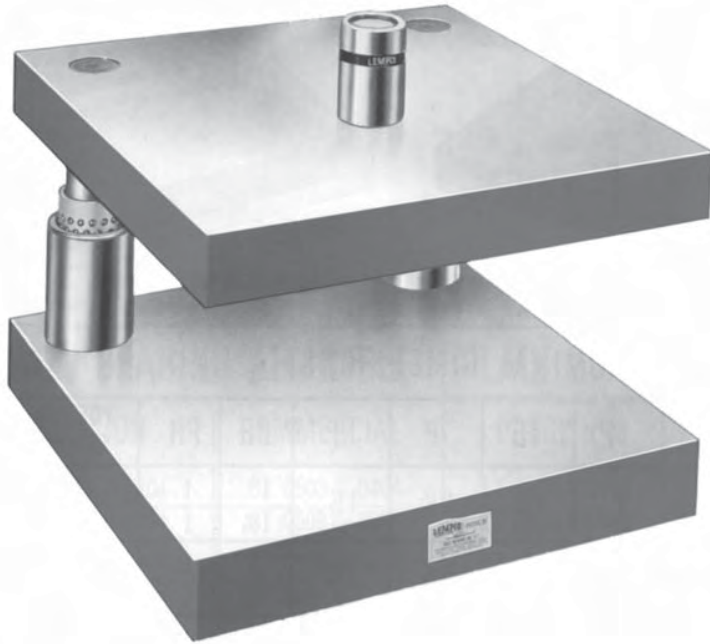
Follow steps 3 through 8, above.





RECTANGULAR STOCK DIE SETS

-Two Post Style



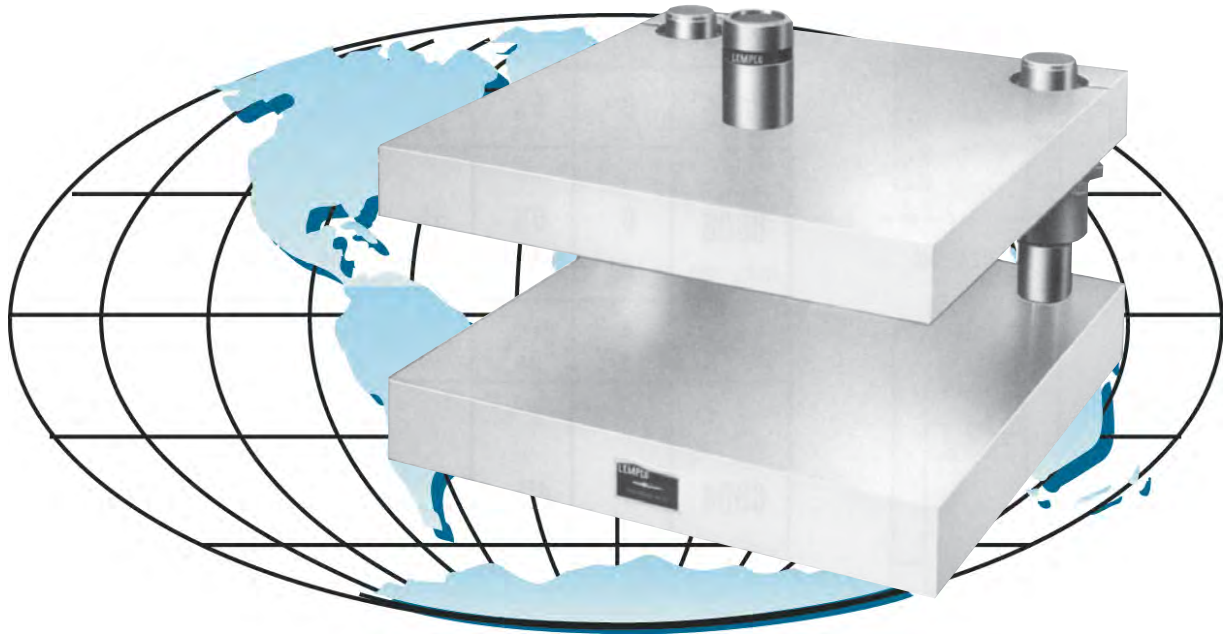
BALL BEARING SETS (Painted Blue)

- ◆ Precision
- ◆ All Steel

*With
Annotations in
"Soft" Metric*

PLAIN BEARING SETS (Painted Yellow)

- ◆ Precision
- ◆ All Steel



Lempco will not be responsible for any malfunction or substandard performance of any Die Set or any Guide Pin or Guide Bushing or Ball Bearing Retainer or Rotainer® when run with Guide Components not of Lempco manufacture.





BALL BEARING STOCK DIE SETS

-Rectangular Two Post



BT-0904-P-0504

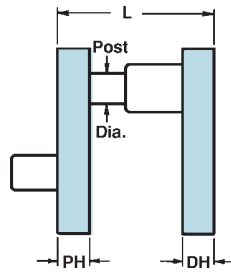
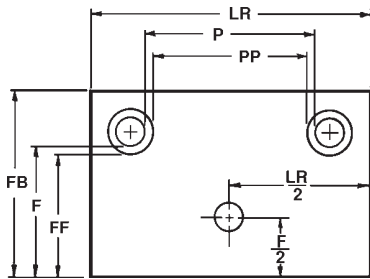


BT-1210-P-0706

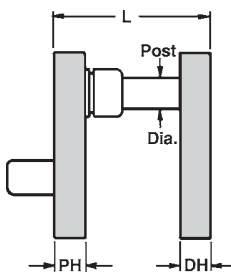


BT-1606-P-0806

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

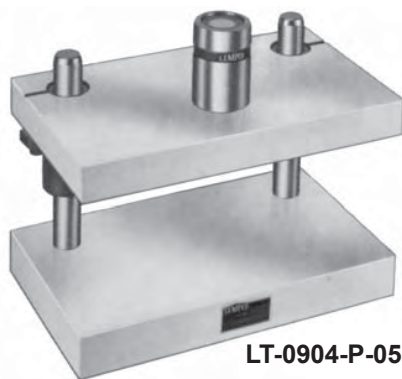
3/4" = 19 mm	4 1/2" = 114 mm
1" = 25 mm	4 3/4" = 121 mm
1 1/4" = 32 mm	5" = 127 mm
1 1/2" = 38 mm	5 1/4" = 133 mm
1 3/4" = 44 mm	5 1/2" = 140 mm
	5 3/4" = 146 mm

NOMINAL DIMENSIONS

SIZE	LR	F	FF	FB	P	PP	DH	PH	POST DIA.	L
0503 <i>133 / 84</i>	5 1/4 <i>133</i>	3 5/16 <i>84</i>	3 <i>76</i>	4 7/8 <i>123</i>	2 1/8 <i>53</i>	1 1/2 <i>38</i>	1	1	3/4	4 1/4
							1 1/4	1		4 3/4
0504 <i>133 / 109</i>	5 1/4 <i>133</i>	4 5/16 <i>109</i>	3 15/16 <i>100</i>	5 7/8 <i>149</i>	2 1/8 <i>53</i>	1 1/2 <i>38</i>	1	1	3/4	4 1/2
							1 1/4	1		4 3/4
0505 <i>133 / 131</i>	5 1/4 <i>133</i>	5 7/16 <i>138</i>	5 1/16 <i>128</i>	7 <i>177</i>	2 1/8 <i>53</i>	1 1/2 <i>38</i>	1	1	3/4	4 1/2
							1 1/4	1		4 3/4
0604 <i>152 / 111</i>	6 <i>152</i>	4 3/8 <i>111</i>	4 <i>101</i>	6 1/4 <i>158</i>	2 1/4 <i>57</i>	1 1/2 <i>38</i>	1 1/4	1 1/4	1	5
							1 1/2	1 1/4		5 1/4
0605 <i>152 / 136</i>	6 <i>152</i>	5 3/8 <i>136</i>	5 <i>127</i>	7 1/4 <i>184</i>	2 1/4 <i>57</i>	1 1/2 <i>38</i>	1 1/4	1 1/4	1	5
							1 1/2	1 1/4		5 1/4
0606 <i>152 / 155</i>	6 <i>152</i>	6 1/8 <i>155</i>	5 3/4 <i>146</i>	8 <i>203</i>	2 1/4 <i>57</i>	1 1/2 <i>38</i>	1 1/2	1 1/4	1	5 1/4
							1 1/2	1 1/2		5 1/2
							1 3/4	1 1/4		5 1/2
							1 3/4	1 1/2		5 3/4
0704 <i>177 / 93</i>	7 <i>177</i>	3 11/16 <i>93</i>	3 5/16 <i>84</i>	5 1/4 <i>133</i>	3 7/8 <i>98</i>	3 3/16 <i>81</i>	1	1	3/4	4 1/2
							1 1/4	1		4 3/4
0804 <i>203 / 112</i>	8 <i>203</i>	4 7/16 <i>112</i>	4 1/16 <i>103</i>	6 <i>152</i>	4 7/8 <i>123</i>	4 3/16 <i>106</i>	1 1/4	1 1/4	3/4	5
							1 1/4	1 1/2		5
							1 1/2	1 1/4		5
							1 1/2	1 1/2		5
							1 3/4	1 1/4		5
0806 <i>203 / 155</i>	8 <i>203</i>	6 1/8 <i>155</i>	5 3/4 <i>146</i>	8 <i>203</i>	4 1/4 <i>107</i>	3 1/2 <i>88</i>	1 1/2	1 1/4	1	5 1/4
							1 1/2	1 1/2		5 1/2
							1 3/4	1 1/4		5 1/2
							1 3/4	1 1/2		5 3/4
0808 <i>203 / 206</i>	8 <i>203</i>	8 1/8 <i>206</i>	7 3/4 <i>196</i>	10 <i>254</i>	4 1/4 <i>107</i>	3 1/2 <i>88</i>	1 1/2	1 1/4	1	5 1/4
							1 1/2	1 1/2		5 1/2
							1 3/4	1 1/4		5 1/2
							1 3/4	1 1/2		5 3/4
0904 <i>228 / 93</i>	9 <i>228</i>	3 11/16 <i>93</i>	3 5/16 <i>88</i>	5 1/4 <i>133</i>	5 7/8 <i>149</i>	5 3/16 <i>132</i>	1	1	3/4	4 1/2
							1 1/4	1		4 3/4

PLAIN BEARING STOCK DIE SETS

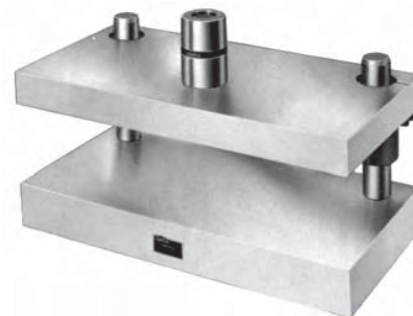
-Rectangular Two Post



LT-0904-P-0504



LT-1210-P-0706



LT-1606-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BT-0503-P-0404	LT-0503-P-0404
BT-0503-P-0504	LT-0503-P-0504
BT-0504-P-0404	LT-0504-P-0404
BT-0504-P-0504	LT-0504-P-0504
BT-0505-P-0404	LT-0505-P-0404
BT-0505-P-0504	LT-0505-P-0504
BT-0604-P-0505	LT-0604-P-0505
BT-0604-P-0605	LT-0604-P-0605
BT-0605-P-0505	LT-0605-P-0505
BT-0605-P-0605	LT-0605-P-0605
BT-0606-P-0605	LT-0606-P-0605
BT-0606-P-0606	LT-0606-P-0606
BT-0606-P-0705	LT-0606-P-0705
BT-0606-P-0706	LT-0606-P-0706
BT-0704-P-0404	LT-0704-P-0404
BT-0704-P-0504	LT-0704-P-0504
BT-0804-P-0505	LT-0804-P-0505
BT-0804-P-0506	LT-0804-P-0506
BT-0804-P-0605	LT-0804-P-0605
BT-0804-P-0606	LT-0804-P-0606
BT-0804-P-0705	LT-0804-P-0705
BT-0804-P-0706	LT-0804-P-0706
BT-0806-P-0605	LT-0806-P-0605
BT-0806-P-0606	LT-0806-P-0606
BT-0806-P-0705	LT-0806-P-0705
BT-0806-P-0706	LT-0806-P-0706
BT-0808-P-0605	LT-0808-P-0605
BT-0808-P-0606	LT-0808-P-0606
BT-0808-P-0705	LT-0808-P-0705
BT-0808-P-0706	LT-0808-P-0706
BT-0904-P-0404	LT-0904-P-0404
BT-0904-P-0504	LT-0904-P-0504

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade, and thickness combination. Show catalog number of selected die set on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is the Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. Specify "no shank" or "Lempcoshank". If "Lempcoshank", give catalog number of kit desired.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.

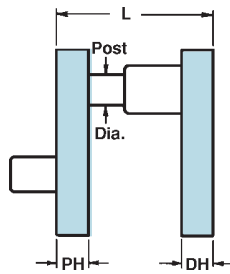
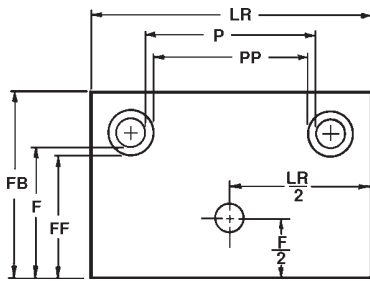


BALL BEARING STOCK DIE SETS

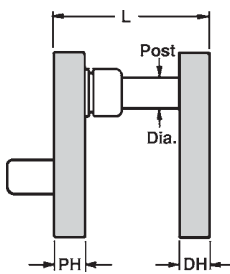
-Rectangular Two Post



"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

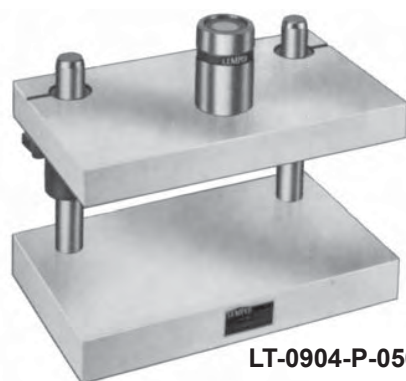
- 1" = 25 mm 5¹/₄" = 133 mm
- 1¹/₄" = 32 mm 5¹/₂" = 140 mm
- 1¹/₂" = 38 mm 5³/₄" = 146 mm
- 1³/₄" = 44 mm 6" = 152 mm
- 2" = 51 mm 6¹/₂" = 165 mm

NOMINAL DIMENSIONS

SIZE	LR	F	FF	FB	P	PP	DH	PH	POST DIA.	L
1004 <i>254 / 104</i>	10 <i>254</i>	4 ¹ / ₈ <i>104</i>	3 ³ / ₄ <i>95</i>	6 <i>152</i>	6 ¹ / ₄ <i>158</i>	5 ¹ / ₂ <i>140</i>	1 ¹ / ₂	1 ¹ / ₄	1	5 ¹ / ₄
							1 ¹ / ₂	1 ¹ / ₂		5 ¹ / ₂
							1 ³ / ₄	1 ¹ / ₄		5 ¹ / ₂
							1 ³ / ₄	1 ¹ / ₂		5 ³ / ₄
1006 <i>254 / 155</i>	10 <i>254</i>	6 ¹ / ₈ <i>155</i>	5 ³ / ₄ <i>146</i>	8 <i>203</i>	6 ¹ / ₄ <i>158</i>	5 ¹ / ₂ <i>140</i>	1 ¹ / ₂	1 ¹ / ₄	1	5 ¹ / ₄
							1 ¹ / ₂	1 ¹ / ₂		5 ¹ / ₂
							1 ³ / ₄	1 ¹ / ₄		5 ¹ / ₂
							1 ³ / ₄	1 ¹ / ₂		5 ³ / ₄
1008 <i>254 / 200</i>	10 <i>254</i>	7 ⁷ / ₈ <i>200</i>	7 ³ / ₈ <i>187</i>	10 <i>254</i>	5 ³ / ₄ <i>146</i>	4 ⁷ / ₈ <i>124</i>	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₄	5 ³ / ₄
							1 ¹ / ₂	1 ¹ / ₂		6
							1 ³ / ₄	1 ¹ / ₄		6
							1 ³ / ₄	1 ¹ / ₂		6
1010 <i>254 / 250</i>	10 <i>254</i>	9 ⁷ / ₈ <i>250</i>	9 ³ / ₈ <i>238</i>	12 <i>304</i>	5 ³ / ₄ <i>146</i>	4 ⁷ / ₈ <i>124</i>	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₄	5 ³ / ₄
							1 ¹ / ₂	1 ¹ / ₂		6
							1 ³ / ₄	1 ¹ / ₄		6
							1 ³ / ₄	1 ¹ / ₂		6
1204 <i>304 / 104</i>	12 <i>304</i>	4 ¹ / ₈ <i>104</i>	3 ³ / ₄ <i>95</i>	6 <i>152</i>	8 ¹ / ₄ <i>210</i>	7 ¹ / ₂ <i>190</i>	1 ¹ / ₂	1 ¹ / ₄	1	5 ¹ / ₄
							1 ¹ / ₂	1 ¹ / ₂		5 ¹ / ₂
							1 ³ / ₄	1 ¹ / ₄		5 ¹ / ₂
							1 ³ / ₄	1 ¹ / ₂		5 ³ / ₄
1206 <i>304 / 149</i>	12 <i>304</i>	5 ⁷ / ₈ <i>149</i>	5 ³ / ₈ <i>136</i>	8 <i>203</i>	7 ³ / ₄ <i>196</i>	6 ⁷ / ₈ <i>174</i>	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₄	5 ³ / ₄
							1 ¹ / ₂	1 ¹ / ₂		6
							1 ³ / ₄	1 ¹ / ₄		6
							1 ³ / ₄	1 ¹ / ₂		6
1208 <i>304 / 200</i>	12 <i>304</i>	7 ⁷ / ₈ <i>200</i>	7 ³ / ₈ <i>187</i>	10 <i>254</i>	7 ³ / ₄ <i>196</i>	6 ⁷ / ₈ <i>174</i>	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₄	5 ³ / ₄
							1 ¹ / ₂	1 ¹ / ₂		6
							1 ³ / ₄	1 ¹ / ₄		6
							1 ³ / ₄	1 ¹ / ₂		6
1210 <i>304 / 250</i>	12 <i>304</i>	9 ⁷ / ₈ <i>250</i>	9 ³ / ₈ <i>238</i>	12 <i>304</i>	7 ³ / ₄ <i>196</i>	6 ⁷ / ₈ <i>174</i>	1 ³ / ₄	1 ¹ / ₂	1 ¹ / ₄	6
							1 ³ / ₄	1 ³ / ₄		6 ¹ / ₂
							2	1 ¹ / ₂		6 ¹ / ₂
							2	1 ³ / ₄		6 ¹ / ₂

PLAIN BEARING STOCK DIE SETS

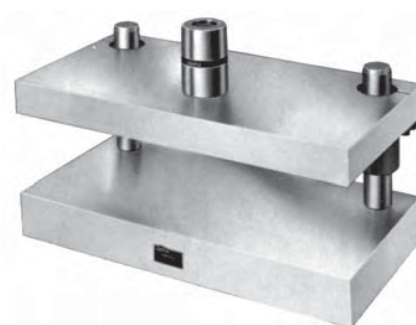
-Rectangular Two Post



LT-0904-P-0504



LT-1210-P-0706



LT-1606-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BT-1004-P-0605	LT-1004-P-0605
BT-1004-P-0606	LT-1004-P-0606
BT-1004-P-0705	LT-1004-P-0705
BT-1004-P-0706	LT-1004-P-0706
BT-1006-P-0605	LT-1006-P-0605
BT-1006-P-0606	LT-1006-P-0606
BT-1006-P-0705	LT-1006-P-0705
BT-1006-P-0706	LT-1006-P-0706
BT-1008-P-0605	LT-1008-P-0605
BT-1008-P-0606	LT-1008-P-0606
BT-1008-P-0705	LT-1008-P-0705
BT-1008-P-0706	LT-1008-P-0706
BT-1010-P-0605	LT-1010-P-0605
BT-1010-P-0606	LT-1010-P-0606
BT-1010-P-0705	LT-1010-P-0705
BT-1010-P-0706	LT-1010-P-0706
BT-1204-P-0605	LT-1204-P-0605
BT-1204-P-0606	LT-1204-P-0606
BT-1204-P-0705	LT-1204-P-0705
BT-1204-P-0706	LT-1204-P-0706
BT-1206-P-0605	LT-1206-P-0605
BT-1206-P-0606	LT-1206-P-0606
BT-1206-P-0705	LT-1206-P-0705
BT-1206-P-0706	LT-1206-P-0706
BT-1208-P-0605	LT-1208-P-0605
BT-1208-P-0606	LT-1208-P-0606
BT-1208-P-0705	LT-1208-P-0705
BT-1208-P-0706	LT-1208-P-0706
BT-1210-P-0706	LT-1210-P-0706
BT-1210-P-0707	LT-1210-P-0707
BT-1210-P-0806	LT-1210-P-0806
BT-1210-P-0807	LT-1210-P-0807

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade, and thickness combination. Show catalog number of selected die set on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is the Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. Specify "no shank" or "Lempcoshank". If "Lempcoshank", give catalog number of kit desired.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



BALL BEARING STOCK DIE SETS

-Rectangular Two Post



BT-1210-P-0706

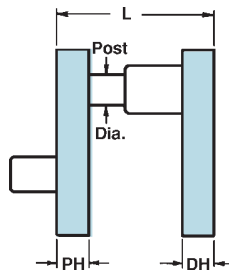
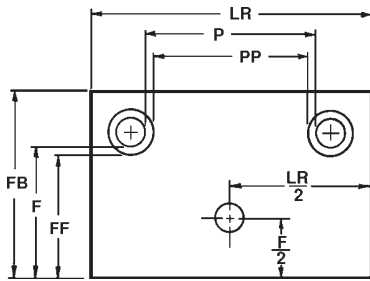


BT-1812-P-0806

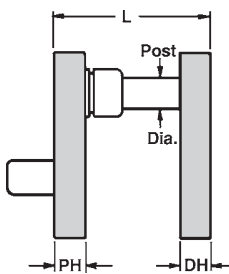


BT-1606-P-0806

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

- 1¹/₄" = 32 mm
- 1¹/₂" = 38 mm
- 1³/₄" = 44 mm
- 2" = 51 mm
- 5³/₈" = 146 mm
- 6" = 152 mm
- 6¹/₂" = 165 mm
- 7" = 178 mm

NOMINAL DIMENSIONS

SIZE	LR	F	FF	FB	P	PP	DH	PH	POST DIA.	L
1212 <i>304 / 292</i>	12 <i>304</i>	11 ¹ / ₂ <i>292</i>	11 <i>279</i>	14 <i>355</i>	7 <i>177</i>	6 <i>152</i>	1 ³ / ₄	1 ¹ / ₂	1 ¹ / ₂	6 ¹ / ₂
							1 ³ / ₄	1 ³ / ₄		7
							2	1 ¹ / ₂		7
							2	1 ³ / ₄		7
1406 <i>355 / 149</i>	14 <i>355</i>	5 ⁷ / ₈ <i>149</i>	5 ³ / ₈ <i>136</i>	8 <i>203</i>	9 ³ / ₄ <i>247</i>	8 ⁷ / ₈ <i>225</i>	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₄	5 ³ / ₄
							1 ¹ / ₂	1 ¹ / ₂		6
							1 ³ / ₄	1 ¹ / ₄		6
							1 ³ / ₄	1 ¹ / ₂		6
1408 <i>355 / 200</i>	14 <i>355</i>	7 ⁷ / ₈ <i>200</i>	7 ³ / ₈ <i>187</i>	10 <i>254</i>	9 ³ / ₄ <i>247</i>	8 ⁷ / ₈ <i>225</i>	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₄	5 ³ / ₄
							1 ¹ / ₂	1 ¹ / ₂		6
							1 ³ / ₄	1 ¹ / ₄		6
							1 ³ / ₄	1 ¹ / ₂		6
1410 <i>355 / 241</i>	14 <i>355</i>	9 ¹ / ₂ <i>241</i>	9 <i>228</i>	12 <i>304</i>	9 <i>228</i>	8 <i>203</i>	1 ³ / ₄	1 ¹ / ₂	1 ¹ / ₂	6 ¹ / ₂
							1 ³ / ₄	1 ³ / ₄		7
							2	1 ¹ / ₂		7
							2	1 ³ / ₄		7
1412 <i>355 / 292</i>	14 <i>355</i>	11 ¹ / ₂ <i>292</i>	11 <i>279</i>	14 <i>355</i>	9 <i>228</i>	8 <i>203</i>	1 ³ / ₄	1 ¹ / ₂	1 ¹ / ₂	6 ¹ / ₂
							1 ³ / ₄	1 ³ / ₄		7
							2	1 ¹ / ₂		7
							2	1 ³ / ₄		7
1414 <i>355 / 342</i>	14 <i>355</i>	13 ¹ / ₂ <i>342</i>	13 <i>330</i>	16 <i>406</i>	9 <i>228</i>	8 <i>203</i>	1 ³ / ₄	1 ¹ / ₂	1 ¹ / ₂	6 ¹ / ₂
							1 ³ / ₄	1 ³ / ₄		7
							2	1 ¹ / ₂		7
							2	1 ³ / ₄		7
1606 <i>406 / 149</i>	16 <i>406</i>	5 ⁷ / ₈ <i>149</i>	5 ³ / ₈ <i>136</i>	8 <i>203</i>	11 ³ / ₄ <i>298</i>	10 ⁷ / ₈ <i>276</i>	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₄	6
							2	1 ¹ / ₂		6 ¹ / ₂
1608 <i>406 / 200</i>	16 <i>406</i>	7 ⁷ / ₈ <i>200</i>	7 ³ / ₈ <i>187</i>	10 <i>254</i>	11 ³ / ₄ <i>298</i>	10 ⁷ / ₈ <i>276</i>	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₄	6
							1 ¹ / ₂	2		6 ¹ / ₂
							2	1 ¹ / ₂		6 ¹ / ₂
							2	2		7

PLAIN BEARING STOCK DIE SETS

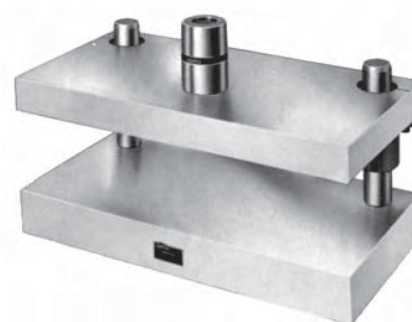
-Rectangular Two Post



LT-1210-P-0706



LT-1812-P-0806



LT-1606-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BT-1212-P-0706	LT-1212-P-0706
BT-1212-P-0707	LT-1212-P-0707
BT-1212-P-0806	LT-1212-P-0806
BT-1212-P-0807	LT-1212-P-0807
BT-1406-P-0605	LT-1406-P-0605
BT-1406-P-0606	LT-1406-P-0606
BT-1406-P-0705	LT-1406-P-0705
BT-1406-P-0706	LT-1406-P-0706
BT-1408-P-0605	LT-1408-P-0605
BT-1408-P-0606	LT-1408-P-0606
BT-1408-P-0705	LT-1408-P-0705
BT-1408-P-0706	LT-1408-P-0706
BT-1410-P-0706	LT-1410-P-0706
BT-1410-P-0707	LT-1410-P-0707
BT-1410-P-0806	LT-1410-P-0806
BT-1410-P-0807	LT-1410-P-0807
BT-1412-P-0706	LT-1412-P-0706
BT-1412-P-0707	LT-1412-P-0707
BT-1412-P-0806	LT-1412-P-0806
BT-1412-P-0807	LT-1412-P-0807
BT-1414-P-0706	LT-1414-P-0706
BT-1414-P-0707	LT-1414-P-0707
BT-1414-P-0806	LT-1414-P-0806
BT-1414-P-0807	LT-1414-P-0807
BT-1606-P-0606	LT-1606-P-0606
BT-1606-P-0806	LT-1606-P-0806
BT-1608-P-0606	LT-1608-P-0606
BT-1608-P-0608	LT-1608-P-0608
BT-1608-P-0806	LT-1608-P-0806
BT-1608-P-0808	LT-1608-P-0808

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade, and thickness combination. Show catalog number of selected die set on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is the Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. Specify "no shank" or "Lempcoshank". If "Lempcoshank", give catalog number of kit desired.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



BALL BEARING STOCK DIE SETS

-Rectangular Two Post



BT-1606-P-0806

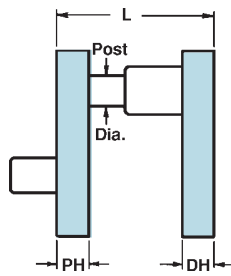
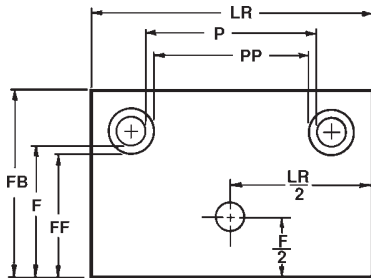


BT-2608-P-0806

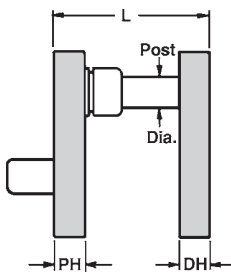


BT-1812-P-0806

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

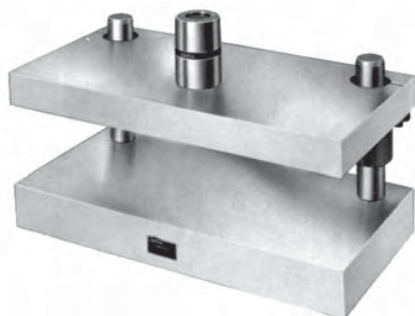
- 1 1/2" = 38 mm
- 2" = 51 mm
- 2 1/2" = 63 mm
- 6 1/2" = 165 mm
- 7" = 178 mm
- 7 1/2" = 190 mm
- 8" = 203 mm

NOMINAL DIMENSIONS

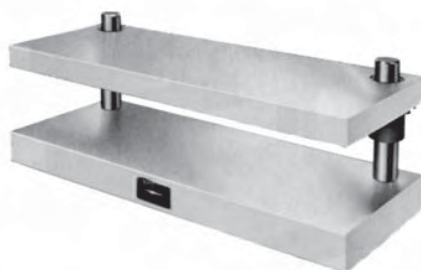
SIZE	LR	F	FF	FB	P	PP	DH	PH	POST DIA.	L
1610 <i>406 / 241</i>	16 406	9 1/2 241	9 228	12 304	11 279	10 254	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	2		7
							2	1 1/2		7
							2	2		7 1/2
1612 <i>406 / 292</i>	16 406	11 1/2 292	11 279	14 355	11 279	10 254	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
1614 <i>406 / 342</i>	16 406	13 1/2 342	13 330	16 406	11 279	10 254	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
1806 <i>457 / 139</i>	18 457	5 1/2 139	5 127	8 203	13 330	12 304	1 1/2	1 1/2	1 1/2	6 1/2
							2	1 1/2		7
1808 <i>457 / 190</i>	18 457	7 1/2 190	7 177	10 254	13 330	12 304	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	2		7
							2	1 1/2		7
							2	2		7 1/2
1810 <i>457 / 241</i>	18 457	9 1/2 241	9 228	12 304	13 330	12 304	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	2		7
							2	1 1/2		7
							2	2		7 1/2
1812 <i>457 / 292</i>	18 457	11 1/2 292	11 279	14 355	13 330	12 304	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
1816 <i>457 / 393</i>	18 457	15 1/2 393	15 381	18 457	13 330	12 304	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8

PLAIN BEARING STOCK DIE SETS

-Rectangular Two Post



LT-1606-P-0806



LT-2608-P-0806



LT-1812-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BT-1610-P-0606	LT-1610-P-0606
BT-1610-P-0608	LT-1610-P-0608
BT-1610-P-0806	LT-1610-P-0806
BT-1610-P-0808	LT-1610-P-0808
BT-1612-P-0806	LT-1612-P-0806
BT-1612-P-0808	LT-1612-P-0808
BT-1612-P-1006	LT-1612-P-1006
BT-1612-P-1008	LT-1612-P-1008
BT-1614-P-0806	LT-1614-P-0806
BT-1614-P-0808	LT-1614-P-0808
BT-1614-P-1006	LT-1614-P-1006
BT-1614-P-1008	LT-1614-P-1008
BT-1806-P-0606	LT-1806-P-0606
BT-1806-P-0806	LT-1806-P-0806
BT-1808-P-0606	LT-1808-P-0606
BT-1808-P-0608	LT-1808-P-0608
BT-1808-P-0806	LT-1808-P-0806
BT-1808-P-0808	LT-1808-P-0808
BT-1810-P-0606	LT-1810-P-0606
BT-1810-P-0608	LT-1810-P-0608
BT-1810-P-0806	LT-1810-P-0806
BT-1810-P-0808	LT-1810-P-0808
BT-1812-P-0806	LT-1812-P-0806
BT-1812-P-0808	LT-1812-P-0808
BT-1812-P-1006	LT-1812-P-1006
BT-1812-P-1008	LT-1812-P-1008
BT-1816-P-0806	LT-1816-P-0806
BT-1816-P-0808	LT-1816-P-0808
BT-1816-P-1006	LT-1816-P-1006
BT-1816-P-1008	LT-1816-P-1008

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade, and thickness combination. Show catalog number of selected die set on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is the Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. Specify "no shank" or "Lempcoshank". If "Lempcoshank", give catalog number of kit desired.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



BALL BEARING STOCK DIE SETS

-Rectangular Two Post



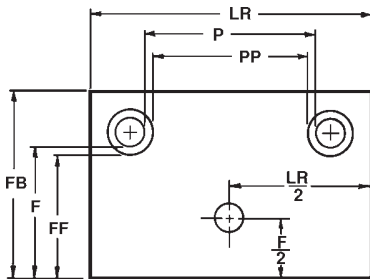
BT-1812-P-0806



BT-1606-P-0806



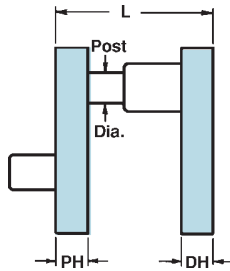
BT-2608-P-0806



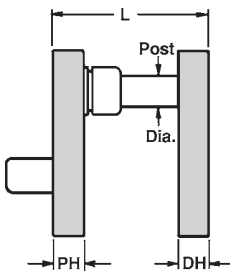
"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.

NOMINAL DIMENSIONS

SIZE	LR	F	FF	FB	P	PP	DH	PH	POST DIA.	L
2010 <i>508 / 241</i>	20 <i>508</i>	9 1/2 <i>241</i>	9 <i>228</i>	12 <i>304</i>	15 <i>381</i>	14 <i>355</i>	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	2		7
							2	1 1/2		7
							2	2		7 1/2
2012 <i>508 / 292</i>	20 <i>508</i>	11 1/2 <i>292</i>	11 <i>279</i>	14 <i>355</i>	15 <i>381</i>	14 <i>355</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2208 <i>558 / 190</i>	22 <i>558</i>	7 1/2 <i>190</i>	7 <i>177</i>	10 <i>254</i>	17 <i>431</i>	16 <i>406</i>	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	2		7
							2	1 1/2		7
							2	2		7 1/2
2210 <i>558 / 241</i>	22 <i>558</i>	9 1/2 <i>241</i>	9 <i>228</i>	12 <i>304</i>	17 <i>431</i>	16 <i>406</i>	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	2		7
							2	1 1/2		7
							2	2		7 1/2
2212 <i>558 / 292</i>	22 <i>558</i>	11 1/2 <i>292</i>	11 <i>279</i>	14 <i>355</i>	17 <i>431</i>	16 <i>406</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2608 <i>660 / 190</i>	26 <i>660</i>	7 1/2 <i>190</i>	7 <i>177</i>	10 <i>254</i>	21 <i>533</i>	20 <i>508</i>	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	2		7
							2	1 1/2		7
							2	2		7 1/2
2612 <i>660 / 292</i>	26 <i>660</i>	11 1/2 <i>292</i>	11 <i>279</i>	14 <i>355</i>	21 <i>533</i>	20 <i>508</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

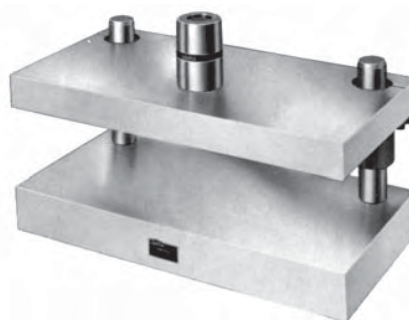
- 1 1/2" = 38 mm
- 2" = 51 mm
- 2 1/2" = 63 mm
- 6 1/2" = 165 mm
- 7" = 178 mm
- 7 1/2" = 190 mm
- 8" = 203 mm

PLAIN BEARING STOCK DIE SETS

-Rectangular Two Post



LT-1812-P-0806



LT-1606-P-0806



LT-2608-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BT-2010-P-0606	LT-2010-P-0606
BT-2010-P-0608	LT-2010-P-0608
BT-2010-P-0806	LT-2010-P-0806
BT-2010-P-0808	LT-2010-P-0808
BT-2012-P-0806	LT-2012-P-0806
BT-2012-P-0808	LT-2012-P-0808
BT-2012-P-1006	LT-2012-P-1006
BT-2012-P-1008	LT-2012-P-1008
BT-2208-P-0606	LT-2208-P-0606
BT-2208-P-0608	LT-2208-P-0608
BT-2208-P-0806	LT-2208-P-0806
BT-2208-P-0808	LT-2208-P-0808
BT-2210-P-0606	LT-2210-P-0606
BT-2210-P-0608	LT-2210-P-0608
BT-2210-P-0806	LT-2210-P-0806
BT-2210-P-0808	LT-2210-P-0808
BT-2212-P-0806	LT-2212-P-0806
BT-2212-P-0808	LT-2212-P-0808
BT-2212-P-1006	LT-2212-P-1006
BT-2212-P-1008	LT-2212-P-1008
BT-2608-P-0606	LT-2608-P-0606
BT-2608-P-0608	LT-2608-P-0608
BT-2608-P-0806	LT-2608-P-0806
BT-2608-P-0808	LT-2608-P-0808
BT-2612-P-0806	LT-2612-P-0806
BT-2612-P-0808	LT-2612-P-0808
BT-2612-P-1006	LT-2612-P-1006
BT-2612-P-1008	LT-2612-P-1008

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade, and thickness combination. Show catalog number of selected die set on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is the Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. Specify "no shank" or "Lempcoshank". If "Lempcoshank", give catalog number of kit desired.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



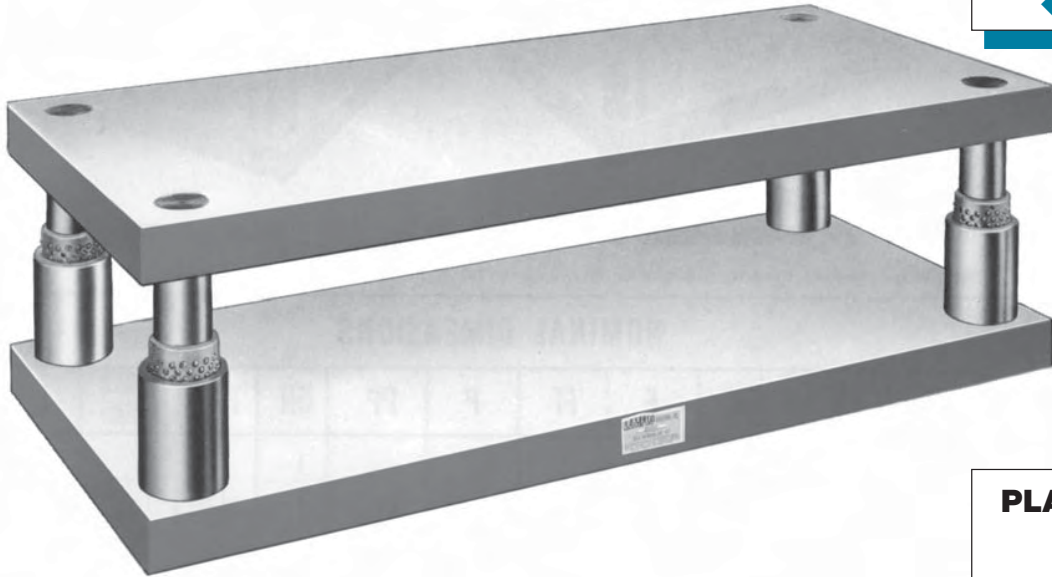


RECTANGULAR STOCK DIE SETS

-Four Post Style

BALL BEARING SETS (Painted Blue)

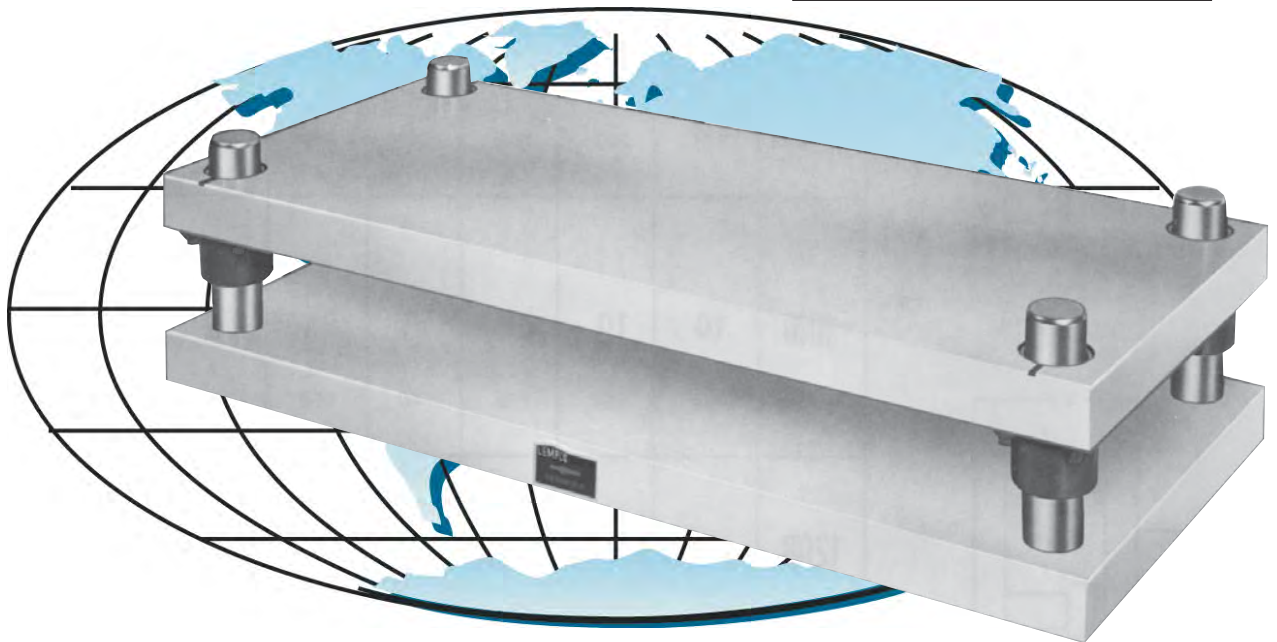
- ◆ Precision
- ◆ All Steel



*With
Annotations in
"Soft" Metric*

PLAIN BEARING SETS (Painted Yellow)

- ◆ Precision
- ◆ All Steel



Lempco will not be responsible for any malfunction or substandard performance of any Die Set or any Guide Pin or Guide Bushing or Ball Bearing Retainer or Rotainer® when run with Guide Components not of Lempco manufacture.





BALL BEARING STOCK DIE SETS

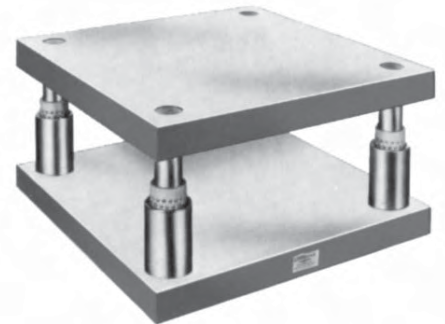
-Rectangular Four Post



BF-1210-P-0605

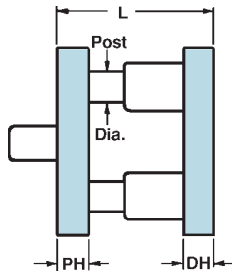
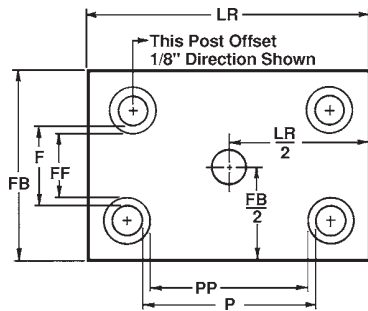


BF-2416-P-0806

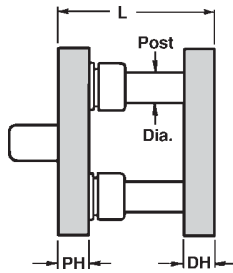


BF-1616-P-0606

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

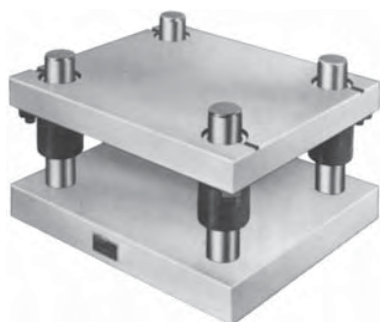
3/4" = 19 mm	4 3/4" = 121 mm
1" = 25 mm	5" = 127 mm
1 1/4" = 32 mm	5 1/4" = 133 mm
1 1/2" = 38 mm	5 1/2" = 140 mm
1 3/4" = 44 mm	5 3/4" = 146 mm
2" = 51 mm	6" = 152 mm
4 1/2" = 114 mm	6 1/2" = 165 mm

NOMINAL DIMENSIONS

SIZE	LR	FB	F	FF	P	PP	DH	PH	POST DIA.	L
0808 <i>203 / 203</i>	8 <i>203</i>	8 <i>203</i>	4 7/8 <i>123</i>	4 3/16 <i>107</i>	4 7/8 <i>123</i>	4 3/16 <i>107</i>	1	1	3/4	4 1/2
							1	1 1/4		4 3/4
							1 1/4	1		4 3/4
							1 1/4	1 1/4		5
1008 <i>254 / 203</i>	10 <i>254</i>	8 <i>203</i>	4 1/4 <i>107</i>	3 1/2 <i>89</i>	6 1/4 <i>158</i>	5 1/2 <i>140</i>	1 1/4	1 1/4	1	5
							1 1/4	1 1/2		5 1/4
							1 1/2	1 1/4		5 1/4
							1 1/2	1 1/2		5 1/2
							1 3/4	1 1/4		5 1/2
1010 <i>254 / 254</i>	10 <i>254</i>	10 <i>254</i>	6 1/4 <i>158</i>	5 1/2 <i>140</i>	6 1/4 <i>158</i>	5 1/2 <i>140</i>	1 1/4	1 1/4	1	5
							1 1/4	1 1/2		5 1/4
							1 1/2	1 1/4		5 1/4
							1 1/2	1 1/2		5 1/2
							1 3/4	1 1/4		5 1/2
1208 <i>304 / 203</i>	12 <i>304</i>	8 <i>203</i>	3 3/4 <i>95</i>	2 7/8 <i>73</i>	7 3/4 <i>196</i>	6 7/8 <i>175</i>	1 1/2	1 1/4	1 1/4	5 3/4
							1 1/2	1 1/2		6
							1 3/4	1 1/4		6
							1 3/4	1 1/2		6
1210 <i>304 / 254</i>	12 <i>304</i>	10 <i>254</i>	5 3/4 <i>146</i>	4 7/8 <i>124</i>	7 3/4 <i>196</i>	6 7/8 <i>175</i>	1 1/2	1 1/4	1 1/4	5 3/4
							1 1/2	1 1/2		6
							1 1/2	1 3/4		6
							1 3/4	1 1/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/4		6
							2	1 1/2		6 1/2
2	1 3/4	6 1/2								

PLAIN BEARING STOCK DIE SETS

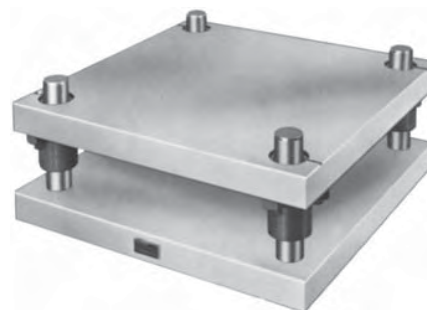
-Rectangular Four Post



LF-1210-P-0605



LF-2416-P-0806



LF-1616-P-0606

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BF-0808-P-0404	LF-0808-P-0404
BF-0808-P-0405	LF-0808-P-0405
BF-0808-P-0504	LF-0808-P-0504
BF-0808-P-0505	LF-0808-P-0505
BF-1008-P-0505	LF-1008-P-0505
BF-1008-P-0506	LF-1008-P-0506
BF-1008-P-0605	LF-1008-P-0605
BF-1008-P-0606	LF-1008-P-0606
BF-1008-P-0705	LF-1008-P-0705
BF-1008-P-0706	LF-1008-P-0706
BF-1010-P-0505	LF-1010-P-0505
BF-1010-P-0506	LF-1010-P-0506
BF-1010-P-0605	LF-1010-P-0605
BF-1010-P-0606	LF-1010-P-0606
BF-1010-P-0705	LF-1010-P-0705
BF-1010-P-0706	LF-1010-P-0706
BF-1208-P-0605	LF-1208-P-0605
BF-1208-P-0606	LF-1208-P-0606
BF-1208-P-0705	LF-1208-P-0705
BF-1208-P-0706	LF-1208-P-0706
BF-1210-P-0605	LF-1210-P-0605
BF-1210-P-0606	LF-1210-P-0606
BF-1210-P-0607	LF-1210-P-0607
BF-1210-P-0705	LF-1210-P-0705
BF-1210-P-0706	LF-1210-P-0706
BF-1210-P-0707	LF-1210-P-0707
BF-1210-P-0805	LF-1210-P-0805
BF-1210-P-0806	LF-1210-P-0806
BF-1210-P-0807	LF-1210-P-0807

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade and thickness combination. Show catalog number of die set selected on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. These die sets are stocked "no shank" only. If "Lempcoshank" is desired give catalog number of kit. Machining of punch holder for "Lempcoshank" is available on special factory order only at an extra cost.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



BALL BEARING STOCK DIE SETS

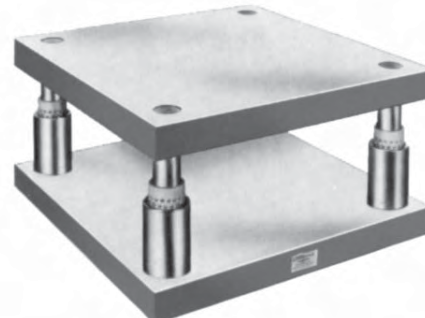
-Rectangular Four Post



BF-1210-P-0605

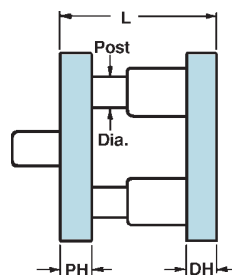
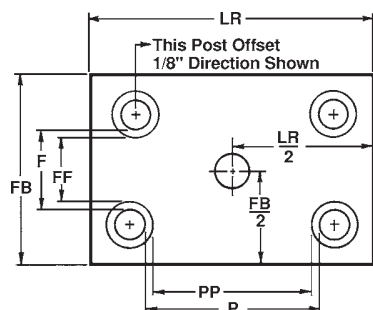


BF-2416-P-0806

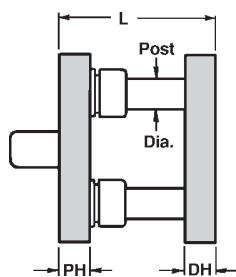


BF-1616-P-0606

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

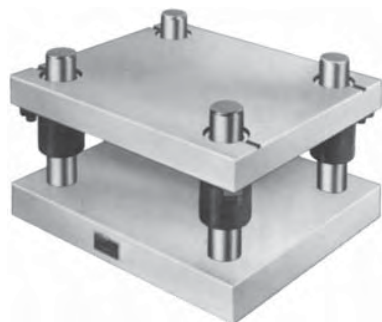
- 1 1/4" = 32 mm 2" = 51 mm
- 1 1/2" = 38 mm 5 3/4" = 146 mm
- 1 3/4" = 44 mm 6" = 152 mm
- 6 1/2" = 165 mm

NOMINAL DIMENSIONS

SIZE	LR	FB	F	FF	P	PP	DH	PH	POST DIA.	L
1212 <i>304 / 304</i>	12 <i>304</i>	12 <i>304</i>	7 3/4 <i>196</i>	6 7/8 <i>175</i>	7 3/4 <i>196</i>	6 7/8 <i>175</i>	1 1/2	1 1/4	1 1/4	5 3/4
							1 1/2	1 1/2		6
							1 1/2	1 3/4		6
							1 3/4	1 1/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/4		6
							2	1 1/2		6 1/2
1408 <i>355 / 203</i>	14 <i>355</i>	8 <i>203</i>	3 3/4 <i>95</i>	2 7/8 <i>73</i>	9 3/4 <i>247</i>	8 7/8 <i>225</i>	1 1/2	1 1/4	1 1/4	5 3/4
							1 1/2	1 1/2		6
							1 3/4	1 1/4		6
							1 3/4	1 1/2		6
1410 <i>355 / 254</i>	14 <i>355</i>	10 <i>254</i>	5 3/4 <i>146</i>	4 7/8 <i>124</i>	9 3/4 <i>247</i>	8 7/8 <i>225</i>	1 1/2	1 1/4	1 1/4	5 3/4
							1 1/2	1 1/2		6
							1 1/2	1 3/4		6
							1 3/4	1 1/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/4		6
							2	1 1/2		6 1/2
1412 <i>355 / 304</i>	14 <i>355</i>	12 <i>304</i>	7 3/4 <i>196</i>	6 7/8 <i>175</i>	9 3/4 <i>247</i>	8 7/8 <i>225</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
							2	1 3/4		6 1/2

PLAIN BEARING STOCK DIE SETS

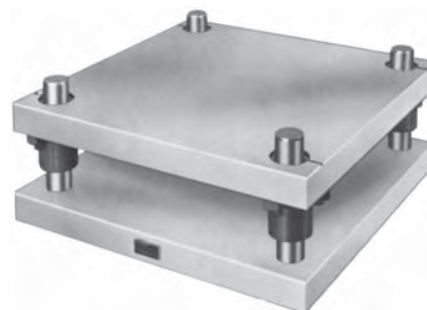
-Rectangular Four Post



LF-1210-P-0605



LF-2416-P-0806



LF-1616-P-0606

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BF-1212-P-0605	LF-1212-P-0605
BF-1212-P-0606	LF-1212-P-0606
BF-1212-P-0607	LF-1212-P-0607
BF-1212-P-0705	LF-1212-P-0705
BF-1212-P-0706	LF-1212-P-0706
BF-1212-P-0707	LF-1212-P-0707
BF-1212-P-0805	LF-1212-P-0805
BF-1212-P-0806	LF-1212-P-0806
BF-1212-P-0807	LF-1212-P-0807
BF-1408-P-0605	LF-1408-P-0605
BF-1408-P-0606	LF-1408-P-0606
BF-1408-P-0705	LF-1408-P-0705
BF-1408-P-0706	LF-1408-P-0706
BF-1410-P-0605	LF-1410-P-0605
BF-1410-P-0606	LF-1410-P-0606
BF-1410-P-0607	LF-1410-P-0607
BF-1410-P-0705	LF-1410-P-0705
BF-1410-P-0706	LF-1410-P-0706
BF-1410-P-0707	LF-1410-P-0707
BF-1410-P-0805	LF-1410-P-0805
BF-1410-P-0806	LF-1410-P-0806
BF-1410-P-0807	LF-1410-P-0807
BF-1412-P-0606	LF-1412-P-0606
BF-1412-P-0607	LF-1412-P-0607
BF-1412-P-0706	LF-1412-P-0706
BF-1412-P-0707	LF-1412-P-0707
BF-1412-P-0806	LF-1412-P-0806
BF-1412-P-0807	LF-1412-P-0807

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade and thickness combination. Show catalog number of die set selected on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. These die sets are stocked "no shank" only. If "Lempcoshank" is desired give catalog number of kit. Machining of punch holder for "Lempcoshank" is available on special factory order only at an extra cost.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



BALL BEARING STOCK DIE SETS

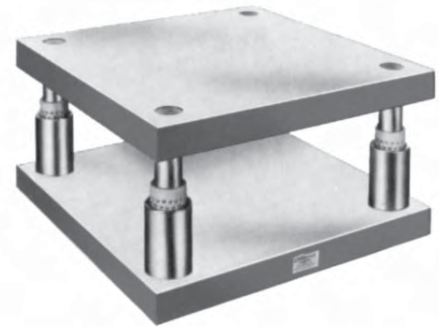
-Rectangular Four Post



BF-1210-P-0605

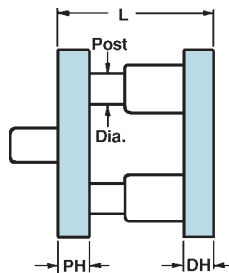
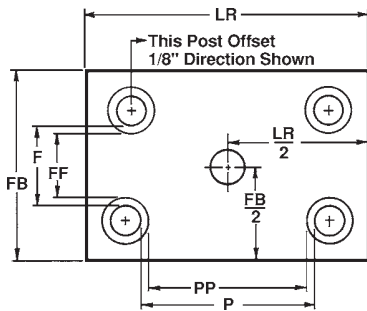


BF-2416-P-0806

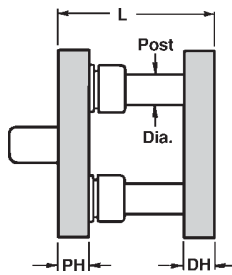


BF-1616-P-0606

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

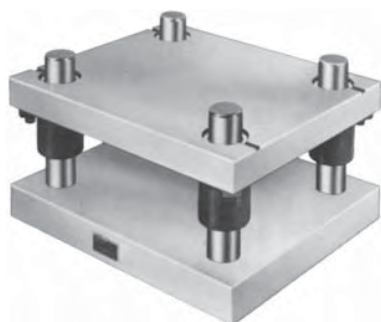
- 1/4" = 32 mm 2" = 51 mm
- 1/2" = 38 mm 6" = 152 mm
- 3/4" = 44 mm 6 1/2" = 165 mm

NOMINAL DIMENSIONS

SIZE	LR	FB	F	FF	P	PP	DH	PH	POST DIA.	L
1414 <i>355 / 355</i>	14 <i>355</i>	14 <i>355</i>	9 3/4 <i>247</i>	8 7/8 <i>225</i>	9 3/4 <i>247</i>	8 7/8 <i>225</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
							2	1 3/4		6 1/2
1610 <i>406 / 254</i>	16 <i>406</i>	10 <i>254</i>	5 3/4 <i>146</i>	4 7/8 <i>124</i>	11 3/4 <i>298</i>	10 7/8 <i>276</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
							2	1 3/4		6 1/2
1612 <i>406 / 304</i>	16 <i>406</i>	12 <i>304</i>	7 3/4 <i>196</i>	6 7/8 <i>175</i>	11 3/4 <i>298</i>	10 7/8 <i>276</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
							2	1 3/4		6 1/2
1614 <i>406 / 355</i>	16 <i>406</i>	14 <i>355</i>	9 3/4 <i>247</i>	8 7/8 <i>225</i>	11 3/4 <i>298</i>	10 7/8 <i>276</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
							2	1 3/4		6 1/2
1616 <i>406 / 406</i>	16 <i>406</i>	16 <i>406</i>	11 3/4 <i>298</i>	10 7/8 <i>276</i>	11 3/4 <i>298</i>	10 7/8 <i>276</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
							2	1 3/4		6 1/2

PLAIN BEARING STOCK DIE SETS

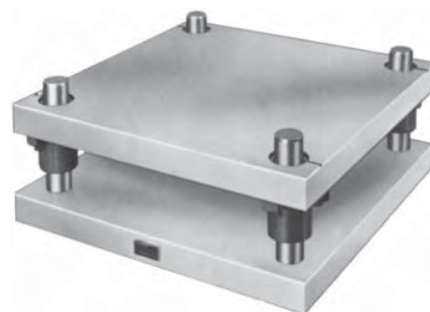
-Rectangular Four Post



LF-1210-P-0605



LF-2416-P-0806



LF-1616-P-0606

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BF-1414-P-0606	LF-1414-P-0606
BF-1414-P-0607	LF-1414-P-0607
BF-1414-P-0706	LF-1414-P-0706
BF-1414-P-0707	LF-1414-P-0707
BF-1414-P-0806	LF-1414-P-0806
BF-1414-P-0807	LF-1414-P-0807
BF-1610-P-0606	LF-1610-P-0606
BF-1610-P-0607	LF-1610-P-0607
BF-1610-P-0706	LF-1610-P-0706
BF-1610-P-0707	LF-1610-P-0707
BF-1610-P-0806	LF-1610-P-0806
BF-1610-P-0807	LF-1610-P-0807
BF-1612-P-0606	LF-1612-P-0606
BF-1612-P-0607	LF-1612-P-0607
BF-1612-P-0706	LF-1612-P-0706
BF-1612-P-0707	LF-1612-P-0707
BF-1612-P-0806	LF-1612-P-0806
BF-1612-P-0807	LF-1612-P-0807
BF-1614-P-0606	LF-1614-P-0606
BF-1614-P-0607	LF-1614-P-0607
BF-1614-P-0706	LF-1614-P-0706
BF-1614-P-0707	LF-1614-P-0707
BF-1614-P-0806	LF-1614-P-0806
BF-1614-P-0807	LF-1614-P-0807
BF-1616-P-0606	LF-1616-P-0606
BF-1616-P-0607	LF-1616-P-0607
BF-1616-P-0706	LF-1616-P-0706
BF-1616-P-0707	LF-1616-P-0707
BF-1616-P-0806	LF-1616-P-0806
BF-1616-P-0807	LF-1616-P-0807

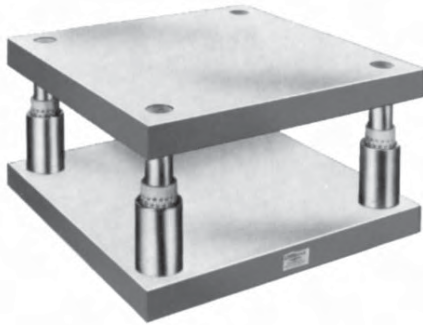
HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade and thickness combination. Show catalog number of die set selected on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. These die sets are stocked "no shank" only. If "Lempcoshank" is desired give catalog number of kit. Machining of punch holder for "Lempcoshank" is available on special factory order only at an extra cost.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.

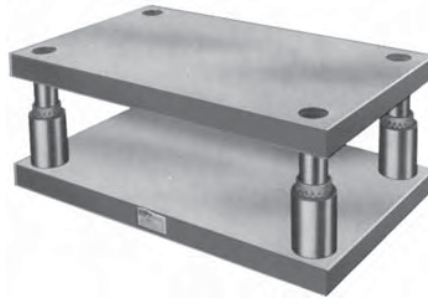


BALL BEARING STOCK DIE SETS

-Rectangular Four Post



BF-1616-P-0606

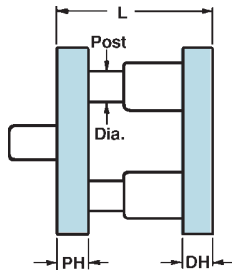
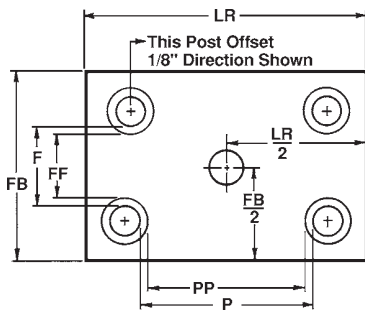


BF-1818-P-0808

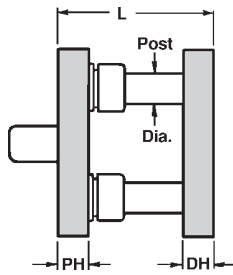


BF-2416-P-0806

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

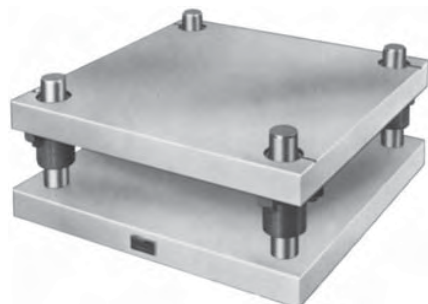
- 1 1/4" = 32 mm 6" = 152 mm
- 1 1/2" = 38 mm 6 1/2" = 165 mm
- 1 3/4" = 44 mm 7" = 178 mm
- 2" = 51 mm 7 1/2" = 190 mm
- 2 1/2" = 63 mm 8" = 203 mm

NOMINAL DIMENSIONS

SIZE	LR	FB	F	FF	P	PP	DH	PH	POST DIA.	L
1810 <i>457 / 254</i>	18 <i>457</i>	10 <i>254</i>	5 3/4 <i>146</i>	4 7/8 <i>124</i>	13 3/4 <i>349</i>	12 7/8 <i>327</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6 1/2
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
1812 <i>457 / 304</i>	18 <i>457</i>	12 <i>304</i>	7 <i>178</i>	6 <i>152</i>	13 <i>330</i>	12 <i>304</i>	1 1/2	1 1/2	1 1/2	6 1/2
							1 1/2	1 3/4		6 1/2
							1 1/2	2		7
							1 3/4	1 1/2		6 1/2
							1 3/4	1 3/4		7
							1 3/4	2		7
							2	1 1/2		7
2	1 3/4	7								
1814 <i>457 / 355</i>	18 <i>457</i>	14 <i>355</i>	9 <i>228</i>	8 <i>203</i>	13 <i>330</i>	12 <i>304</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
1816 <i>457 / 406</i>	18 <i>457</i>	16 <i>406</i>	11 <i>279</i>	10 <i>254</i>	13 <i>330</i>	12 <i>304</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
1818 <i>457 / 457</i>	18 <i>457</i>	18 <i>457</i>	13 <i>330</i>	12 <i>304</i>	13 <i>330</i>	12 <i>304</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
2010 <i>508 / 254</i>	20 <i>508</i>	10 <i>254</i>	5 3/4 <i>146</i>	4 7/8 <i>124</i>	15 3/4 <i>400</i>	14 7/8 <i>378</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							2	1 1/2		6 1/2
2	1 3/4	6 1/2								

PLAIN BEARING STOCK DIE SETS

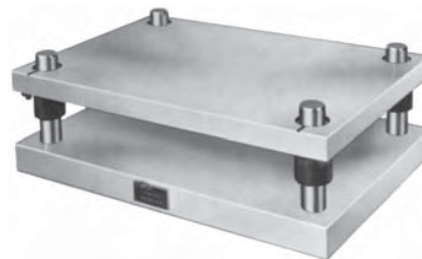
-Rectangular Four Post



LF-1616-P-0606



LF-1818-P-0808



LF-2416-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BF-1810-P-0606	LF-1810-P-0606
BF-1810-P-0607	LF-1810-P-0607
BF-1810-P-0706	LF-1810-P-0706
BF-1810-P-0707	LF-1810-P-0707
BF-1810-P-0806	LF-1810-P-0806
BF-1810-P-0807	LF-1810-P-0807
BF-1812-P-0606	LF-1812-P-0606
BF-1812-P-0607	LF-1812-P-0607
BF-1812-P-0608	LF-1812-P-0608
BF-1812-P-0706	LF-1812-P-0706
BF-1812-P-0707	LF-1812-P-0707
BF-1812-P-0708	LF-1812-P-0708
BF-1812-P-0806	LF-1812-P-0806
BF-1812-P-0807	LF-1812-P-0807
BF-1812-P-0808	LF-1812-P-0808
BF-1814-P-0806	LF-1814-P-0806
BF-1814-P-0808	LF-1814-P-0808
BF-1814-P-1006	LF-1814-P-1006
BF-1814-P-1008	LF-1814-P-1008
BF-1816-P-0806	LF-1816-P-0806
BF-1816-P-0808	LF-1816-P-0808
BF-1816-P-1006	LF-1816-P-1006
BF-1816-P-1008	LF-1816-P-1008
BF-1818-P-0806	LF-1818-P-0806
BF-1818-P-0808	LF-1818-P-0808
BF-1818-P-1006	LF-1818-P-1006
BF-1818-P-1008	LF-1818-P-1008
BF-2010-P-0606	LF-2010-P-0606
BF-2010-P-0607	LF-2010-P-0607
BF-2010-P-0706	LF-2010-P-0706
BF-2010-P-0707	LF-2010-P-0707
BF-2010-P-0806	LF-2010-P-0806
BF-2010-P-0807	LF-2010-P-0807

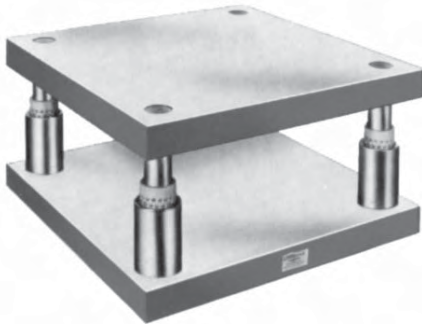
HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade and thickness combination. Show catalog number of die set selected on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. These die sets are stocked "no shank" only. If "Lempcoshank" is desired give catalog number of kit. Machining of punch holder for "Lempcoshank" is available on special factory order only at an extra cost.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.

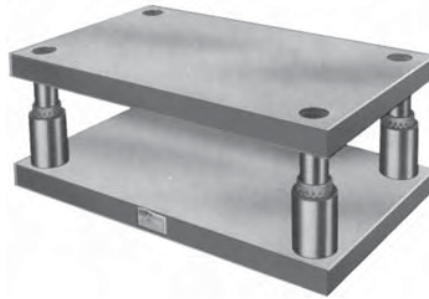


BALL BEARING STOCK DIE SETS

-Rectangular Four Post



BF-1616-P-0606

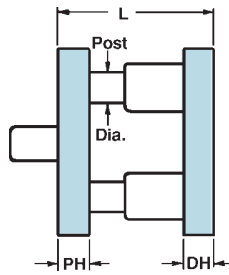
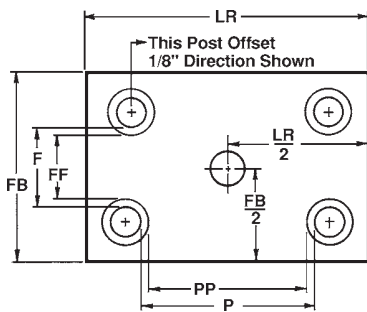


BF-2212-P-0808

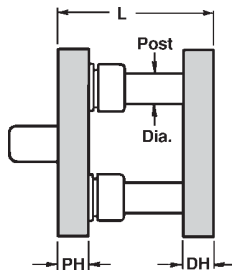


BF-2416-P-0806

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

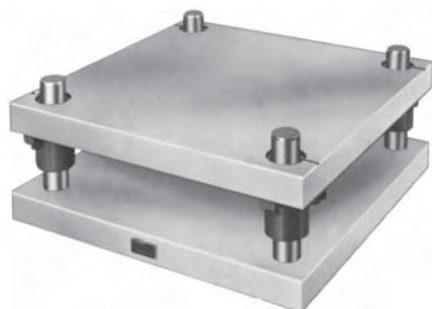
1 ¹ / ₄ " = 32 mm	2 ¹ / ₂ " = 63 mm
1 ¹ / ₂ " = 38 mm	6 ¹ / ₂ " = 165 mm
1 ³ / ₄ " = 44 mm	7" = 178 mm
2" = 51 mm	7 ¹ / ₂ " = 190 mm
	8" = 203 mm

NOMINAL DIMENSIONS

SIZE	LR	FB	F	FF	P	PP	DH	PH	POST DIA.	L
2012 <i>508 / 304</i>	20 <i>508</i>	12 <i>304</i>	7 <i>178</i>	6 <i>152</i>	15 <i>381</i>	14 <i>355</i>	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂	6 ¹ / ₂
							1 ¹ / ₂	1 ³ / ₄		6 ¹ / ₂
							1 ¹ / ₂	2		7
							1 ³ / ₄	1 ¹ / ₂		6 ¹ / ₂
							1 ³ / ₄	1 ³ / ₄		7
							1 ³ / ₄	2		7
							2	1 ¹ / ₂		7
							2	1 ³ / ₄		7
2014 <i>508 / 355</i>	20 <i>508</i>	14 <i>355</i>	9 <i>229</i>	8 <i>203</i>	15 <i>381</i>	14 <i>355</i>	2	1 ¹ / ₂	1 ¹ / ₂	7
							2	2		7 ¹ / ₂
							2 ¹ / ₂	1 ¹ / ₂		7 ¹ / ₂
							2 ¹ / ₂	2		8
2016 <i>508 / 406</i>	20 <i>508</i>	16 <i>406</i>	11 <i>279</i>	10 <i>254</i>	15 <i>381</i>	14 <i>355</i>	2	1 ¹ / ₂	1 ¹ / ₂	7
							2	2		7 ¹ / ₂
							2 ¹ / ₂	1 ¹ / ₂		7 ¹ / ₂
							2 ¹ / ₂	2		8
2018 <i>508 / 457</i>	20 <i>508</i>	18 <i>457</i>	13 <i>330</i>	12 <i>304</i>	15 <i>381</i>	14 <i>355</i>	2	1 ¹ / ₂	1 ¹ / ₂	7
							2	2		7 ¹ / ₂
							2 ¹ / ₂	1 ¹ / ₂		7 ¹ / ₂
							2 ¹ / ₂	2		8
2210 <i>558 / 254</i>	22 <i>558</i>	10 <i>254</i>	5 ³ / ₄ <i>146</i>	4 ⁷ / ₈ <i>124</i>	17 ³ / ₄ <i>450</i>	16 ⁷ / ₈ <i>428</i>	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₄	6
							1 ¹ / ₂	1 ³ / ₄		6
							1 ³ / ₄	1 ¹ / ₂		6
							1 ³ / ₄	1 ³ / ₄		6 ¹ / ₂
							2	1 ¹ / ₂		6 ¹ / ₂
							2	1 ³ / ₄		6 ¹ / ₂
2212 <i>558 / 304</i>	22 <i>558</i>	12 <i>304</i>	7 <i>178</i>	6 <i>152</i>	17 <i>431</i>	16 <i>406</i>	2	1 ¹ / ₂	1 ¹ / ₂	7
							2	2		7 ¹ / ₂
							2 ¹ / ₂	1 ¹ / ₂		7 ¹ / ₂
							2 ¹ / ₂	2		8

PLAIN BEARING STOCK DIE SETS

-Rectangular Four Post



LF-1616-P-0606



LF-2212-P-0808



LF-2416-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BF-2012-P-0606	LF-2012-P-0606
BF-2012-P-0607	LF-2012-P-0607
BF-2012-P-0608	LF-2012-P-0608
BF-2012-P-0706	LF-2012-P-0706
BF-2012-P-0707	LF-2012-P-0707
BF-2012-P-0708	LF-2012-P-0708
BF-2012-P-0806	LF-2012-P-0806
BF-2012-P-0807	LF-2012-P-0807
BF-2012-P-0808	LF-2012-P-0808
BF-2014-P-0806	LF-2014-P-0806
BF-2014-P-0808	LF-2014-P-0808
BF-2014-P-1006	LF-2014-P-1006
BF-2014-P-1008	LF-2014-P-1008
BF-2016-P-0806	LF-2016-P-0806
BF-2016-P-0808	LF-2016-P-0808
BF-2016-P-1006	LF-2016-P-1006
BF-2016-P-1008	LF-2016-P-1008
BF-2018-P-0806	LF-2018-P-0806
BF-2018-P-0808	LF-2018-P-0808
BF-2018-P-1006	LF-2018-P-1006
BF-2018-P-1008	LF-2018-P-1008
BF-2210-P-0606	LF-2210-P-0606
BF-2210-P-0607	LF-2210-P-0607
BF-2210-P-0706	LF-2210-P-0706
BF-2210-P-0707	LF-2210-P-0707
BF-2210-P-0806	LF-2210-P-0806
BF-2210-P-0807	LF-2210-P-0807
BF-2212-P-0806	LF-2212-P-0806
BF-2212-P-0808	LF-2212-P-0808
BF-2212-P-1006	LF-2212-P-1006
BF-2212-P-1008	LF-2212-P-1008

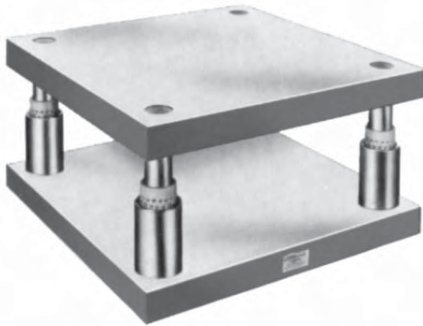
HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade and thickness combination. Show catalog number of die set selected on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. These die sets are stocked "no shank" only. If "Lempcoshank" is desired give catalog number of kit. Machining of punch holder for "Lempcoshank" is available on special factory order only at an extra cost.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.

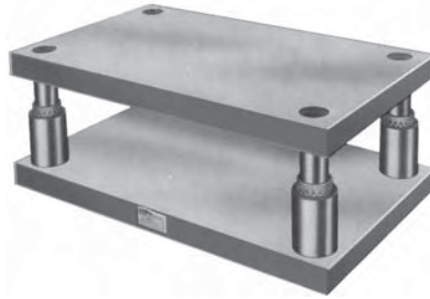


BALL BEARING STOCK DIE SETS

-Rectangular Four Post



BF-1616-P-0606

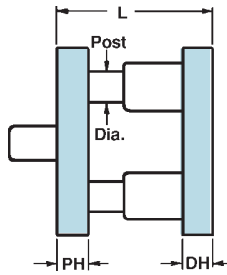
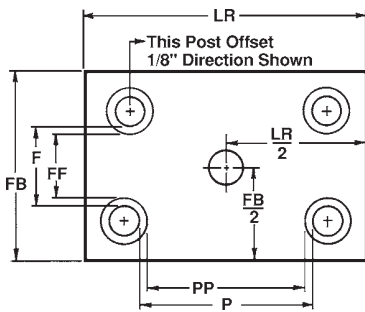


BF-2414-P-0808

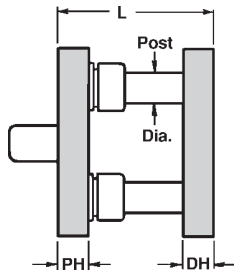


BF-2416-P-0806

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

METRIC EQUIVALENTS

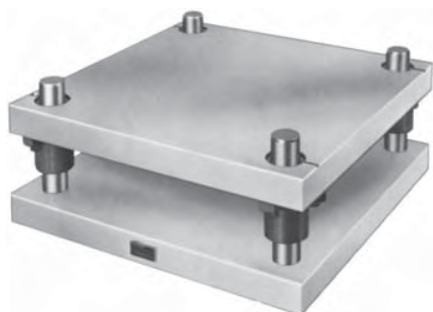
- 1 1/4" = 32 mm
- 1 1/2" = 38 mm
- 1 3/4" = 44 mm
- 2" = 51 mm
- 2 1/2" = 63 mm
- 6" = 152 mm
- 6 1/2" = 165 mm
- 7" = 178 mm
- 7 1/2" = 190 mm
- 8" = 203 mm

NOMINAL DIMENSIONS

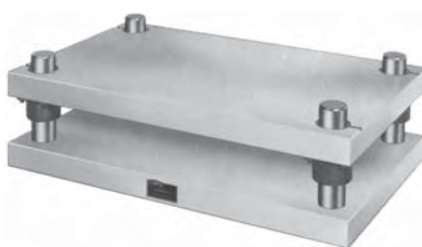
SIZE	LR	FB	F	FF	P	PP	DH	PH	POST DIA.	L
2214 <i>558 / 355</i>	22 <i>558</i>	14 <i>355</i>	9 <i>229</i>	8 <i>203</i>	17 <i>431</i>	16 <i>406</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2216 <i>558 / 406</i>	22 <i>558</i>	16 <i>406</i>	11 <i>279</i>	10 <i>254</i>	17 <i>431</i>	16 <i>406</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2218 <i>558 / 457</i>	22 <i>558</i>	18 <i>457</i>	13 <i>330</i>	12 <i>304</i>	17 <i>431</i>	16 <i>406</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2220 <i>558 / 508</i>	22 <i>558</i>	20 <i>508</i>	15 <i>381</i>	14 <i>355</i>	17 <i>431</i>	16 <i>406</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2410 <i>609 / 254</i>	24 <i>609</i>	10 <i>254</i>	5 3/4 <i>146</i>	4 7/8 <i>124</i>	19 3/4 <i>501</i>	18 7/8 <i>479</i>	1 1/2	1 1/2	1 1/4	6
							1 1/2	1 3/4		6
							1 1/2	2		6 1/2
							1 3/4	1 1/2		6
							1 3/4	1 3/4		6 1/2
							1 3/4	2		6 1/2
							2	1 1/2		6 1/2
							2	1 3/4		6 1/2
							2	2		7
							2412 <i>609 / 304</i>	24 <i>609</i>		12 <i>304</i>	7 178	6 152	19 482	18 457	2	1 1/2	1 1/2	7
2	2	7 1/2								
2 1/2	1 1/2	7 1/2								
2 1/2	2	8								
2414 <i>609 / 355</i>	24 <i>609</i>	14 <i>355</i>	9 <i>229</i>	8 <i>203</i>	19 <i>482</i>	18 <i>457</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8

PLAIN BEARING STOCK DIE SETS

-Rectangular Four Post



LF-1616-P-0606



LF-2414-P-0808



LF-2416-P-0806

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BF-2214-P-0806	LF-2214-P-0806
BF-2214-P-0808	LF-2214-P-0808
BF-2214-P-1006	LF-2214-P-1006
BF-2214-P-1008	LF-2214-P-1008
BF-2216-P-0806	LF-2216-P-0806
BF-2216-P-0808	LF-2216-P-0808
BF-2216-P-1006	LF-2216-P-1006
BF-2216-P-1008	LF-2216-P-1008
BF-2218-P-0806	LF-2218-P-0806
BF-2218-P-0808	LF-2218-P-0808
BF-2218-P-1006	LF-2218-P-1006
BF-2218-P-1008	LF-2218-P-1008
BF-2220-P-0806	LF-2220-P-0806
BF-2220-P-0808	LF-2220-P-0808
BF-2220-P-1006	LF-2220-P-1006
BF-2220-P-1008	LF-2220-P-1008
BF-2410-P-0606	LF-2410-P-0606
BF-2410-P-0607	LF-2410-P-0607
BF-2410-P-0608	LF-2410-P-0608
BF-2410-P-0706	LF-2410-P-0706
BF-2410-P-0707	LF-2410-P-0707
BF-2410-P-0708	LF-2410-P-0708
BF-2410-P-0806	LF-2410-P-0806
BF-2410-P-0807	LF-2410-P-0807
BF-2410-P-0808	LF-2410-P-0808
BF-2412-P-0806	LF-2412-P-0806
BF-2412-P-0808	LF-2412-P-0808
BF-2412-P-1006	LF-2412-P-1006
BF-2412-P-1008	LF-2412-P-1008
BF-2414-P-0806	LF-2414-P-0806
BF-2414-P-0808	LF-2414-P-0808
BF-2414-P-1006	LF-2414-P-1006
BF-2414-P-1008	LF-2414-P-1008

HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade and thickness combination. Show catalog number of die set selected on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. These die sets are stocked "no shank" only. If "Lempcoshank" is desired give catalog number of kit. Machining of punch holder for "Lempcoshank" is available on special factory order only at an extra cost.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



BALL BEARING STOCK DIE SETS

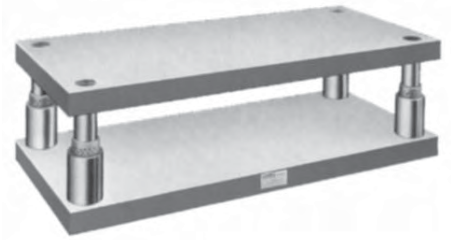
-Rectangular Four Post



BF-2416-P-0808

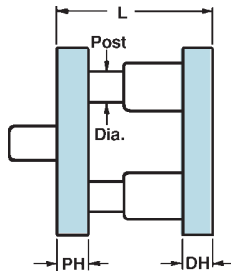
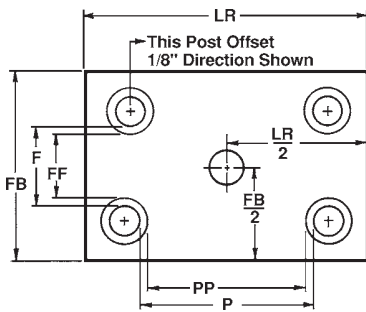


BF-2416-P-0806

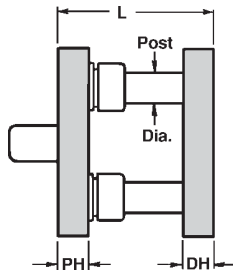


BF-2422-P-0808

"Soft" metric equivalents in italic numerals for reference only - DO NOT USE TO ORDER.



BALL BEARING



PLAIN BEARING

NOMINAL DIMENSIONS										
SIZE	LR	FB	F	FF	P	PP	DH	PH	POST DIA.	L
2416 <i>609 / 406</i>	24 <i>609</i>	16 <i>406</i>	11 <i>279</i>	10 <i>254</i>	19 <i>482</i>	18 <i>457</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2418 <i>609 / 457</i>	24 <i>609</i>	18 <i>457</i>	13 <i>330</i>	12 <i>304</i>	19 <i>482</i>	18 <i>457</i>	2	1 1/2	1 1/2	7
							2	2		7 1/2
							2 1/2	1 1/2		7 1/2
							2 1/2	2		8
2420 <i>609 / 508</i>	24 <i>609</i>	20 <i>508</i>	14 1/2 <i>368</i>	13 1/2 <i>342</i>	18 1/2 <i>469</i>	17 1/2 <i>444</i>	2	1 1/2	1 3/4	7 1/2
							2	2		8
							2 1/2	1 1/2		8
							2 1/2	2		8 1/2
2422 <i>609 / 558</i>	24 <i>609</i>	22 <i>558</i>	16 1/2 <i>419</i>	15 1/2 <i>393</i>	18 1/2 <i>469</i>	17 1/2 <i>444</i>	2	1 1/2	1 3/4	7 1/2
							2	2		8
							2 1/2	1 1/2		8
							2 1/2	2		8 1/2

METRIC EQUIVALENTS

- 1 1/2" = 38 mm
- 1 3/4" = 44 mm
- 2" = 51 mm
- 2 1/2" = 63 mm
- 7" = 178 mm
- 7 1/2" = 190 mm
- 8" = 203 mm
- 8 1/2" = 216 mm
- 9" = 229 mm

PLAIN BEARING STOCK DIE SETS

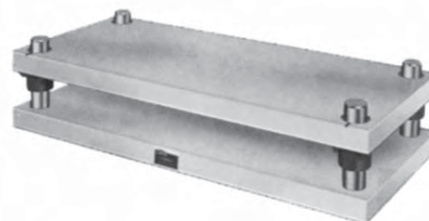
-Rectangular Four Post



LF-2422-P-0808



LF-2416-P-0806



LF-2416-P-0808

BALL BEARING ALL STEEL	PLAIN BEARING ALL STEEL
PRECISION	PRECISION
BF-2416-P-0806	LF-2416-P-0806
BF-2416-P-0808	LF-2416-P-0808
BF-2416-P-1006	LF-2416-P-1006
BF-2416-P-1008	LF-2416-P-1008
BF-2418-P-0806	LF-2418-P-0806
BF-2418-P-0808	LF-2418-P-0808
BF-2418-P-1006	LF-2418-P-1006
BF-2418-P-1008	LF-2418-P-1008
BF-2420-P-0806	LF-2420-P-0806
BF-2420-P-0808	LF-2420-P-0808
BF-2420-P-1006	LF-2420-P-1006
BF-2420-P-1008	LF-2420-P-1008
BF-2422-P-0806	LF-2422-P-0806
BF-2422-P-0808	LF-2422-P-0808
BF-2422-P-1006	LF-2422-P-1006
BF-2422-P-1008	LF-2422-P-1008

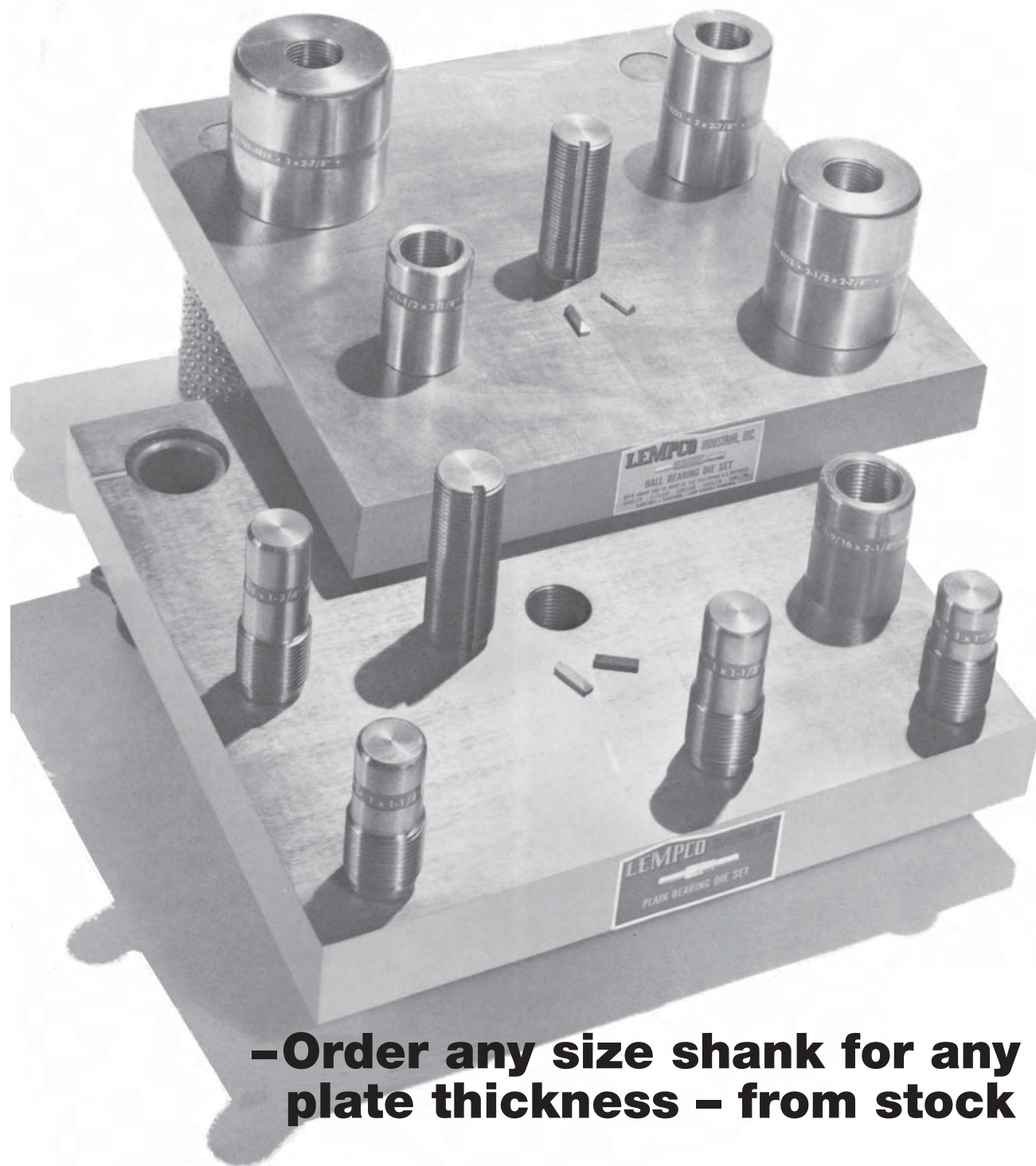
HOW TO ORDER . . .

1. Select either Ball Bearing or Plain Bearing in the required size, grade and thickness combination. Show catalog number of die set selected on your order.
2. Specify quantity.
3. Specify type of bushing.
4. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of guide post.
5. These die sets are stocked "no shank" only. If "Lempcoshank" is desired give catalog number of kit. Machining of punch holder for "Lempcoshank" is available on special factory order only at an extra cost.
6. Specify thickness combinations other than shown. Special or exact thicknesses available at extra cost.
7. Tell us how to ship. Otherwise we will ship "best way" in our judgment.



LEMPCOSHANK[®]

-A new idea for die set users from



-Order any size shank for any plate thickness - from stock

U.S. Patent No. 3,496,824. Patented
Canada 1970. Mexico Patente No. 104,806



DIE SET SHANK KITS

A new idea for die set users – that's LEMPCOSHANK®. Stronger than even welded shanks, it can be installed at the die maker's convenience and need not interfere with his work. Order any size shank for any plate thickness or size – you can get it from stock. From 1½" diameter upward the LEMPCOSHANK kit comprises threaded stud, shank nut and two locking keys. In the 1" diameter (for small sets) the kit is a threaded shank. Both types are manufactured to bottom squarely and tighten firmly into accurately prepared sockets. Lempcos research proves that a properly assembled LEMPCOSHANK – its threaded components tightened and keyed – resists displacement beyond the fatigue limit of a welded shank. There are no voids in punch holder nor interruptions in die surface. Only standard tools are needed for installation. If additional stability is desired for a 1" threaded shank a lock can be inserted as suggested by schematic.



IF PINCH HOLDER THICKNESS IS:

1"	SHANK SIZE:	1 x 1"	1 x 1-1/4"	1 x 1-1/2"	1 x 1-3/4"
	ORDER KIT:	No. 100-1608-04	No. 100-1610-04	No. 100-1612-04	No. 100-1614-04
1¼"	SHANK SIZE:	1 x 1"	1 x 1-1/4"	1 x 1-1/2"	1 x 1-3/4"
	ORDER KIT:	No. 100-1608-05	No. 100-1610-05	No. 100-1612-05	No. 100-1614-05
1½" +	SHANK SIZE:	1 x 1"	1 x 1-1/4"	1 x 1-1/2"	1 x 1-3/4"
	ORDER KIT:	No. 100-1608-06	No. 100-1610-06	No. 100-1612-06	No. 100-1614-06

Tap drill specifications

1½-12 UNF 3B
 PITCH DIA. 1.0709/1.0768
 TAP DRILL HOLE 1.035 + .010 - .000 DIA.
 MAJOR DIA. 1.125 MIN.

X	Y	Z
PUNCH HOLDER THICKNESS	BORE DEPTH	THREAD DEPTH
1"	.812 ± .010	.550 MIN.
1¼"	1.062 ± .010	.800 MIN.
1½" +	1.250 ± .010	.988 MIN.

Assembling threaded shanks

1½-12 UNF 3B
 PITCH DIA. 1.0709/1.0768
 TAP DRILL HOLE 1.035 + .010 - .000 DIA.
 MAJOR DIA. 1.125 MIN.

X	Y	Z
PUNCH HOLDER THICKNESS	BORE DEPTH	THREAD DEPTH
1"	.812 ± .010	.550 MIN.
1¼"	1.062 ± .010	.800 MIN.
1½" +	1.250 ± .010	.988 MIN.

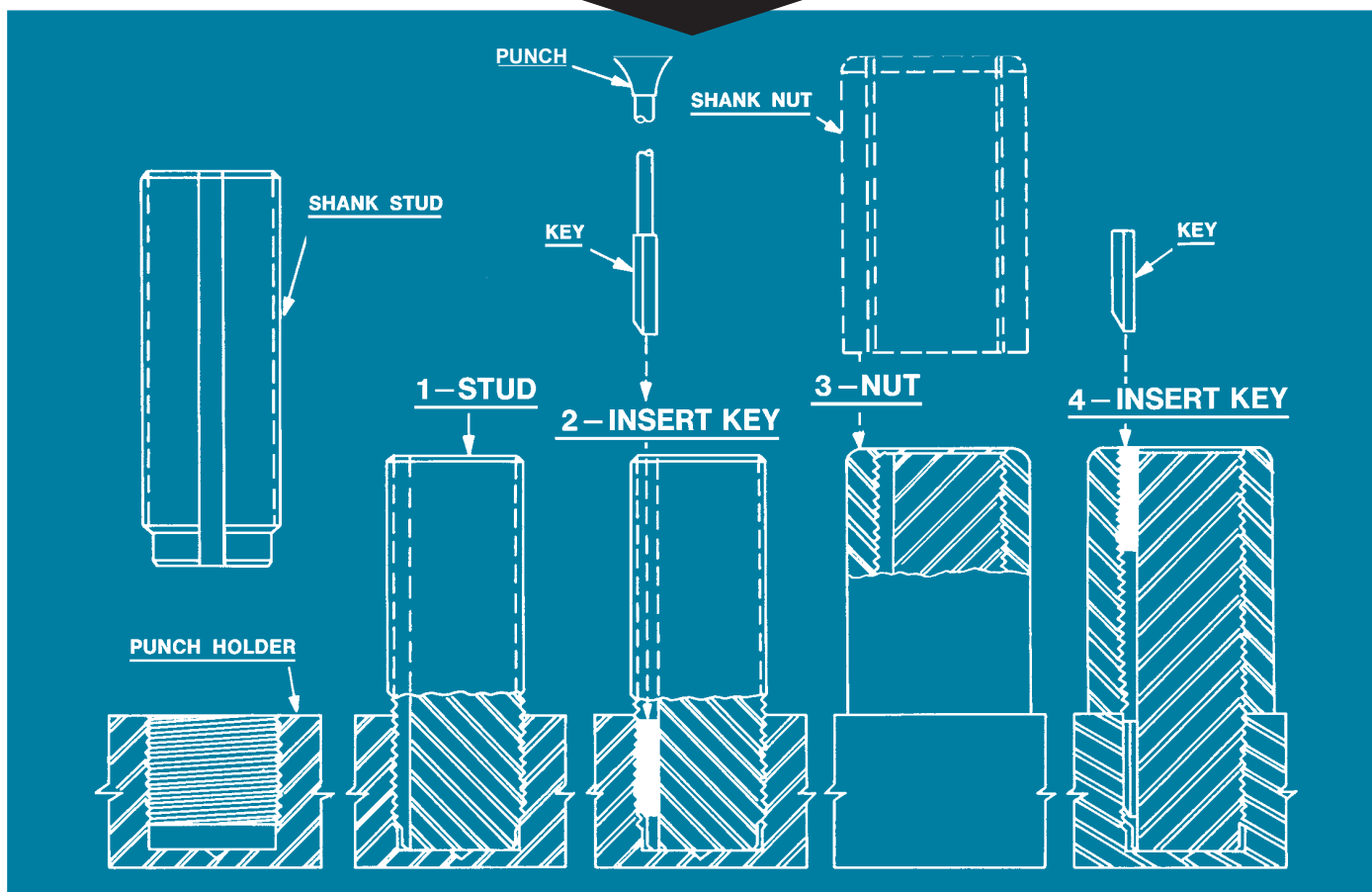
NOTE: Locking keys are permanent.

DIE SET SHANK KITS



1-1/2 x 2-1/8" <i>No. 100-2417-04</i>	1-9/16 x 2-1/8" <i>No. 100-2517-04</i>	2 x 2-7/8" <i>No. 100-3223-04</i>	2-1/2 x 2-7/8" <i>No. 100-4023-04</i>	3 x 2-7/8" <i>No. 100-4823-04</i>
1-1/2 x 2-1/8" <i>No. 100-2417-05</i>	1-9/16 x 2-1/8" <i>No. 100-2517-05</i>	2 x 2-7/8" <i>No. 100-3223-05</i>	2-1/2 x 2-7/8" <i>No. 100-4023-05</i>	3 x 2-7/8" <i>No. 100-4823-05</i>
1-1/2 x 2-1/8" <i>No. 100-2417-06</i>	1-9/16 x 2-1/8" <i>No. 100-2517-06</i>	2 x 2-7/8" <i>No. 100-3223-06</i>	2-1/2 x 2-7/8" <i>No. 100-4023-06</i>	3 x 2-7/8" <i>No. 100-4823-06</i>

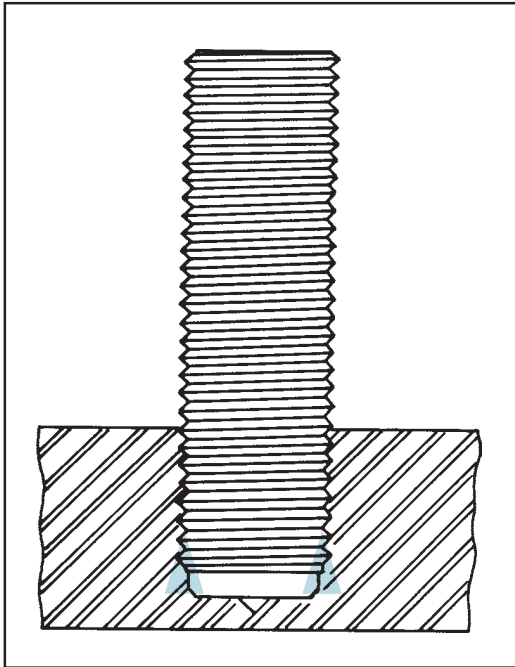
Step-by-step assembly of Lempcoshank kits





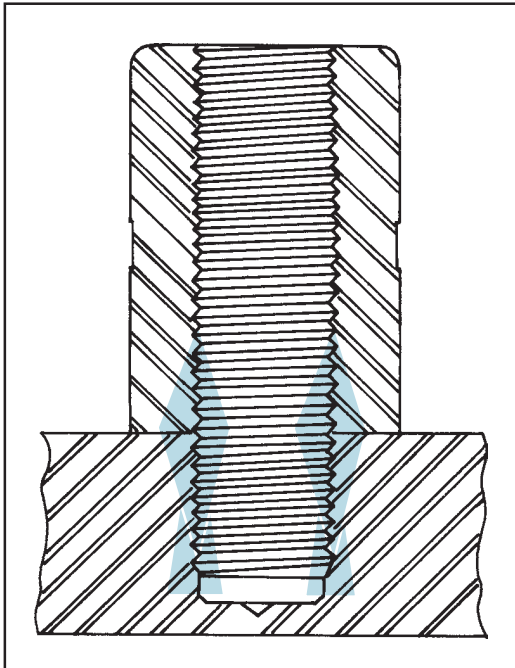
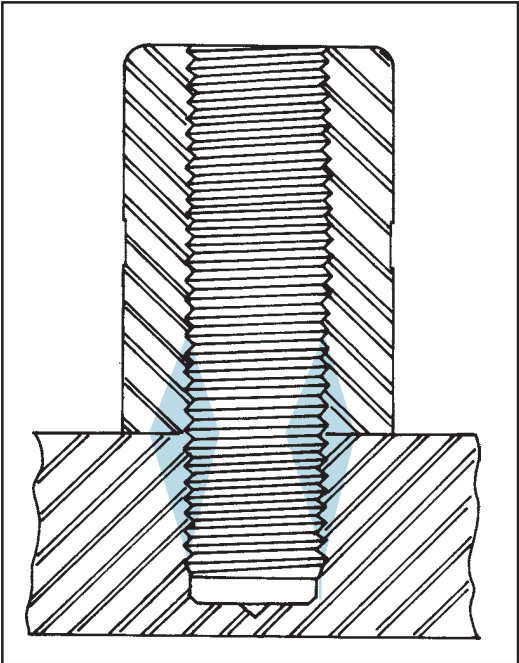
QUALITY • DEPENDABILITY • SERVICE • SINCE 1918

WHY LEMPCOSHANK[®] OUTPERFORMS ALL OTHERS



The pre-stressed rigidity which enables Lempcoshank assemblies to outperform even welded shanks starts with bottoming of the stud in its punch holder socket. Lowermost threads of both members are stressed by bottoming, as shown at left, without any material effect on the flat, ground working surface of punch holder.

Assembling the shank nut to stud causes the nut to bottom against the machined top surface of punch holder, creating a stress pattern (illustrated at right) in the nut and adjacent portions of shank stud, and in the punch holder itself.

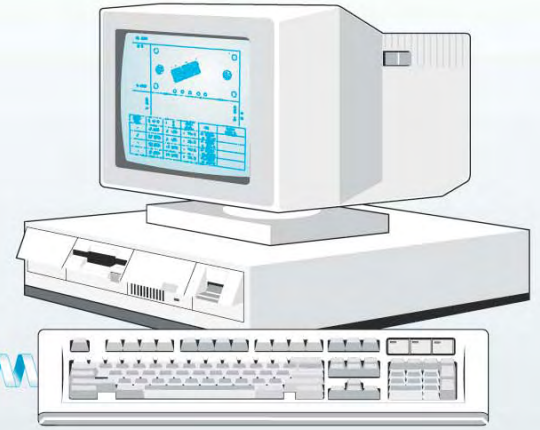


These assembly steps create stresses which are not only additive but also cumulative (illustrated at left). All members are pre-stressed, the critical portions being fully pre-conditioned. The locking keys (not shown) function in the rigidly stressed areas, providing additional stability for entire assembly.

LEMPCO

**INVENTOR OF
BALL BEARING
DIE SETS**

PRESENTS.....



Sending your C.A.D. die set drawing to Lempco is only an E-Mail away.

Now you can send Lempco your C.A.D. die set drawing the same day you place an order or request a special quotation:

- Via E-Mail: sales@hodie.com
- Internet users may send to Lempco, in the following formats:
 - dwg
 - dxf
 - igs
- For requests for quotes on die sets with no machining; and for general information, use our 24 hour fax line:
817-985-0046
- User access — 24 hours a day
- Visit Our Website at:
www.hodie.com



C.A.D. E-Mail Information:

Once your E-Mail is received, it will be sent directly to our CAD/CAM system for processing.

If you are not equipped with a modem, then simply mail us your 3-1/2 or 5-1/4 disks for prompt processing of your drawings.

If you have any questions, please contact us at:

1-800-222-5441

Please add identification information to your E-Mail request, so we can reply promptly.

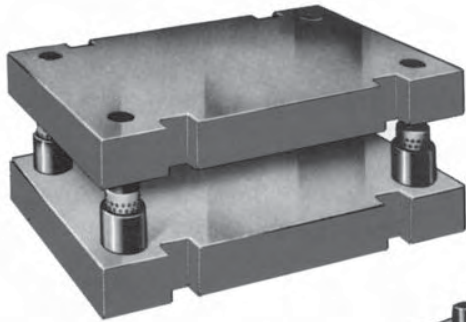
- Your Name
- Company Name
- Telephone Number
- E-Mail Address

The information above is necessary, in order to process your request.

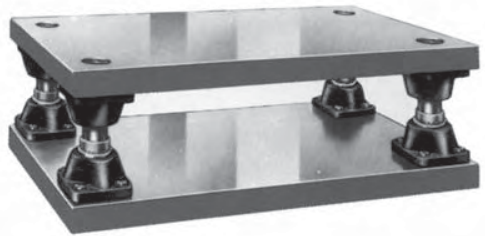




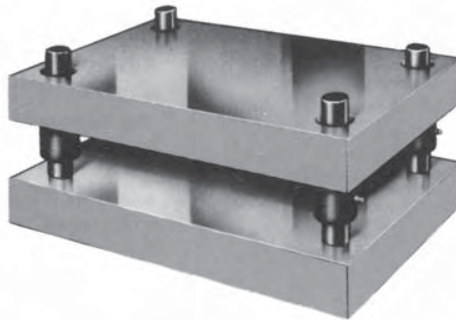
SPECIAL DIE SETS



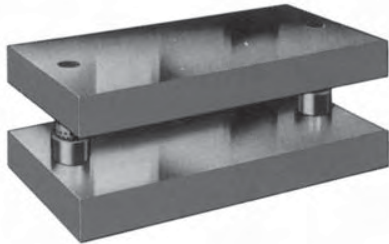
BALL BEARING AS-38 STYLE



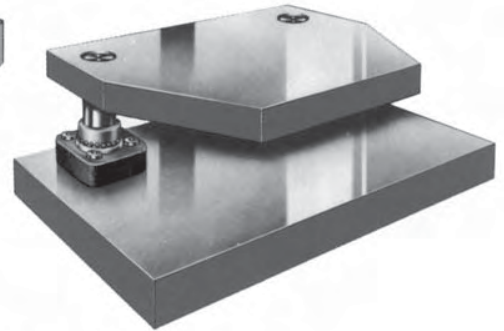
BALL BEARING AS-40 STYLE



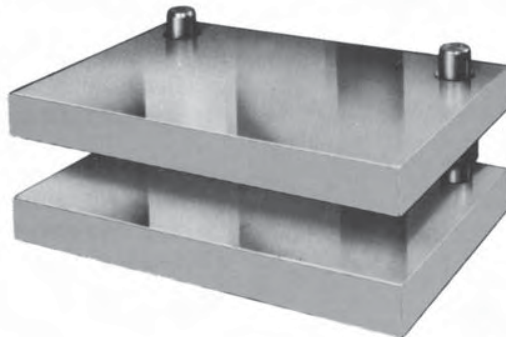
PLAIN BEARING AS-37 STYLE



BALL BEARING AS-34 STYLE



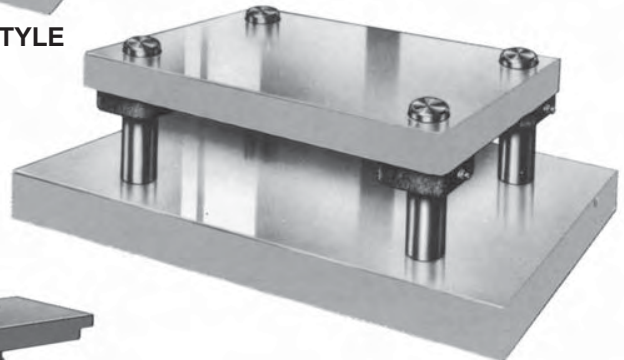
BALL BEARING AS-63 STYLE



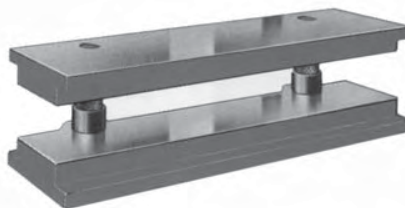
PLAIN BEARING AS-33 STYLE



PLAIN BEARING AS-31 STYLE



PLAIN BEARING AS-67 STYLE

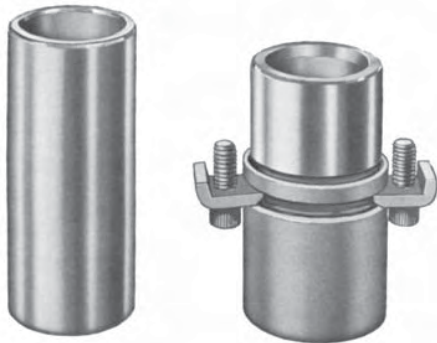


BALL BEARING AS-41 STYLE





THE ONLY COMPLETE BALL BEARING



For many years Lempco's Ball Bearing Die Set has paced the precision needs of production engineers demanding finer parts tolerances, longer die life, minimum down time for maintenance. Lempco's precision quality ball bearing die set consistently has met these needs by matching improvements in design, materials and manufacture with demand.

Lempco offers a Precision Ball Bearing Die Set for even more accuracy in operation, even smoother performance, more resistance to wear, longest die life, even more customer convenience. This results only from years of experience in designing and building die sets solely to the highest precision level available to industry.

PRECISION OFFERS MORE LOAD CAPACITY

The tiny ball bearing in a Rotainer® illustrates the rigid quality control program under which Lempco die sets are manufactured. It has been tested for sphericity, hardness, elasticity, and dimensional tolerance. It is in a given set because not only it but also every other bearing in the same rotainer has passed all tests. Several sources of supply are needed since no manufacturer can meet Lempco's huge quantity, ultra quality demands.

The Precision Rotainer® sleeve is an even tougher alloy for additional wear resistance. A Lempco die set of the Precision design provides longer operating life and smoother performance through increased load capacity and resistance to adverse forces. For greater convenience in disassembly a set screw keys the rotainer to the guide post slot. The Precision Rotainer® sleeve is a silver color with blue stripes for quick visual identification.

BALL BEARING LINE INCLUDES COMPLETE ASSORTMENT OF GUIDE POSTS, BUSHINGS

Three kinds of guide posts for Ball Bearing die sets are offered: the *straight* type for most die set assemblies such as standard stock sets; the *removable* for quick release of the post to expedite disassembly; the *shoulder* post for special die set construction where it is considered desirable to through bore both die holder and punch holder to a single diameter.

Bushings for Ball Bearing Assemblies are offered in four types: the *press fit steel sleeve* with which stock sets are equipped as standard; *steel demountable shoulder* bushing; *steel demountable boss* bushing; *steel demountable shoulder guide post* bushing.

AND PLAIN BEARING DIE SET LINE



All Lempco Ball Bearing Guide Posts, Bushings and Retainers® are completely interchangeable without any necessity whatsoever for select fitting of any kind and, if mounted in accordance with boring and assembly instructions on page numbers 89 and 90, do not require any grinding, honing, lapping, or any other modification of any kind.

PLAIN BEARING USERS HAVE FULL CHOICE OF STOCK AND CUSTOM SETS, ACCESSORIES

In addition to the Ball Bearing line, Lempco offers the most complete line of Plain Bearing design die sets available. In this catalog you will find a complete dimensional description of all Ball Bearing and Plain Bearing stock die sets.

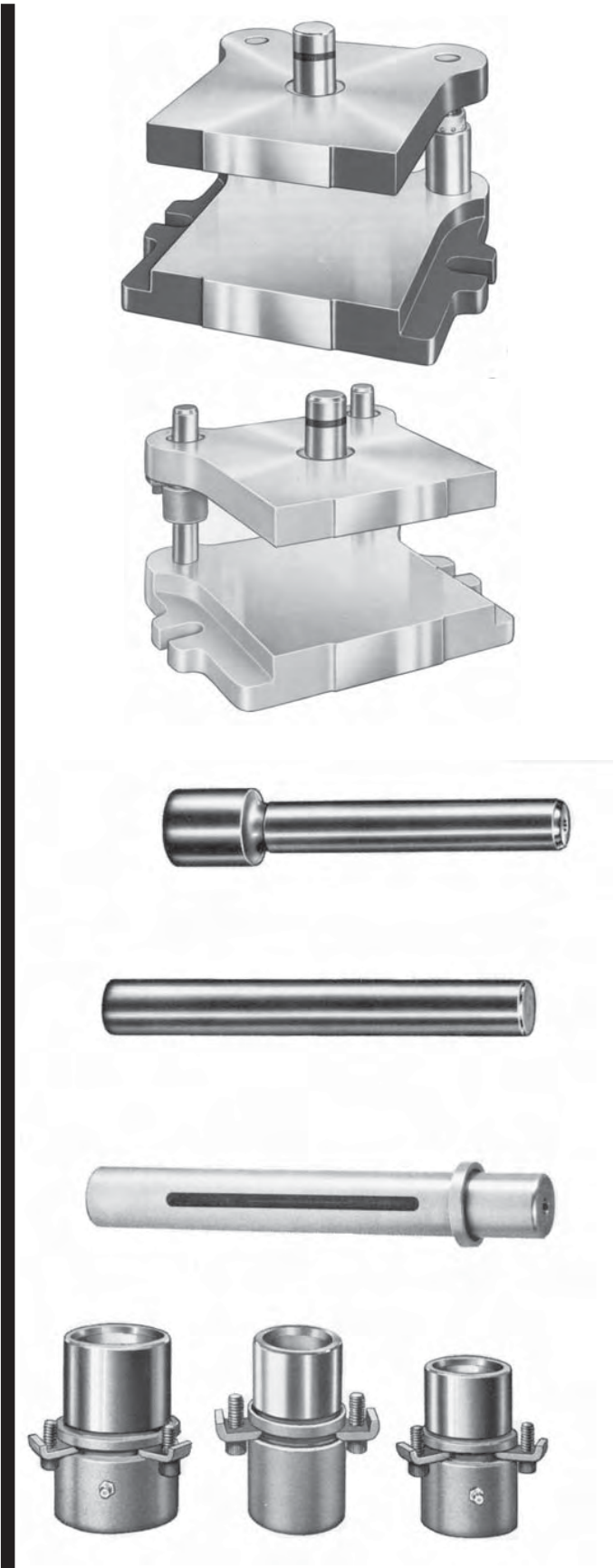
Lempco offers three types of Plain Bearing Guide Posts. Straight type, flanged demountable, to expedite disassembly of the completed die for repairs; and the shoulder guide post.

The most complete line of Plain Bearing bushings ever offered by a single manufacturer are available to Lempco customers. Your choice can be made from five types of Precision *demountable*, bronze, bronze plate and steel; five types of Precision *press fit*, bronze, bronze plate and steel; five types of *shoulder guide post* bushings, bronze, bronze plate and steel; three designs of *demountable bosses and boss bushings*.

SAVE TIME, ASSURE YOURSELF OF TOP QUALITY FROM THE ONLY COMPLETE LINE—LEMPCO

The components described previously are available to you as constituent parts, or already assembled into complete stock, special or special purpose die sets. Lempco's Die Set Engineering Handbook and Catalog, offers easy-to-find information, whatever your immediate interest: stock or large set, component, bolster, spring, or special purpose die set or forming machine types.

Lempco's Die Set Engineering Handbook and Catalog has been designed for maximum convenience and utility to you, the customer. Its use not only will save you time while assuring you of only the highest quality product, but also it will assist you to evaluate your needs in terms of the only complete offering of die sets and components, both Ball Bearing and Plain Bearing designs, available from a single source.



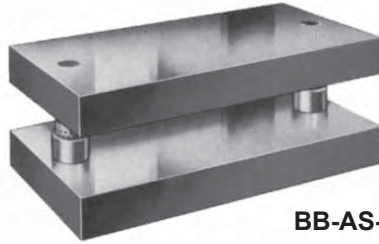


BALL BEARING ALL-STEEL DIE SETS

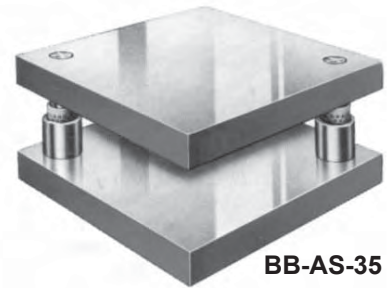
Large Two Post Styles



BB-AS-33



BB-AS-34

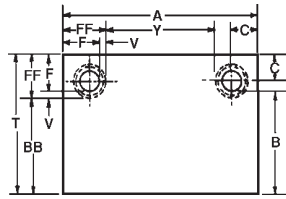


BB-AS-35

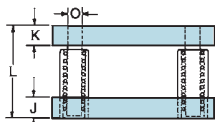
These Large Two Post All-Steel Die Sets are offered in Ball Bearing and Plain Bearing designs, in Back Post, Center Post and Diagonal Post styles, and in Precision grade.

Suggested minimum dimensions are shown in the charts. Sizes are not limited to these suggestions, since customer specifies "A" and "B" dimensions as well as "J" and "K" thicknesses. Sets with "A" dimensions more than 100" and "B" dimensions more than 60" can be provided, as well as reverse sets with "B" greater than "A". Special machining, torch cutting and welded components are available to the details of your print. These die sets may not be returned for credit.

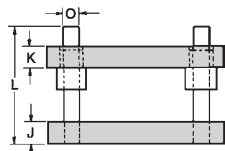
If "A" dimension is 33" or less and "B" dimension does not exceed 18" it is advisable to check the Rectangular Two Post stock die set section on pages 9 to 19 in this handbook. These sets are available for **immediate delivery**.



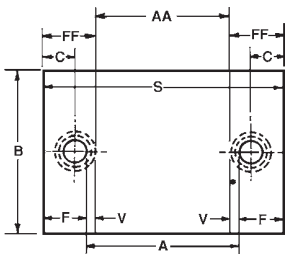
AS-33 STYLE



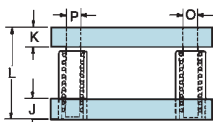
BALL BEARING



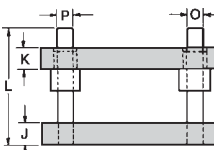
PLAIN BEARING



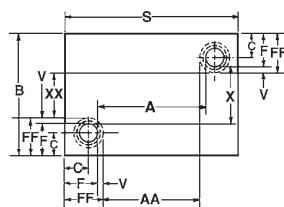
AS-34 STYLE



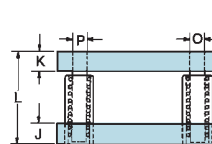
BALL BEARING



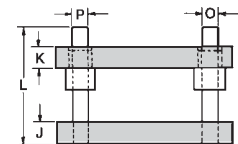
PLAIN BEARING



AS-35 STYLE



BALL BEARING



PLAIN BEARING

HOW TO ORDER . . .

BALL BEARING SETS

1. Specify **Ball Bearing**.
2. Specify Series AS-33, Series AS-34, or Series AS-35. **Prefix** to the series designation the symbol **BB**.
Example: BB-AS-33.

Follow steps 3 through 10 below

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with your choice of Plain Bearing Precision Bushings. See Pages 82 and 92-95, for details of these optional bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height

PLAIN BEARING SETS

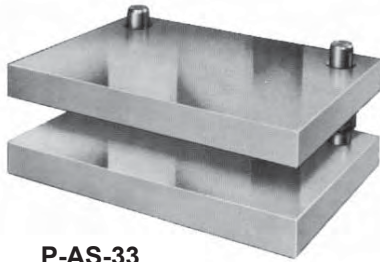
1. Specify **Plain Bearing**.
2. Specify Series AS-33, Series AS-34, or Series AS-35. **Prefix** to the series designation the symbol **P**.
Example: P-AS-33.

Follow steps 3 through 10 below

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with your choice of Plain Bearing Precision Bushings. See Pages 82 and 92-95, for details of these optional bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height
8. Specify diameter of Guide Post if other than listed. Larger or smaller diameter guide posts than listed will cause dimensional variations. See "Dimensional Variations" data.
9. Specify "no shank", or Lempcoshank". Specify shank diameter and length. If "Lempcoshank" give catalog number of kit desired. Specify exact location of shank relative to guide post locations. All shanks furnished at extra cost.
10. Tell us how to ship; otherwise we will ship "best way" in our judgment.

PLAIN BEARING ALL-STEEL DIE SETS

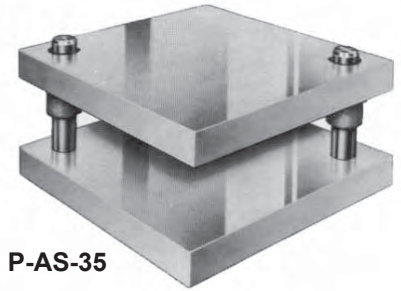
Large Two Post Styles



P-AS-33



P-AS-34



P-AS-35

SUGGESTED MINIMUM DIMENSIONS

WHEN	A = 6 to 11"				A = 12 to 17"				A = 18 to 23"				A = 24 to 29"			
B=	J	K	O	P	J	K	O	P	J	K	O	P	J	K	O	P
6 to 8"	1 1/2	1 1/2	1 1/4	1	1 1/2	1 1/2	1 1/4	1	1 1/2	1 1/2	1 1/2	1 1/4	1 1/2	1 1/2	1 1/2	1 1/4
9 to 11"	1 1/2	1 1/2	1 1/2	1 1/4	1 1/2	1 1/2	1 1/2	1 1/4	1 3/4	1 3/4	1 3/4	1 1/2	1 3/4	1 3/4	1 3/4	1 1/2
12 to 17"			1 1/2	1 1/4	1 3/4	1 3/4	1 3/4	1 1/2	2	2	2	1 3/4	2	2	2	1 3/4
18 to 23"			1 3/4	1 1/2			1 3/4	1 1/2	2	2	2	1 3/4	2 1/2	2 1/2	2 1/2	2
24 to 29"			2	1 3/4			2	1 3/4			2 1/2	2	2 1/2	2 1/2	2 1/2	2
30 to 44"			2 1/2	2			2 1/2	2			2 1/2	2			3	2 1/2
45 to 60"			3	2 1/2			3	2 1/2			3	2 1/2			3	2 1/2

WHEN	A = 30 to 44"				A = 45 to 69"				A = 70 to 100"			
B=	J	K	O	P	J	K	O	P	J	K	O	P
6 to 8"	1 3/4	1 3/4	1 3/4	1 1/2	2	2	2	1 3/4	2	2	2	1 3/4
9 to 11"	2	2	2	1 3/4	2	2	2	1 3/4	2	2	2	1 3/4
12 to 17"	2 1/2	2 1/2	2 1/2	2	2 1/2	2 1/2	2 1/2	2	2 1/2	2 1/2	2 1/2	2
18 to 23"	2 1/2	2 1/2	2 1/2	2	2 1/2	2 1/2	2 1/2	2	2 1/2	2 1/2	2 1/2	2
24 to 29"	2 1/2	2 1/2	2 1/2	2	3	3	3	2 1/2	3	3	3	2 1/2
30 to 44"	3	3	2 1/2	2	3	3	3	2 1/2	3	3	3	2 1/2
45 to 60"			3	2 1/2	3	3	3	2 1/2	3 1/2	3 1/2	3	2 1/2

DIMENSIONAL VARIATIONS

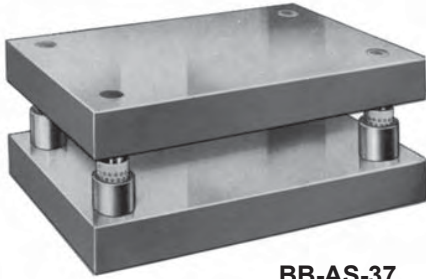
Nom. Guide Post Dia.	BALL BEARING								PLAIN BEARING							
	Sleeve Bushing				Shoulder Bushing				Sleeve Bushing				Shoulder Bushing			
	C	F	V	FF	C	F	V	FF	C	F	V	FF	C	F	V	FF
1	1 1/2	2	3/8	2 3/8	1 1/2	2	1/2	2 1/2	1 1/2	2	1/4	2 1/4	1 1/2	2	3/8	2 3/8
1 1/4	1 3/4	2 3/8	1/2	2 7/8	1 3/4	2 3/8	5/8	3	1 3/4	2 3/8	1/4	2 5/8	1 3/4	2 3/8	3/8	2 3/4
1 1/2	2	2 3/4	1/2	3 1/4	2	2 3/4	5/8	3 3/8	2	2 3/4	1/4	3	2	2 3/4	3/8	3 1/8
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2	2 3/8	3 3/8	5/8	4	2 3/8	3 3/8	7/8	4 1/4	2 3/8	3 3/8	1/4	3 5/8	2 3/8	3 3/8	3/8	3 3/4
2 1/2	2 5/8	3 7/8	5/8	4 1/2	2 5/8	3 7/8	7/8	4 3/4	2 5/8	3 7/8	3/8	4 1/4	2 5/8	3 7/8	5/8	4 1/2
3	3	4 1/2	5/8	5 1/8	3	4 1/2	7/8	5 3/8	3	4 1/2	3/8	4 7/8	3	4 1/2	5/8	5 1/8

FORMULAS				PLATE THICKNESSES STOCKED FOR IMMEDIATE FABRICATION				
AA = A - 2V	S = A + 2F	T = B + F	X = B - 2F	1	1 1/8	1 1/4	1 3/8	1 1/2
BB = B - V				1 5/8	1 3/4	1 7/8	2	2 1/4
Y = A - 2FF				2 1/2	2 3/4	3	3 1/4	3 1/2
XX = B - 2FF				4	4 1/2	5	5 1/2	6
				6 1/2	7			

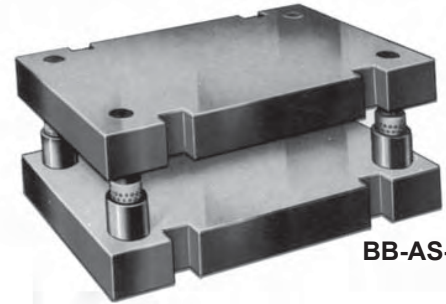


BALL BEARING ALL-STEEL DIE SETS

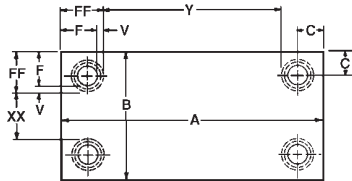
Large Four Post Styles



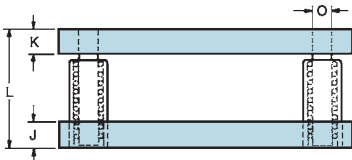
BB-AS-37



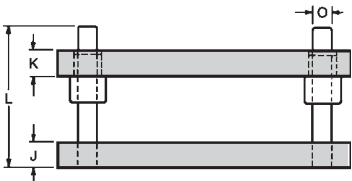
BB-AS-35



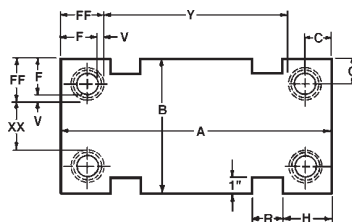
AS-37 STYLE



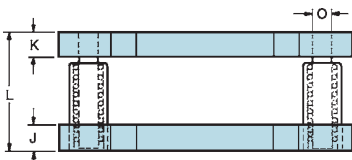
BALL BEARING



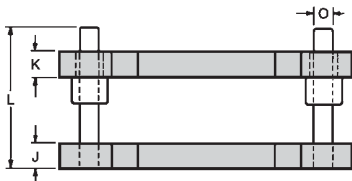
PLAIN BEARING



AS-38 STYLE



BALL BEARING



PLAIN BEARING

Lempco's Large Four Post All-Steel Die Sets are available in Ball Bearing and Plain Bearing types, in two designs of the die and punch holders, and in Precision grade.

Charted dimensions on the facing page are for your convenience in designing a die set to your special requirements, but sizes are not limited to these listed dimensions. Customer specifies "A" and "B" dimensions and "J" and "K" shoe thicknesses. Sets will be provided with "A" dimension in excess of 100" and "B" dimension in excess of 60", as well as reverse sets in which "B" is greater than "A". Special machining, torch cutting and welded components are available to your print. These die sets may not be returned for credit.

If "A" dimension is 40" or less and "B" dimension does not exceed 30" it is advisable to check the Rectangular Four Post stock die set section on pages 21 to 35 in this handbook. These sets are available for **immediate delivery**.

HOW TO ORDER . . .

BALL BEARING SETS

1. Specify **Ball Bearing**.
2. Specify Series AS-37, or Series AS-38. **Prefix** to the series designation the symbol **BB**. Example: BB-AS-37.

Follow steps 3 through 10, below.

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with your choice of Plain Bearing Precision Bushings. See Pages 82 and 92-95, for details of these optional bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height

PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series AS-37, or Series AS-38. **Prefix** to the series designation the symbol **P**. Example: P-AS-38.

Follow steps 3 through 10, below.

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with your choice of Plain Bearing Precision Bushings. See Pages 82 and 92-95, for details of these optional bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height
8. Specify diameter of Guide Post if other than listed. Larger or smaller diameter guide posts than listed will cause dimensional variations. See "Dimensional Variations" data.
9. Specify "no shank", or Lempcoshank". Specify shank diameter and length. If "Lempcoshank" give catalog number of kit desired. Specify exact location of shank relative to guide post locations. All shanks furnished at extra cost.
10. Tell us how to ship; otherwise we will ship "best way" in our judgment.

When ordering a Lempco 4-Post Special Die Set, indicate on the Purchase Order and on the C.A.D. file the pin offset you require or use the Lempco standard pin offset.

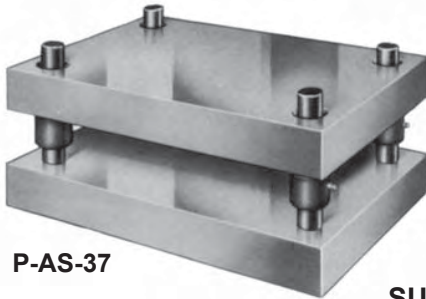
LEMPCO STANDARD PIN OFFSET:

- a.) Left rear pin is offset to the RIGHT.
- b.) Die sets up to 48" left to right are offset .125" from pin location.
- c.) Die sets over 48" left to right are offset .250" from pin location.

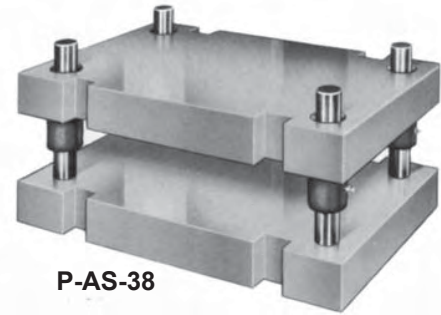
These die sets may not be returned for credit.

PLAIN BEARING ALL-STEEL DIE SETS

Large Four Post Styles



P-AS-37



P-AS-38

SUGGESTED MINIMUM DIMENSIONS

WHEN	A = 6 to 11"					A = 12 to 17"					A = 18 to 23"					A = 24 to 29"				
B=	J	K	O	H	R	J	K	O	H	R	J	K	O	H	R	J	K	O	H	R
6 to 8"	1 1/4	1	1	—	—	1 1/2	1	1 1/4	—	—	1 1/2	1 1/4	1 1/2	—	—	1 1/2	1 1/4	1 3/4	—	—
9 to 11"	1 1/2	1	1	—	—	1 1/2	1 1/4	1 1/4	—	—	1 1/2	1 1/4	1 1/2	—	—	1 3/4	1 1/2	1 3/4	—	—
12 to 17"			1 1/4			1 1/2	1 1/4	1 1/4	—	—	1 3/4	1 1/2	1 1/2	—	—	1 3/4	1 1/2	1 3/4	—	—
18 to 23"			1 1/2					1 1/2			1 3/4	1 1/2	1 1/2	—	—	2	1 3/4	1 3/4	—	—
24 to 29"			1 3/4					1 3/4					1 3/4			2	1 3/4	1 3/4	—	—
30 to 44"			2					2					2					2		
45 to 60"			2					2					2					2		

WHEN	A = 30 to 44"					A = 45 to 69"					A = 70 to 100"				
B=	J	K	O	H	R	J	K	O	H	R	J	K	O	H	R
6 to 8"	1 3/4	1 1/2	2	5	3	2	1 1/2	2	5	4					
9 to 11"	1 3/4	1 1/2	2	5	3	2	1 1/2	2	5	4	2 1/2	1 3/4	2 1/2	6	4
12 to 17"	2	1 3/4	2	5	3	2 1/2	1 3/4	2	5	4	2 1/2	2	2 1/2	6	4
18 to 23"	2	1 3/4	2	5	3	2 1/2	1 3/4	2	5	4	3	2	2 1/2	6	4
24 to 29"	2 1/2	2	2	5	3	2 1/2	2	2	5	4	3	2	2 1/2	6	4
30 to 44"	2 1/2	2	2	5	3	3	2	2	5	4	3 1/2	2 1/2	2 1/2	6	4
45 to 60"			2			3	2	2	5	4	3 1/2	2 1/2	2 1/2	6	4

DIMENSIONAL VARIATIONS

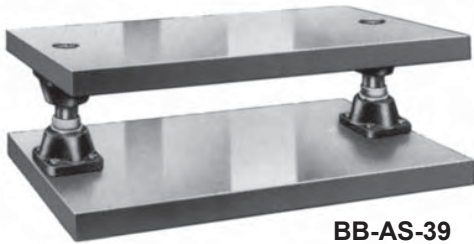
Nom. Guide Post Dia.	BALL BEARING								PLAIN BEARING							
	Sleeve Bushing				Shoulder Bushing				Sleeve Bushing				Shoulder Bushing			
	C	F	V	FF	C	F	V	FF	C	F	V	FF	C	F	V	FF
1	1 1/2	2	3/8	2 3/8	1 1/2	2	1/2	2 1/2	1 1/2	2	1/4	2 1/4	1 1/2	2	3/8	2 3/8
1 1/4	1 3/4	2 3/8	1/2	2 7/8	1 3/4	2 3/8	5/8	3	1 3/4	2 3/8	1/4	2 5/8	1 3/4	2 3/8	3/8	2 3/4
1 1/2	2	2 3/4	1/2	3 1/4	2	2 3/4	5/8	3 3/8	2	2 3/4	1/4	3	2	2 3/4	3/8	3 1/8
1 3/4	2 1/8	3	1/2	3 1/2	2 1/8	3	5/8	3 5/8	2 1/8	3	1/4	3 1/4	2 1/8	3	3/8	3 3/8
2	2 3/8	3 3/8	5/8	4	2 3/8	3 3/8	7/8	4 1/4	2 3/8	3 3/8	1/4	3 5/8	2 3/8	3 3/8	3/8	3 7/8
2 1/2	2 5/8	3 7/8	5/8	4 1/2	2 5/8	3 7/8	7/8	4 3/4	2 5/8	3 7/8	3/8	4 1/4	2 5/8	3 7/8	5/8	4 1/2
3	3	4 1/2	5/8	5 1/8	3	4 1/2	7/8	5 3/8	3	4 1/2	3/8	4 7/8	3	4 1/2	5/8	5 1/8

FORMULAS	PLATE THICKNESSES STOCKED FOR IMMEDIATE FABRICATION				
XX = B - 2FF	1	1 1/8	1 1/4	1 3/8	1 1/2
	1 5/8	1 3/4	1 7/8	2	2 1/4
	2 1/2	2 3/4	3	3 1/4	3 1/2
Y = A - 2FF	4	4 1/2	5	5 1/2	6
	6 1/2	7			

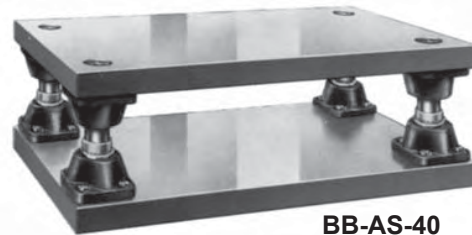


BALL BEARING ALL-STEEL DIE SETS

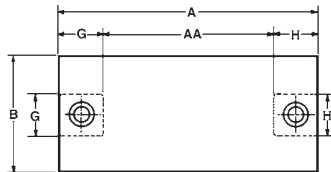
Demountable Boss Styles



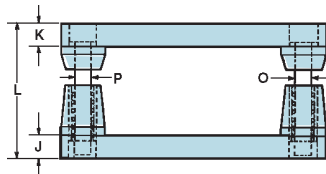
BB-AS-39



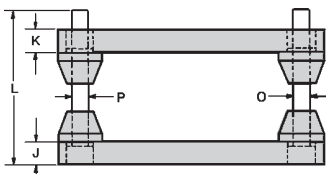
BB-AS-40



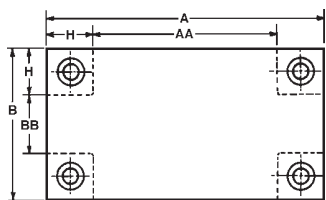
AS-39 STYLE



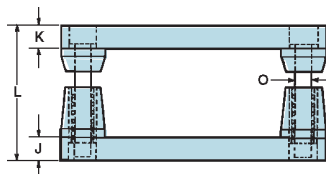
BALL BEARING



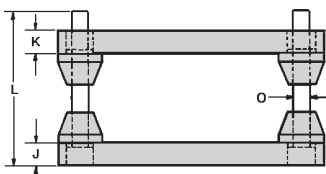
PLAIN BEARING



AS-40 STYLE



BALL BEARING



PLAIN BEARING

Additional flexibility in the design of large special die sets; is offered by Lempco's All-Steel Demountable Boss construction, and is available in both Ball Bearing and Plain Bearing types. These sets are manufactured in Two-Post and Four-Post styles, in Precision grade.

Two combinations of bosses are available in both Ball Bearing and Plain Bearing. Combination No. 1 is preferred for heavy duty work where maximum support is required. Combination No. 2 is recommended when the shut height of the press is limited.

Suggested minimum dimensions are provided in the charts, but sets with "A" dimension exceeding 100" and "B" dimension more than 60" are also available. Reverse sets with "B" greater than "A" may be ordered. The "J" and "K" thicknesses are subject to customer specifications. Special machining, torch-cutting, and welded components are done to details of customer's print or templet. These die sets may not be returned for credit.

GENERAL DIMENSIONS

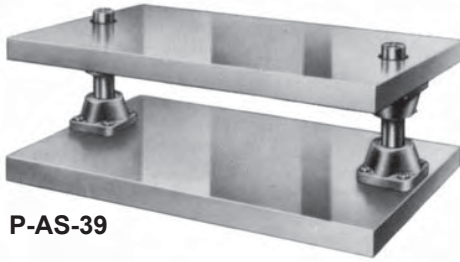
WHEN	A = 30 to 44"		BALL BEARING		PLAIN BEARING	
			AS-39	AS-40	AS-39	AS-40
B =	J	K				
6 to 8"	1 ³ / ₄	2	O = 2		O = 2	
9 to 11"	2	2	H = 5 ¹ / ₂	O = 2	H = 5	O = 2
12 to 17"	2 ¹ / ₂	2 ¹ / ₂	P = 2 ¹ / ₂	H = 5 ¹ / ₂	P = 2 ¹ / ₂	H = 5
18 to 23"	2 ¹ / ₂	2 ¹ / ₂	G = 6	AA = A - 2H	G = 6	AA = A - 2H
24 to 29"	3	3	AA = A - (H+G)	BB = B - 2H	AA = A - (H+G)	BB = B - 2H
30 to 44"	3	3				
45 to 60"	3	3				

WHEN	A = 45 to 69"					
B =	J	K				
6 to 8"	2	2	O = 2		O = 2	
9 to 11"	2	2	H = 5 ¹ / ₂	O = 2	H = 5	O = 2
12 to 17"	2 ¹ / ₂	2 ¹ / ₂	P = 2 ¹ / ₂	H = 5 ¹ / ₂	P = 2 ¹ / ₂	H = 5
18 to 23"	2 ¹ / ₂	2 ¹ / ₂	G = 6	AA = A - 2H	G = 6	AA = A - 2H
24 to 29"	3	3	AA = A - (H+G)	BB = B - 2H	AA = A - (H+G)	BB = B - 2H
30 to 44"	3	3				
45 to 60"	3	3				

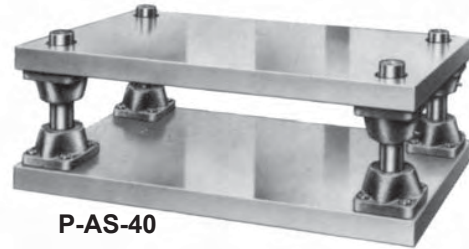
WHEN	A = 70 to 100"					
B =	J	K				
6 to 8"	2	2	O = 2 ¹ / ₂		O = 2 ¹ / ₂	
9 to 11"	2	2	H = 6	O = 2 ¹ / ₂	H = 6	O = 2 ¹ / ₂
12 to 17"	2 ¹ / ₂	2 ¹ / ₂	P = 3	H = 6	P = 3	H = 6
18 to 23"	2 ¹ / ₂	2 ¹ / ₂	G = 7	AA = A - 2H	G = 7	AA = A - 2H
24 to 29"	3	3	AA = A - (H+G)	BB = B - 2H	AA = A - (H+G)	BB = B - 2H
30 to 44"	3	3				
45 to 60"	3 ¹ / ₂	3 ¹ / ₂				

PLAIN BEARING ALL-STEEL DIE SETS

Demountable Boss Styles



P-AS-39



P-AS-40

HOW TO ORDER . . .

BALL BEARING SETS

1. Specify **Ball Bearing**.
2. Specify Series AS-39 or AS-40. **Prefix** the symbol **BB** to the series designation. Example: BB-AS-39. Follow steps 3 through 10, below.

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify diameter of Guide Post "O" if other than listed.
7. Specify Boss Combination No.1 or Combination No. 2.
8. Specify lengths "C" (post support and/or boss bushing) and length "M" for Ball Bearing sets; specify lengths "C"

PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series AS-39 or AS-40. **Prefix** the symbol **P** to the series designation. Example: P-AS-39. Follow steps 3 through 10, below.

(post support and/or boss bushing) for Plain Bearing sets.

9. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of Guide Post "O".
10. Tell us how to ship; otherwise we will ship "best way" in our judgment.

BALL BEARING BOSS SETS					PLAIN BEARING BOSS SETS		
DIMENSIONS – TYPE A BUSHINGS, SUPPORTS					DIMENSIONS – TYPES 1, 3 DEMOUNTABLE BOSSES		
Guide Post Diameter	C	M	CATALOG NUMBERS		Guide Post Diameter	C Length	CATALOG NUMBERS
			Bushings	Supports			
2	2 ⁵ / ₈	*	960-1601	960-1610	2	1 ¹ / ₂	660-1611
	3 ⁵ / ₈		960-1602	960-1611		2 ¹ / ₂	660-1619
	4 ⁵ / ₈		960-1603	960-1612		3 ¹ / ₂	660-1612
2 ¹ / ₂	3 ³ / ₈	*	960-2001	960-2010		5 ¹ / ₂	660-1613
	4 ⁵ / ₈		960-2002	960-2011		1 ¹ / ₂	660-2011
	5 ⁷ / ₈		960-2003	960-2012	2 ¹ / ₂	660-2019	
3	4 ¹ / ₈	*	960-2401	960-2410	3 ¹ / ₂	660-2012	
	5 ⁵ / ₈		960-2402	960-2411	5 ¹ / ₂	660-2013	
	8 ⁵ / ₈		960-2403	960-2412	3 ¹ / ₂	660-2412	
					3	5 ¹ / ₂	660-2413

*Customer must specify length "M" of bushings only.



ROUND ALL-STEEL DIE SETS

Plain Bearing, Ball Bearing Types



BB-AS-31

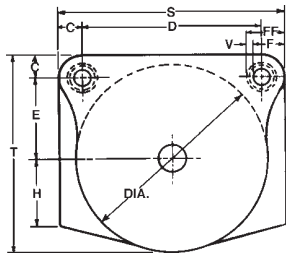


P-AS-31

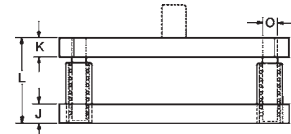
Lempco manufactures to your order, Round All-Steel Die Sets, in both Ball Bearing and Plain Bearing designs, Center Post and Back Post styles, and Precision grade.

Suggested minimum dimensions are tabulated on this page, but sizes are not limited to any of these dimensions since customer specifies diameter as well as "J", "K" and "L" dimensions. Special machining can be done to specifications. These die sets may not be returned for credit.

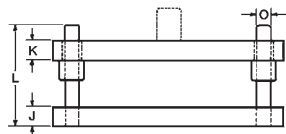
Please see chart on opposite page for Dimensional Variations



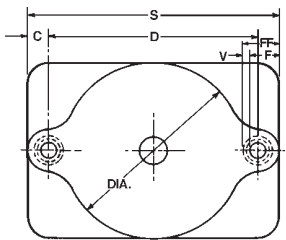
AS-31 STYLE



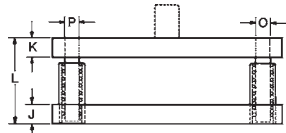
BALL BEARING



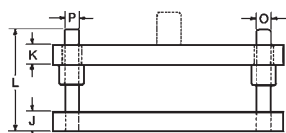
PLAIN BEARING



AS-32 STYLE



BALL BEARING



PLAIN BEARING

GENERAL DIMENSIONS

Size Dia.	SERIES AS-31, BACK POST						
	D	E	C	H	O	S	T
4	3 ¹ / ₄	2 ¹ / ₄	1 ¹ / ₈	1 ¹ / ₄	3 ³ / ₄	5 ¹ / ₂	5 ³ / ₈
6	5 ¹ / ₈	3 ¹ / ₄	1 ¹ / ₂	1 ¹ / ₂	1	8 ¹ / ₈	7 ³ / ₄
8	6 ¹ / ₂	4	1 ¹ / ₂	1 ¹ / ₂	1	9 ¹ / ₂	9 ¹ / ₂
10	7 ³ / ₄	4 ³ / ₄	1 ¹ / ₂	1 ³ / ₄	1	10 ³ / ₄	11 ¹ / ₄
12	9 ¹ / ₈	5 ¹ / ₂	1 ³ / ₄	3	1 ¹ / ₄	12 ⁵ / ₈	13 ¹ / ₄
14	12	6	1 ³ / ₄	4	1 ¹ / ₄	15 ¹ / ₂	14 ³ / ₄
16	14	7	2	4	1 ¹ / ₂	18	17
18	17	8	2 ¹ / ₈	5	1 ³ / ₄	21 ¹ / ₄	19 ¹ / ₈
20	20	9	2 ¹ / ₈	5	1 ³ / ₄	24 ¹ / ₄	21 ¹ / ₈
24	24	11	2 ³ / ₈	5	2	28 ³ / ₄	25 ³ / ₈
28	28	13	2 ³ / ₈	6	2	32 ³ / ₄	29 ³ / ₈
32	30	15	2 ⁵ / ₈	6	2 ¹ / ₂	35 ¹ / ₄	33 ³ / ₈
36	34	17	2 ⁵ / ₈	8	2 ¹ / ₂	39 ¹ / ₄	37 ³ / ₈
40	38	19	2 ⁵ / ₈	8	2 ¹ / ₂	43 ¹ / ₄	41 ⁵ / ₈
44	42	21	3	10	3	48	46
48	46	23	3	10	3	52	50

Size Dia.	SERIES AS-32, CENTER POST				
	D	C	O	P	S
5 ¹ / ₂	1 ¹ / ₂	3 ³ / ₄	1	8 ¹ / ₂	
8	1 ¹ / ₂	3 ³ / ₄	1	11	
10	1 ³ / ₄	1	1 ¹ / ₄	13 ¹ / ₂	
12	1 ³ / ₄	1	1 ¹ / ₄	15 ¹ / ₂	
14	1 ³ / ₄	1	1 ¹ / ₄	17 ¹ / ₂	
16 ¹ / ₂	2	1 ¹ / ₄	1 ¹ / ₂	20 ¹ / ₂	
18 ¹ / ₂	2	1 ¹ / ₄	1 ¹ / ₂	22 ¹ / ₂	
20 ³ / ₄	2 ¹ / ₈	1 ¹ / ₂	1 ³ / ₄	25	
22 ³ / ₄	2 ¹ / ₈	1 ¹ / ₂	1 ³ / ₄	27	
27 ¹ / ₂	2 ³ / ₈	1 ³ / ₄	2	32	
31 ¹ / ₂	2 ³ / ₈	1 ³ / ₄	2	36	
36	2 ⁵ / ₈	2	2 ¹ / ₂	41 ¹ / ₄	
40	2 ⁵ / ₈	2	2 ¹ / ₂	45 ¹ / ₄	
44	2 ⁵ / ₈	2	2 ¹ / ₂	49 ¹ / ₄	
48 ¹ / ₂	3	2 ¹ / ₂	3	54 ¹ / ₂	
52 ¹ / ₂	3	2 ¹ / ₂	3	58 ¹ / ₂	

HOW TO ORDER . . .

BALL BEARING SETS

1. Specify **Ball Bearing**.
2. Specify Series AS-31 or Series AS-32. **Prefix** to the series designation the symbol **BB**. Example: BB-AS-31. Then follow steps 3 through 10, below.

PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series AS-31 or Series AS-32. **Prefix** to the series designation the symbol **P**. Example: P-AS-31. Then follow steps 3 through 10, below.

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with your choice of Plain Bearing Precision Bushings. See Pages 82 and 92-95, for details of these optional bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain

- Bearing sets this is dimension from bottom of die holder to top of Guide Post.
8. Specify diameter of Guide Post if other than listed. Larger or smaller diameter guide posts than listed will cause dimensional variations. See "Dimensional Variations" data.
9. Specify "no shank", or Lempcoshank". Specify shank diameter and length. If "Lempcoshank" give catalog number of kit desired. Specify exact location of shank relative to guide post locations. All shanks furnished at extra cost.
10. Tell us how to ship; otherwise we will ship "best way" in our judgment.

LONG NARROW ALL-STEEL DIE SETS

Ball Bearing and Plain Bearing Types



BB-AS-41



P-AS-41

Users of Long Narrow All-Steel Die Sets; in Two-Post or Three-Post design, have their choice of Lempcó's Ball Bearing or Plain Bearing types, in Precision grade. Sizes are not limited to suggested dimensions. Customer may specify any "A" or "B" dimension, "J" and "K" thicknesses. Flange types depend on shoe thicknesses. When "J" and "K" are less than 3" Flange Type "X" is supplied, Flange Type "Y" when these thicknesses are 3" or more.

HOW TO ORDER . . .

BALL BEARING SETS

1. Specify **Ball Bearing**.
2. Specify Series AS-41 or Series AS-42.
Prefix the symbol **BB** to series designation.
Example: BB-AS-41.

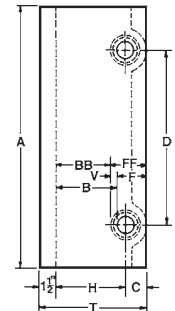
Follow steps 3 through 8, below.

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thicknesses of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with your choice of Plain Bearing Precision Bushings. See Pages 82 and 92-95, for details of these optional bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of Guide Post "O".
8. Tell us how to ship; otherwise we will ship "best way" in our judgment.

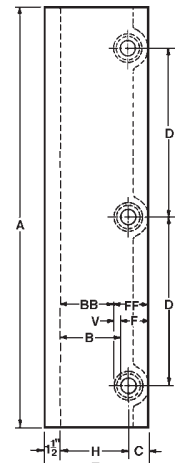
PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series AS-41 or Series AS-42.
Prefix the symbol **P** to the series designation. Example: P-AS-41.

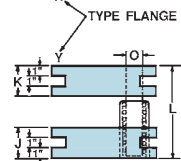
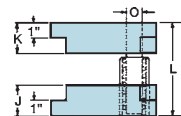
Follow steps 3 through 8.



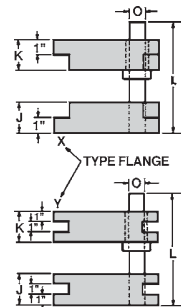
AS-41 STYLE



AS-42 STYLE



BALL BEARING



PLAIN BEARING

	Die Space		GENERAL DIMENSIONS			
	A	B	H	D	T	O
AS-41 2 POST SETS	12	4 1/2	5 1/8	8 1/2	8 3/8	1 1/4
	14			10 1/2		
	18		5 1/4	14	8 3/4	1 1/2
	24			18		
	30		5 3/8	24	9	1 3/4
	36					
	42					
	48		5 1/2	34	9 3/8	2
	60					
	72					

AS-42 3 POST SETS	84	4 1/2	5 1/2	33 1/2	9 3/8	2
	96			33 1/2		
	108			42 1/2		
	120			45		
	132			51		
	144			57		
	156			63		

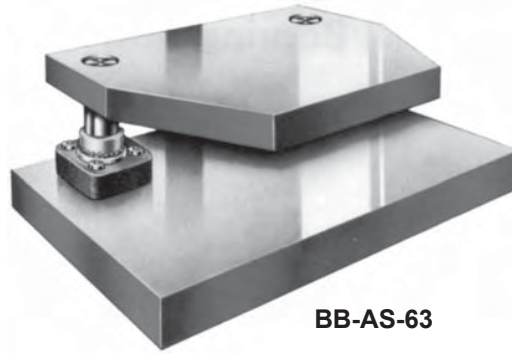
DIMENSIONAL VARIATIONS

Nom. Guide Post Dia.	BALL BEARING								PLAIN BEARING							
	Sleeve Bushing				Shoulder Bushing				Sleeve Bushing				Shoulder Bushing			
	C	F	V	FF	C	F	V	FF	C	F	V	FF	C	F	V	FF
3/4	1 1/8	1 1/2	3/8	1 7/8	—	—	—	—	1 1/8	1 1/2	3/16	1 11/16	1 1/8	1 1/2	5/16	1 13/16
1	1 1/2	2	3/8	2 3/8	1 1/2	2	1/2	2 1/2	1 1/2	2	1/4	2 1/4	1 1/2	2	3/8	2 3/8
1 1/4	1 3/4	2 3/8	1/2	2 7/8	1 3/4	2 3/8	5/8	3	1 3/4	2 3/8	1/4	2 5/8	1 3/4	2 3/8	3/8	2 3/4
1 1/2	2	2 3/4	1/2	3 1/4	2	2 3/4	5/8	3 3/8	2	2 3/4	1/4	3	2	2 3/4	3/8	3 1/8
1 3/4	2 1/8	3	1/2	3 1/2	2 1/8	3	5/8	3 5/8	2 1/8	3	1/4	3 1/4	2 1/8	3	3/8	3 3/8
2	2 3/8	3 3/8	5/8	4	2 3/8	3 3/8	7/8	4 1/4	2 3/8	3 3/8	1/4	3 5/8	2 3/8	3 3/8	3/8	3 3/4
2 1/2	2 5/8	3 7/8	5/8	4 1/2	2 5/8	3 7/8	7/8	4 3/4	2 5/8	3 7/8	3/8	4 1/4	2 5/8	3 7/8	5/8	4 1/2
3	3	4 1/2	5/8	5 1/8	3	4 1/2	7/8	5 3/8	3	4 1/2	3/8	4 7/8	3	4 1/2	5/8	5 1/8

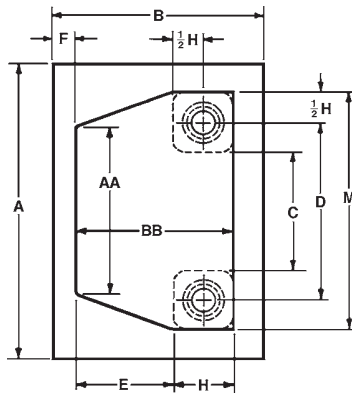


BALL BEARING ALL-STEEL DIE SETS

Heavy Duty Two Post Style



BB-AS-63



AS-63 STYLE

The die holder is used as a bolster plate in these Lempco Heavy Duty All-Steel Two-Post Die Sets, which are offered in both Ball Bearing and Plain Bearing designs, and Precision grade.

Demountable Bushings are boss type, bolted to the shoes with socket head cap screws.

Frequently specified sizes are charted, but sizes are not limited to these dimensions since customer specifies "A" and "B" and "AA" and "BB" dimensions as well as the "J" and "K" thicknesses. Reverse sets with "B" greater than "A" can be made to your specifications. Send print if special machining, torch-cutting, or welded components are required. These die sets may not be returned for credit.

HOW TO ORDER . . .

BALL BEARING SETS

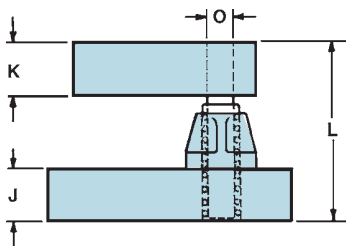
1. Specify **Ball Bearing**.
2. Specify Series **BB-AS-63**.
3. Specify Boss Bushing, Types A, B or C. Specify required dimensions.

Follow steps 4 through 8, below.

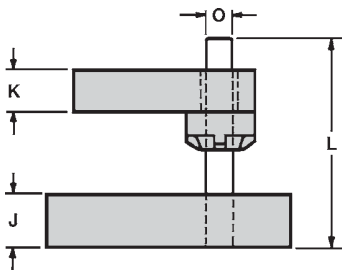
PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series **P-AS-63**.
3. Specify Boss Bushing, Types 1, 2, or 3. Specify required dimensions.

Follow steps 4 through 8, below.



BALL BEARING



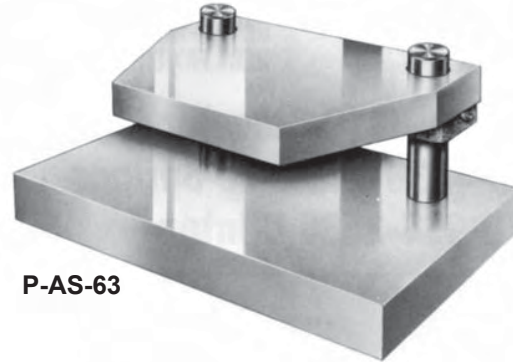
PLAIN BEARING

4. Specify Precision.
5. Specify dimensions "A" and "B" and "AA" and "BB".
6. Specify thicknesses of die holder "J" and punch holder "K".
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of Guide Post "O".
8. Tell us how to ship; otherwise we will ship "best way" in our judgment.

PLAIN BEARING ALL-STEEL DIE SETS

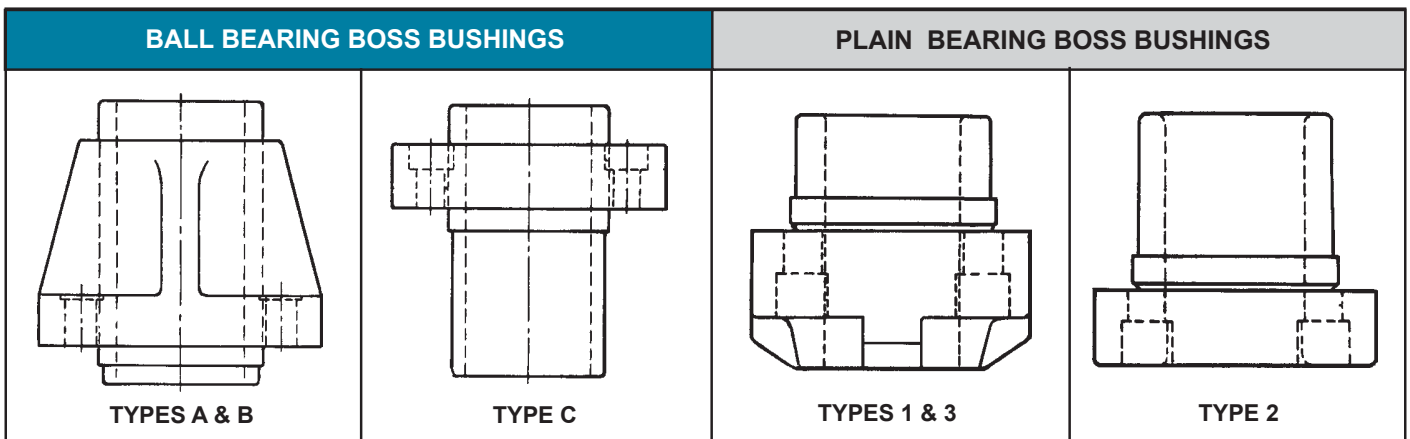


**Heavy Duty
Two Post
Style**



P-AS-63

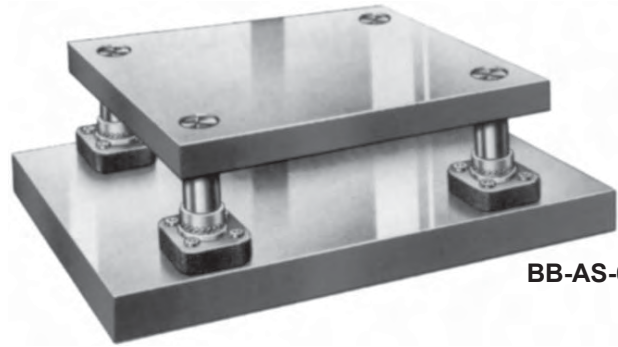
DIE SPACE				THICKNESS		BALL BEARING							PLAIN BEARING						
Die Holder		Punch Holder		Die Holder	Punch Holder	General Dimensions							General Dimensions						
A	B	AA	BB	J	K	C	D	E	F	H	O	M	C	D	E	F	H	O	M
20	10 ^{1/2}	11 ^{1/2}	8 ^{3/4}	2	2	4 ^{1/2}	10	3 ^{1/4}	1 ^{3/4}	5 ^{1/2}	2	15 ^{1/2}	7 ^{1/2}	11 ^{1/2}	4 ^{3/4}	1 ^{3/4}	4	2	15 ^{1/2}
				2	3														
				3	2														
				3	3														
26	12 ^{1/2}	15	10	2	2	8 ^{1/2}	14	4 ^{1/2}	2 ^{1/4}	5 ^{1/2}	2	19 ^{1/2}	11 ^{1/2}	15 ^{1/2}	6	2 ^{1/4}	4	2	19 ^{1/2}
				2	3														
				3	2														
				3	3														
26	22	18	20	3	3	12	18	14	1	6	2 ^{1/2}	24	14	19	15	1	5	2 ^{1/2}	24
				3	4														
				4	3														
				4	4														
29	16 ^{1/2}	18 ^{1/2}	14 ^{3/4}	2 ^{1/2}	2 ^{1/2}	12	18	8 ^{3/4}	1 ^{3/4}	6	2 ^{1/2}	24	14	19	9 ^{1/4}	1 ^{3/4}	5	2 ^{1/2}	24
				2 ^{1/2}	3 ^{1/2}														
				3 ^{1/2}	2 ^{1/2}														
				3 ^{1/2}	3 ^{1/2}														
32	20	18	15	3	3	12	18	9	3	6	2 ^{1/2}	24	14	19	10	3	5	2 ^{1/2}	24
				3	4														
				4	3														
				4	4														
36	26	18	22	3	3	12	18	18	3	6	2 ^{1/2}	24	14	19	17	3	5	2 ^{1/2}	24
				3	4														
				4	3														
				4	4														



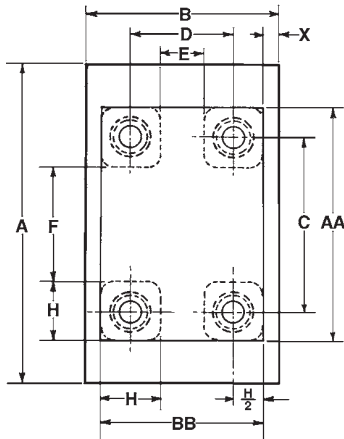


BALL BEARING ALL-STEEL DIE SETS

Heavy Duty Four Post Style



BB-AS-67



AS-67 STYLE

Lempco's Heavy Duty Four-Post All-Steel Die Sets, feature Demountable Boss Bushings and a die holder which also serves as the press bolster plate. They are available in Ball Bearing and Plain Bearing designs, and Precision grade.

Standardized dimensions are presented here in chart form to aid customer in designing to his needs. Any desired "A" and "B" or "AA" and "BB" as well as "J" and "K" thicknesses may be ordered. Reverse sets with "B" greater than "A" also are offered. Special machining, torch-cutting, and welded components are available to specifications of customer's print. These die sets may not be returned for credit.

HOW TO ORDER . . .

BALL BEARING SETS

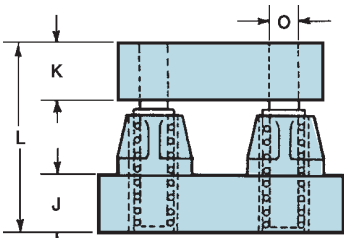
1. Specify **Ball Bearing**.
2. Specify Series **BB-AS-67**.
3. Specify Boss Bushing, Types A, B or C. Specify required dimensions.

Follow steps 4 through 8, below.

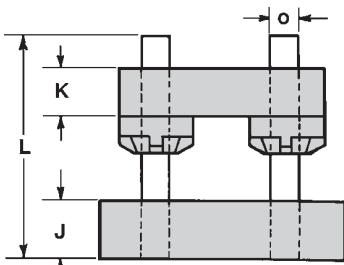
PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series **P-AS-67**.
3. Specify Boss Bushing, Types 1, 2 or 3. Specify required dimensions.

Follow steps 4 through 8, below.



BALL BEARING



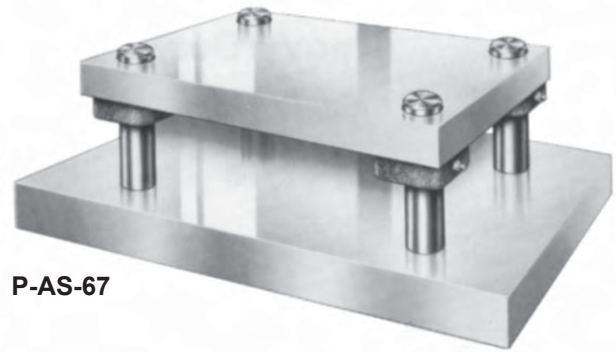
PLAIN BEARING

4. Specify Precision.
5. Specify dimensions "A" and "B" and "AA" and "BB".
6. Specify thicknesses of die holder "J" and punch holder "K".
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this is dimension from bottom of die holder to top of Guide Post "O".
8. Tell us how to ship; otherwise we will ship "best way" in our judgment.

PLAIN BEARING ALL-STEEL DIE SETS

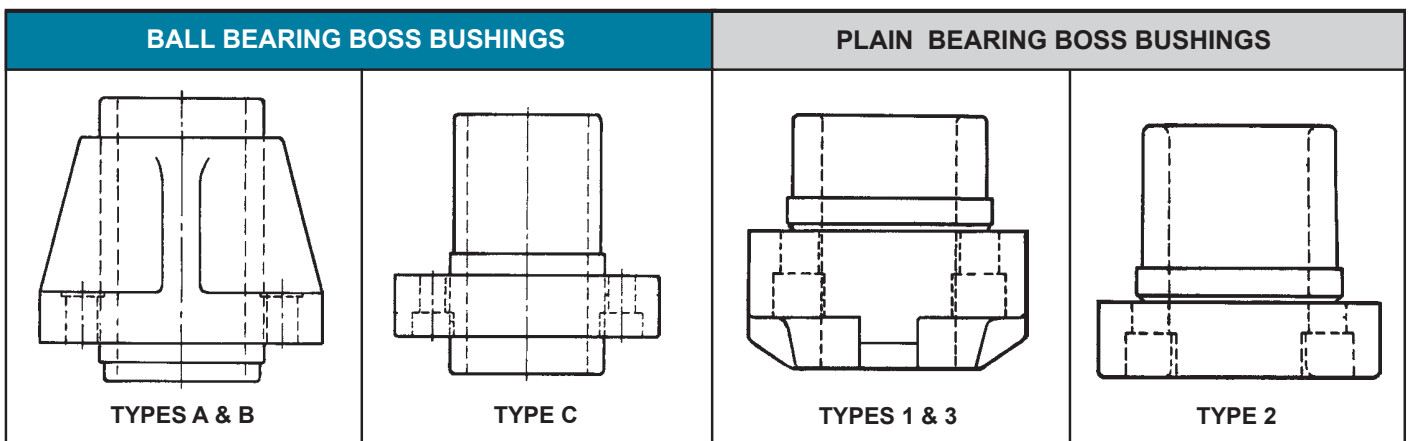


**Heavy Duty
Four Post
Style**



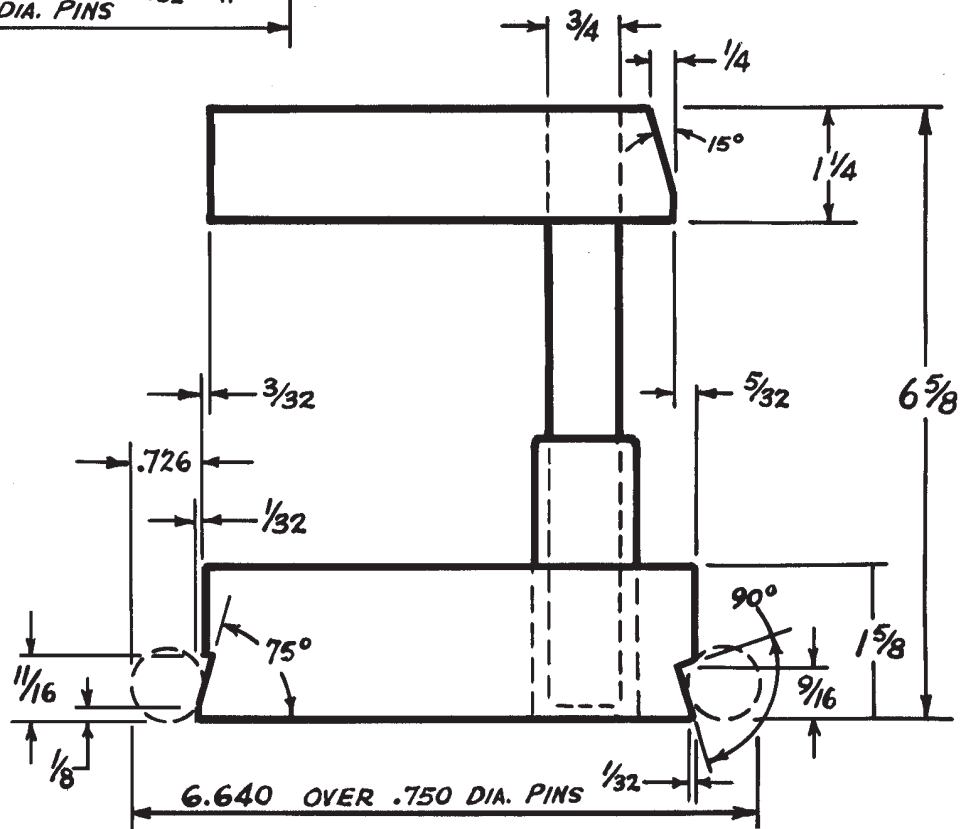
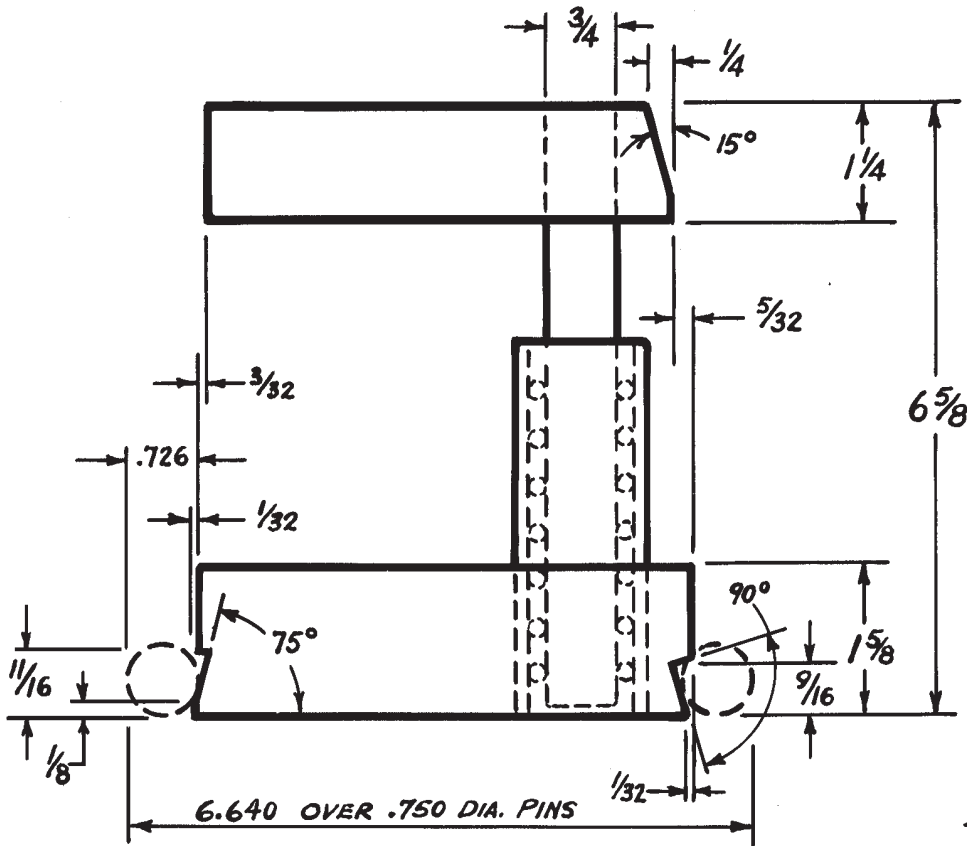
P-AS-67

DIE SPACE				THICKNESS		BALL BEARING							PLAIN BEARING						
Die Holder		Punch Holder		Die Holder	Punch Holder	General Dimensions							General Dimensions						
A	B	AA	BB	J	K	C	D	E	F	H	O	X	C	D	E	F	H	O	X
26	12 1/2	19	11 1/2	2	2	13 1/2	6	1/2	8	5 1/2	2	1/2	15	7 1/2	3 1/2	11	4	2	1/2
				2	3														
				3	2														
				3	3														
29	16 1/2	24 1/2	16 1/2	2 1/2	2 1/2	18 1/2	10 1/2	4 1/2	12 1/2	6	2 1/2	0	19 1/2	11 1/2	6 1/2	14 1/2	5	2 1/2	0
				2 1/2	3 1/2														
				3 1/2	2 1/2														
				3 1/2	3 1/2														
26	22	24	20	3	3	18	14	8	12	6	2 1/2	1	19	15	10	14	5	2 1/2	1
				3	4														
				4	3														
				4	4														
32	20	24	16	3	3	18	10	4	12	6	2 1/2	2	19	11	6	14	5	2 1/2	2
				3	4														
				4	3														
				4	4														
36	26	24 1/2	22	3	3	18 1/2	16	10	12 1/2	6	2 1/2	2	19 1/2	17	12	14 1/2	5	2 1/2	2
				3	4														
				4	3														
				4	4														





FORMING MACHINE DIE SETS





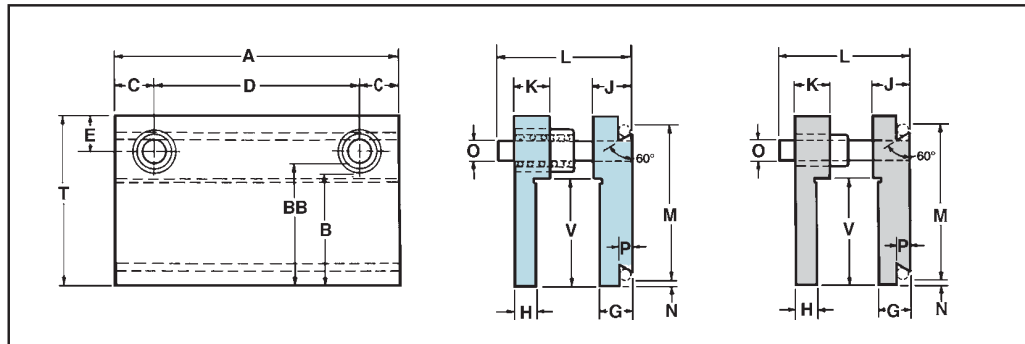
ALL STEEL DOVETAIL DIE SETS

For U.S. Tool
Multi-Slide
Machines

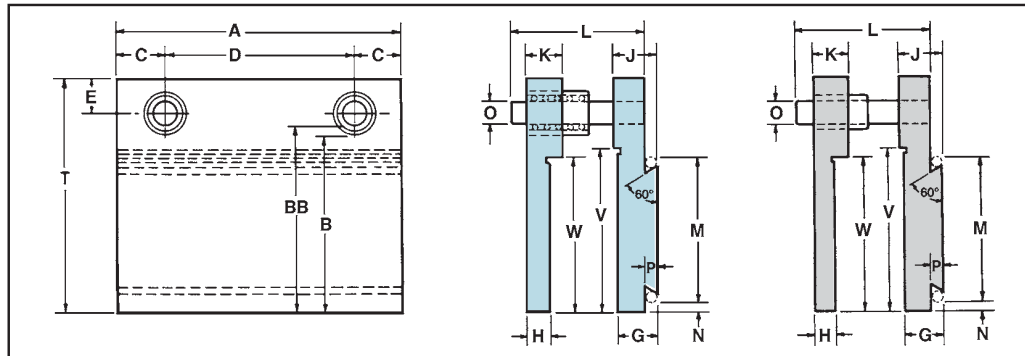


BB-95-M33-1

MODELS
28 & 35



MODEL
33



HOW TO ORDER . . .

BALL BEARING SETS

1. Select die set for proper machine model, and in the required left to right dimension.
2. **Prefix** to the catalog number the symbol **BB**. Example: **BB-63-M28-2** is a Ball Bearing type, for Model 28, 6 1/2" x 3 9/16". Follow steps 3 through 7, below.

PLAIN BEARING SETS

1. Select die set for proper machine model, and in the required left to right dimension.
2. **Prefix** to the catalog number the symbol **P**. Example: **P-63-M28-2** is a Plain Bearing type, for Model 28, 6 1/2" x 3 9/16". Follow steps 3 through 7, below.

3. Specify quantity.
4. Specify length "L" if other than listed standard. For Ball Bearing sets this is Minimum Shut Height Dimension. For Plain Bearing sets this dimension is length of Guide Post "O".
5. Specify type of bushing. Unless otherwise specified, both Ball Bearing and Plain Bearing sets will be furnished with Press

Fit Steel Sleeve Bushings.

6. Specify any special machining required. Unless otherwise specified, these sets will be finished to the dimensions tabulated in the chart and to the configurations shown in the schematic drawings.
7. Tell us how to ship; otherwise we will ship "best way" in our judgment.

These die sets may not be returned for credit.

ALL STEEL DOVETAIL DIE SETS



For U.S. Tool Multi-Slide Machines



P-95-M33-1

Lempco Precision Grade All Steel die sets are offered in both Ball Bearing and Plain Bearing designs for U. S. Tool Multi-Slide Machines. These sets are machined to close tolerances to dimensions as shown, but can also be provided to customer specifications. Special machining is available at additional charge.

Twelve sizes for the Model 28, ten for the Model 33, and nine for Model 35 machines are charted and dimensioned on these pages. Please request quotation if deviations from these suggested standards are required, or for die sets to be used with any other models of this forming machine design type.

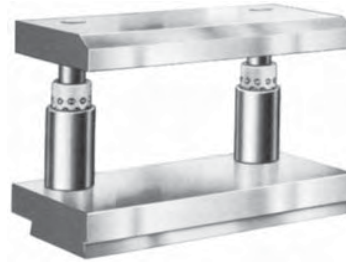
MULTI-SLIDE MODEL	DIE SPACE			THICKNESS		Stand. Min. Shut Height	GENERAL DIMENSIONS										CATALOG NUMBER															
	Left to Right	Front to Back		Die Holder	Punch Holder		C	D	E	M*	N	O	P	T	V	W																
	A	B	BB	J (G)	K (H)		L																									
No. 28	6 1/2	3 11/16	3 7/8	1 3/16	1 1/8 (1 1/16)	3 7/16	1 1/4	4	1 1/8	4.930	.215	3/4	13/32	5 3/8	3 3/8	-	63-M28-2															
	7							4 1/2									73-M28-1															
	7 1/2							5									73-M28-2															
	8							5 1/2									83-M28-1															
	8 1/2							6									83-M28-2															
	9							6 1/2									93-M28-1															
	10							7 1/2									103-M28-1															
	11							8 1/2									113-M28-1															
	12							9 1/2									123-M28-1															
	13							10 1/2									133-M28-1															
	14							11 1/2									143-M28-1															
	17							14 1/2									173-M28-1															
No. 33	7 1/2	5 7/16	5 3/4	1 3/8 (1 1/4)	1 1/8 (1 1/16)	3 7/16	1 1/2	4 1/2	1 1/4	4.572	.332	3/4	3/8	7 3/8	5 1/8	4 7/8	75-M33-2															
	8							5									85-M33-1															
	8 1/2							5 1/2									85-M33-2															
	9							6									95-M33-1															
	10							7									105-M33-1															
	11							8									115-M33-1															
	12							9									125-M33-1															
	13							10									135-M33-1															
	14							11									145-M33-1															
	15							12									155-M33-1															
	No. 35							7 1/2									6 1/16	6 3/8	1 1/2 (1 1/4)	1 3/16 (3/4)	4 11/16	1 1/2	4 1/2	1 1/8	5.075	.588	3/4	25/64	7 7/8	5 7/8	-	76-M35-2
								8															5									86-M35-1
8 1/2		5 1/2	86-M35-2																													
9		6	96-M35-1																													
10		7	106-M35-1																													
11		8	116-M35-1																													
12		9	126-M35-1																													
13		10	136-M35-1																													
14		11	146-M35-1																													

*Dimension "M" measured over 0.375 diameter pins.



ALL STEEL DOVETAIL DIE SETS

**For Torrington
Verti-Slide
Machines**

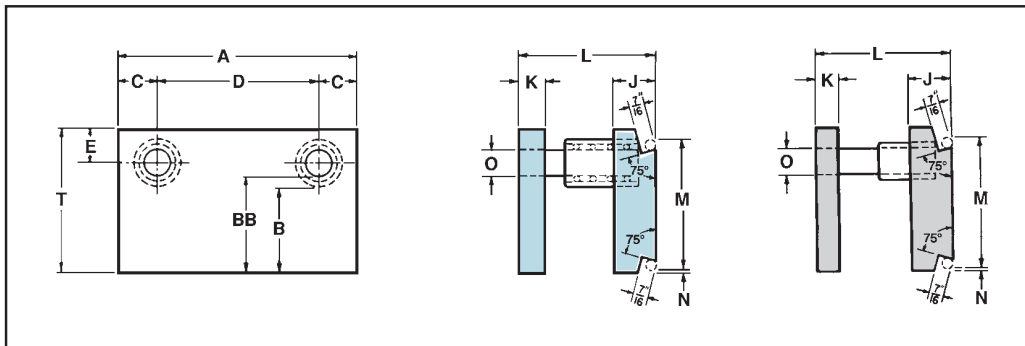


BB-92-V81

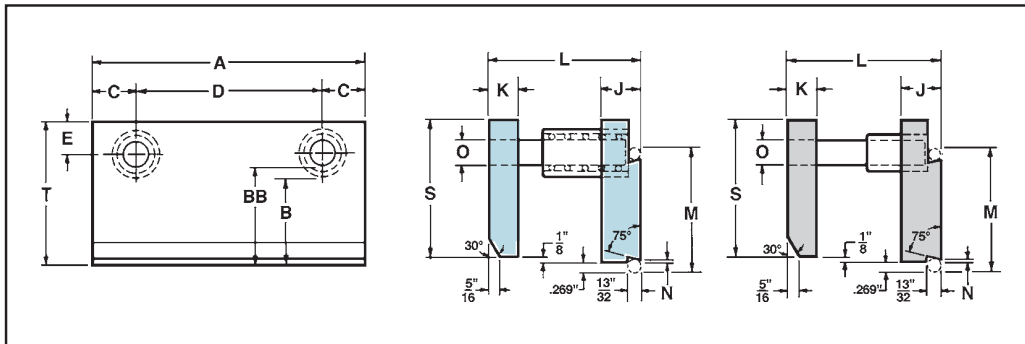
Lempco manufactures All Steel Ball Bearing and Plain Bearing die sets for three models of Torrington Verti-Slide Machines, the V-80, V-81, and V-82. These die sets are manufactured Precision Grade.

Three sizes of die sets for each of these machines are suggested, and in standardized form are dimensioned and charted on these pages. Completely special sets also are available. Request quotation. Special machining will be done at additional cost to details of customer print.

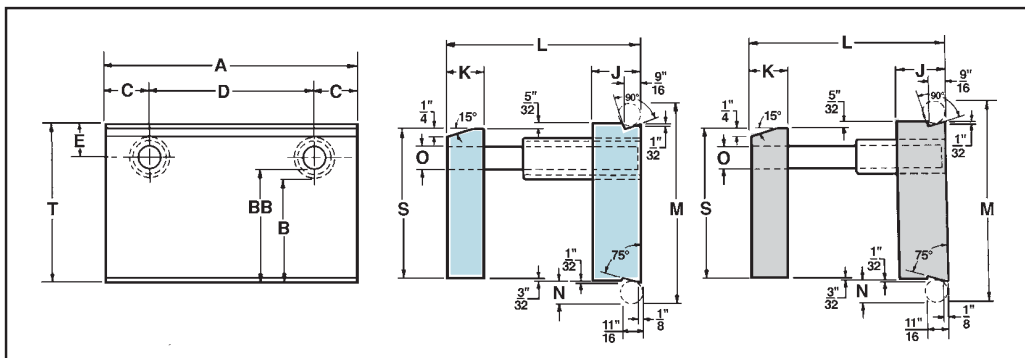
**MODEL
V-80**



**MODEL
V-81**



**MODEL
V-82**



ALL STEEL DOVETAIL DIE SETS



**For Torrington
Verti-Slide
Machines**



P-92-V81

VERTI-SLIDE MODEL	DIE SPACE			THICKNESS		Stand. Min. Shut Height	GENERAL DIMENSIONS								CATALOG NUMBER
	Left to Right	Front to Back		Die Holder	Punch Holder		C	D	E	M*	N	O	S	T	
	A	B	BB	J	K		L	C	D	E	M*	N	O	S		T
V-80	6							3 ³ / ₄							62-V80
	7	2 ¹ / ₂	2 ¹³ / ₁₆	1 ¹ / ₄	1 ¹¹ / ₁₆	3 ³ / ₄	1 ¹ / ₈	4 ³ / ₄	1	3.802	.062	3 ³ / ₄	—	4 ³ / ₁₆	72-V80
	8							5 ³ / ₄							82-V80
V-81	8							5 ¹ / ₂							82-V81
	9	2 ¹ / ₂	2 ¹¹ / ₁₆	1 ³ / ₁₆	7 ⁷ / ₈	5	1 ¹ / ₄	6 ¹ / ₂	1	3.662	.062	3 ³ / ₄	4 ¹ / ₁₆	4 ³ / ₁₆	92-V81
	10							7 ¹ / ₂							102-V81
V-82	7 ¹ / ₄							4 ¹ / ₄							73-V82
	8 ¹ / ₂	3 ⁷ / ₁₆	3 ³ / ₄	1 ⁵ / ₈	1 ¹ / ₄	6 ⁵ / ₈	1 ¹ / ₂	5 ¹ / ₂	1 ¹ / ₈	6.640	.726	3 ³ / ₄	5	5 ¹ / ₄	83-V82
	10							7							103-V82

*Dimension "M" measured over 0.3125 diameter pins for V-80; 0.375 pins for V-81; 0.750 pins for V-82.

HOW TO ORDER . . .

BALL BEARING SETS

1. Select die set for proper machine model, and in the required left to right dimension.
2. **Prefix** to the catalog number the symbol **BB**. Example: **BB-62-V80** is a Ball Bearing type for Model V-80, 6" x 2¹/₂". Follow steps 3 through 7, below.

PLAIN BEARING SETS

1. Select die set for proper machine model, and in the required left to right dimension.
2. **Prefix** to the catalog number the symbol **P**. Example: **P-62-V80** is a Plain Bearing type for Model V-80, 6" x 2¹/₂". Follow steps 3 through 7, below.

3. Specify quantity.
4. Specify length "L" if other than listed standard. For Ball Bearing sets this is Minimum Shut Height Dimension. For Plain Bearing sets this dimension is length of Guide Post "O".
5. Specify type of bushing. Unless otherwise specified, both Ball Bearing and Plain Bearing sets will be furnished with Press

Fit Steel Sleeve Bushings.

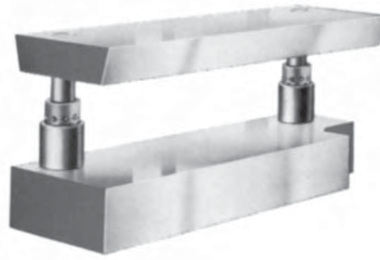
6. Specify any special machining required. Unless otherwise specified, these sets will be finished to the dimensions tabulated in the chart and to the configurations shown in the schematic drawings.
7. Tell us how to ship; otherwise we will ship "best way" in our judgment.

These die sets may not be returned for credit.



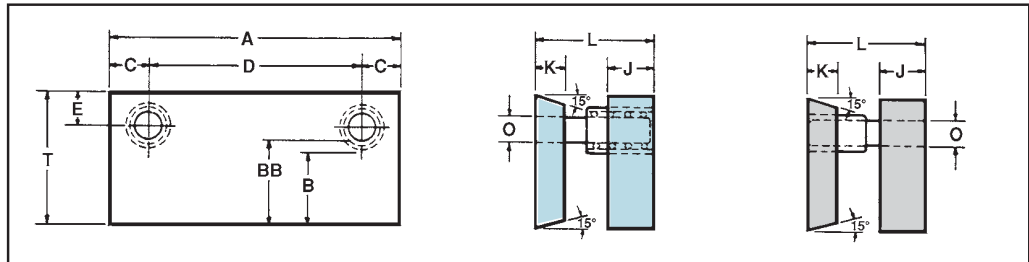
ALL STEEL DOVETAIL DIE SETS

For Nilson
Fourslide
Machines

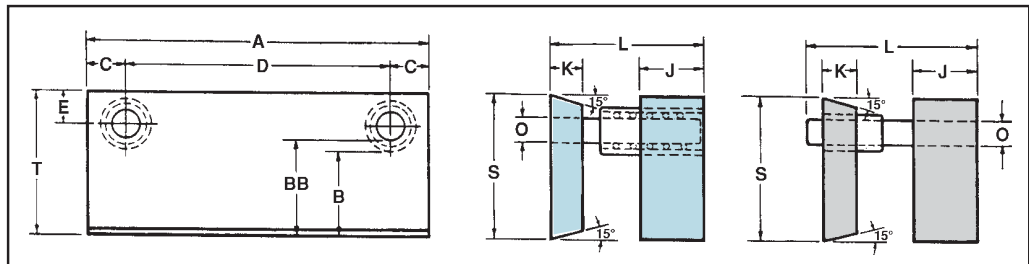


BB-132-S2F

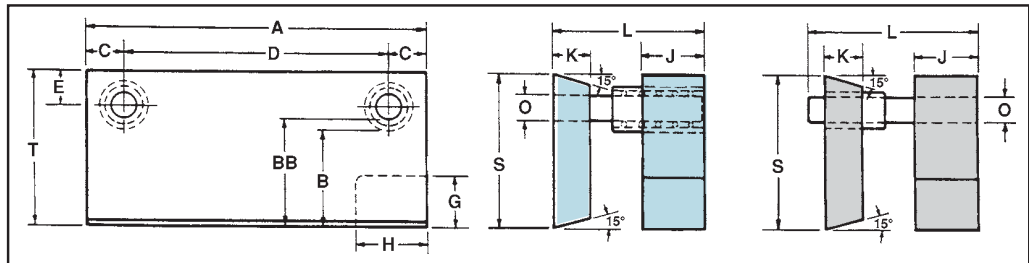
MODEL
S-0-F



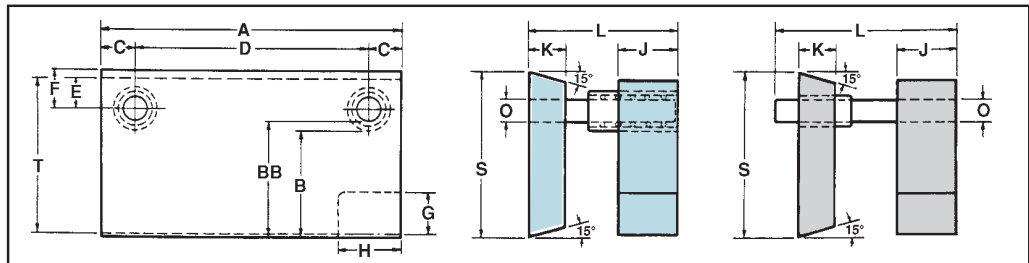
MODEL
S-1-F



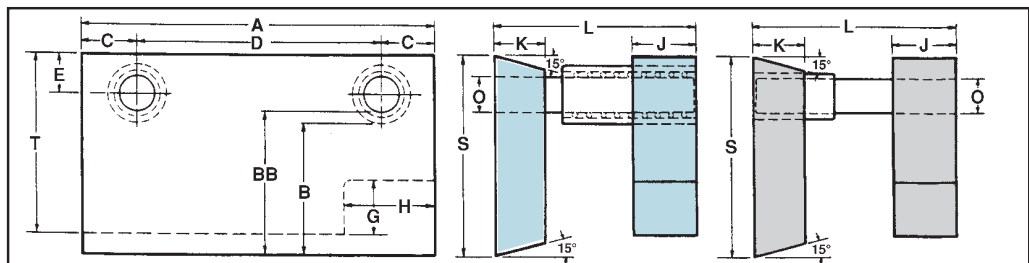
MODEL
S-2-F



MODEL
S-3-F



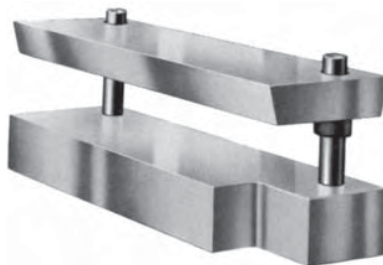
MODEL
S-4-F



ALL STEEL DOVETAIL DIE SETS



For Nilson Fourslide Machines



P-132-S2F

Lempco All Steel die sets in both Ball Bearing and Plain Bearing types are available for five models of Nilson Fourslide Machines. These standardized sets, which closely adhere to the machine manufacturer's specifications, are dimensioned and charted on these pages, but alterations can be offered to details of customer specifications.

As described here, these sets for the Models S-0-F, S-1-F, S-2-F, S-3-F, and S-4-F, are offered only in Precision Grade and All Steel construction.

If special machining is required please send print.

FOURSLIDE MODEL	DIE SPACE			THICKNESS		Stand. Min. Shut Height	GENERAL DIMENSIONS									CATALOG NUMBER	
	Left to Right	Front to Back		Die Holder	Punch Holder		L	C	D	E	F	G	H	O	S		T
		A	B															BB	J	K
S-0-F	8 ¹ / ₂	2 ³ / ₁₆	2 ¹ / ₂	1 ³ / ₈	7 ₈	3 ¹ / ₂	1 ¹ / ₈	6 ¹ / ₄	1	—	—	—	3 ₄	—	3 ⁷ / ₈	82-S0F	
S-1-F	11 ³ / ₄	2 ⁹ / ₁₆	2 ⁷ / ₈	1 ⁷ / ₈	1	4 ¹ / ₂	1 ¹ / ₈	9 ¹ / ₂	1	—	—	—	3 ₄	4.205	4 ¹ / ₄	112-S1F	
S-2-F	13 ¹ / ₄	2 ⁷ / ₈	3 ³ / ₁₆	1 ⁷ / ₈	1 ¹ / ₈	4 ¹ / ₂	1 ¹ / ₈	11	1	—	1 ⁹ / ₁₆	2 ¹ / ₈	3 ₄	4.468	4 ⁹ / ₁₆	132-S2F	
S-3-F	16 ¹ / ₄	3 ⁵ / ₁₆	3 ⁵ / ₈	2	1 ¹ / ₄	5 ¹ / ₄	1 ¹ / ₈	14	1 ¹ / ₈	1 ⁵ / ₁₆	1 ³ / ₈	2 ¹ / ₈	3 ₄	5.522	5 ¹ / ₈	163-S3F	
S-4-F	21 ³ / ₄	4 ¹ / ₈	4 ⁹ / ₁₆	2 ³ / ₈	1 ¹⁵ / ₁₆	7 ¹ / ₂	2	17 ³ / ₄	1 ⁷ / ₁₆	—	2	3 ³ / ₈	1 ¹ / ₄	7.394	6 ⁵ / ₈	214-S4F	

HOW TO ORDER . . .

BALL BEARING SETS

1. Select die set for proper machine model.
2. **Prefix** to the catalog number the symbol **BB**. Example: **BB-82-S0F** is a Ball Bearing type for Model S-0-F. Follow steps 3 through 7, below.

PLAIN BEARING SETS

1. Select die set for proper machine model.
2. **Prefix** to the catalog number the symbol **P**. Example: **P-82-S0F** is a Plain Bearing type for Model S-0-F. Follow steps 3 through 7, below.

3. Specify quantity.
4. Specify length "L" if other than listed standard. For Ball Bearing sets this is Minimum Shut Height Dimension. For Plain Bearing sets this dimension is length of Guide Post "O".
5. Specify type of bushing. Unless otherwise specified, both Ball Bearing and Plain Bearing sets will be furnished with Press

Fit Steel Sleeve Bushings.

6. Specify any special machining required. Unless otherwise specified, these sets will be finished to the dimensions tabulated in the chart and to the configurations shown in the schematic drawings.
7. Tell us how to ship; otherwise we will ship "best way" in our judgment.

These die sets may not be returned for credit.

ALUMINUM

HIGH QUALITY, HIGH STRENGTH PRECISION DIE SETS OF ALCOA QC-7®



Strength

QC-7's strength provides durability and long life. Yield strengths up to 54% higher than 7075-T651 help make QC-7 an attractive alternative to tool and other steels where weight is a consideration.

Consistency

Die and Mold makers have been extremely impressed with the consistency of QC-7 during machining. Production and chemistry refinements help minimize property gradients throughout the thickness of the plates. "Soft" centers or pockets are eliminated.

Stability

To reduce the cost of a finished die set or mold, you need a material that will allow extensive machining without movement or additional thermal treatment. Minimizing residual stress while maintaining peak strengths is the cost effective advantage of QC-7 As Die Set and Mold Plate Material.

Thermal Conductivity

QC-7's thermal conductivity, four times that of steel, results in higher quality finished parts. More uniform temperature distribution on mold surfaces minimizes molded-in stresses due to "hot spots."

The machining advantages of aluminum over steel add to the benefits you get with QC-7. Cutting speeds are up to 40% faster than in tool steels. Cutting tools stay sharper and benching operations are faster. Overall, production up-time is greater.

Cutting Speeds

A starting cutting speed of 600-1000 surface feet per minute is recommended. Much higher machining speeds, up to 15,000 sfm with carbide tools, are possible, depending on equipment capabilities and part configurations. Unlike many other materials, aluminum will not limit faster cutting speeds, thereby permitting higher production rates and resulting in lower machining costs.

Tooling Requirements

Tooling may be high speed or carbide. For best aluminum machining, tools should have a fine cutting edge and the proper tool geometry for aluminum (higher positive rake angles and larger clearance angles are recommended).

Cutting Fluids for QC-7

Cutting fluids applied by flooding or air mist will enhance the generally good machinability of aluminum alloys. Cutting fluids provide four functions:

- cooling of the work and tool;
- lubrication and the tool face;
- an anti-welding characteristic to prevent or delay the formation of a built-up edge on the cutting tool;
- a "hosing" effect to clear chips out of the cutting area.

Straight mineral oils, soluble oils or emulsions, and synthetic chemical solutions may all be used in the machining of aluminum alloys.



BALL BEARING AS-37 STYLE



PLAIN BEARING AS-33 STYLE



BALL BEARING AS-34 STYLE



PLAIN BEARING AS-37



BALL BEARING AS-40 STYLE



BALL BEARING AS-41 STYLE



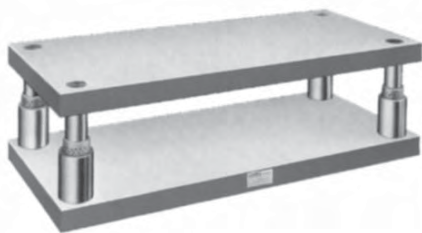
BALL BEARING AS-63



PLAIN BEARING AS-67

**Light Weight
Tough**
1/3 the weight of steel...

**All Sets Made To Order
For Prices Call 1-800-321-8632**



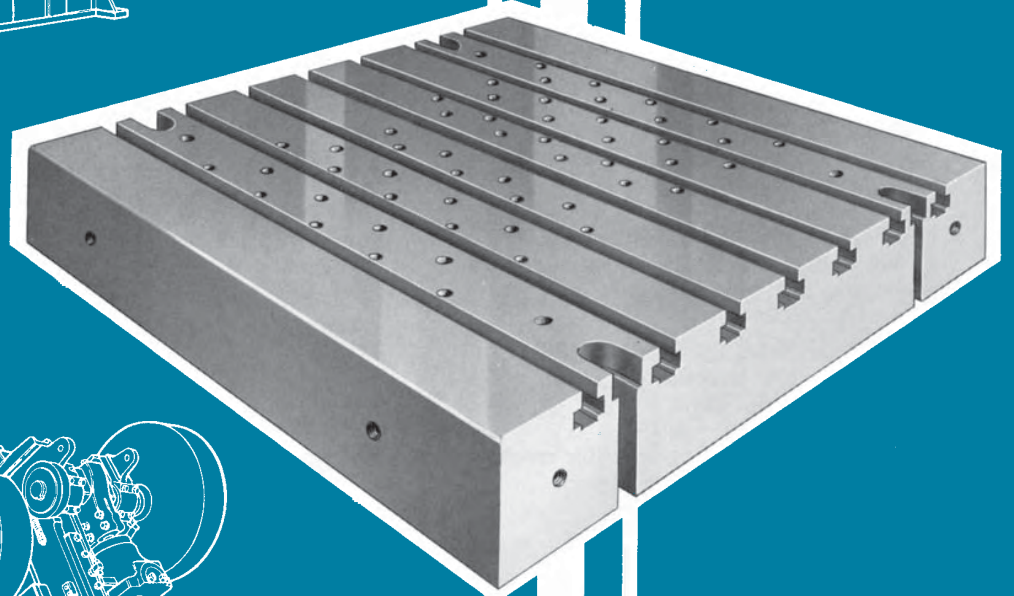
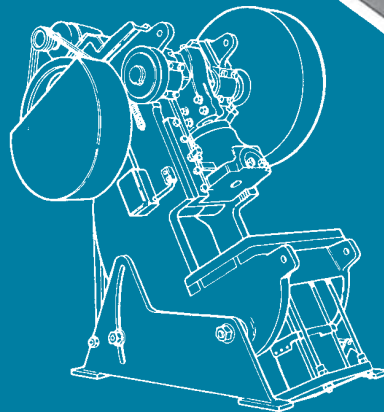
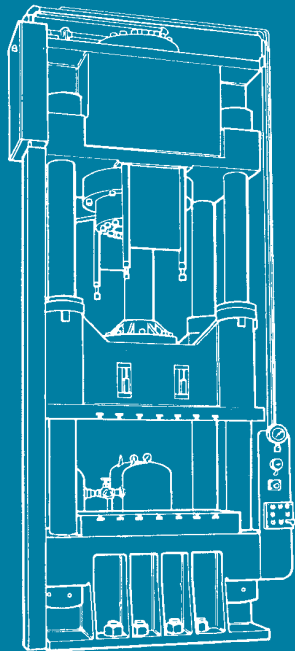
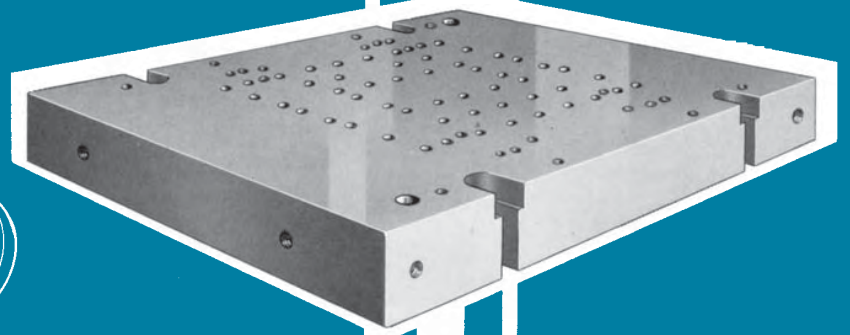
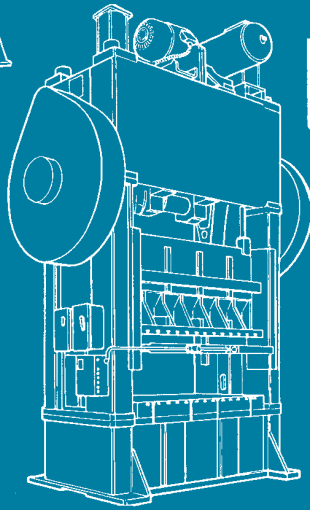
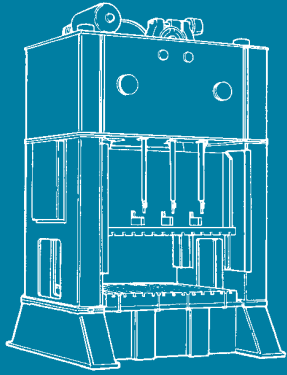
Comparison of Typical Mechanical and Physical Properties

	ALCOA QC-7		COMPETITION	
	To 3 1/2"	Over 3 1/2"	To 3 1/2"	Over 3 1/2"
Thickness (In.)	To 3 1/2"	Over 3 1/2"	To 3 1/2"	Over 3 1/2"
Tensile Strength (PSI)	85,000/86,000	81,000/84,000	78,320	74,000
Yield Strength (PSI)	77,000/79,000	74,000/77,000	69,600	63,800
Modulus of Elasticity (PSI) x 10.6	10.3	10.3	10.44	10.3
Shear Strength (PSI)	46,000	46,000	48,000	48,000
Coefficient of Expansion (in/in/ F) x 106	12.8	12.8	13.05	12.78
Density (P/in 3)	.1	.1	.1	.1

WHEN YOUR REQUIREMENTS NEED
ALUMINUM, USE LEMPCO

LEMPCO THE BETTER BUY — BETTER BUY LEMPCO

BOLSTERS AND STEEL PLATE





SMALL PRESS BOLSTERS

All Steel

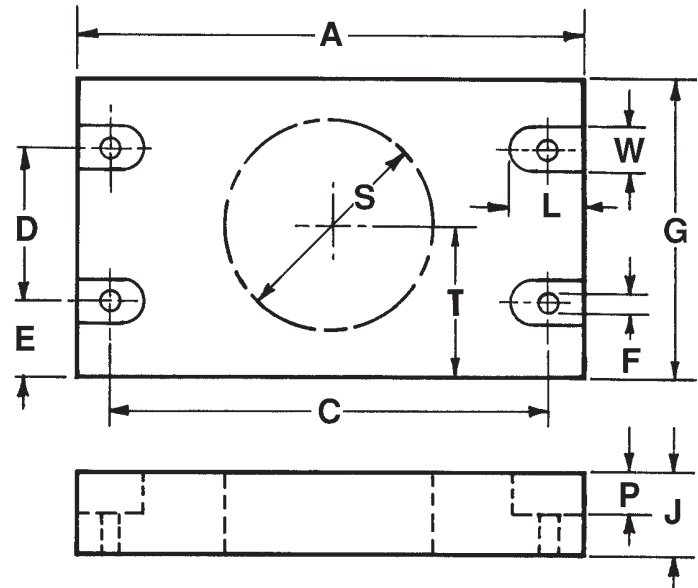
Lempco manufactures bolster plates in steel or to any customer requirement of size or configuration. Bolsters for many smaller presses fall into two general classifications, as represented by the sketch shown on this page. Bolsters for larger presses are discussed in succeeding pages.

Bolsters will be machined to your exact specifications. Torch cutting of steel plates are available to your order.

HOW TO ORDER . . .

1. Specify all the dimensions, as referenced. If the sketch does not adequately describe your requirement provide the additional dimensional data. Send sketch.
2. If your specifications are not met by the bolster configuration illustrated on this page, send drawing with your order or request for quotation.

Bolster plates may not be returned for credit.



Series AS-52 – All Steel

O.B.I., HORNING, GAP FRAME PRESS BOLSTERS



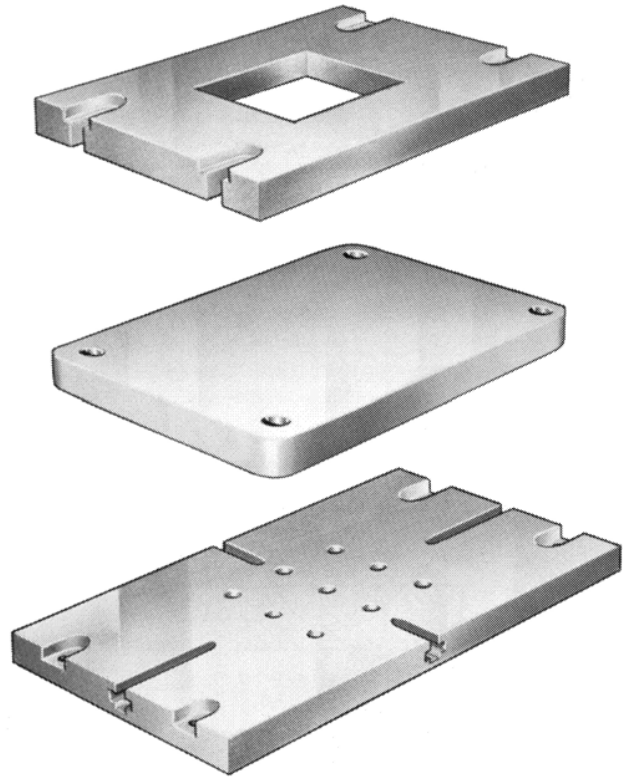
Bolster plates for Open Back Inclinable, Horning and Gap Frame presses are manufactured to customer order in Lempco's plants. Bolsters for presses in these categories are built in steel.

Because interchangeability of dies is offered through standardization of pressure pin, T-Slot and mounting slot locations, many O.B.I. press users prefer bolster plates manufactured to standards adopted by the Joint Industry Conference of the Metal Working Industry. J.I.C. bolster standards are available for the O.B.I. presses in the 22, 32, 45, 60, 75, 110, 150 and 200 ton capacities.

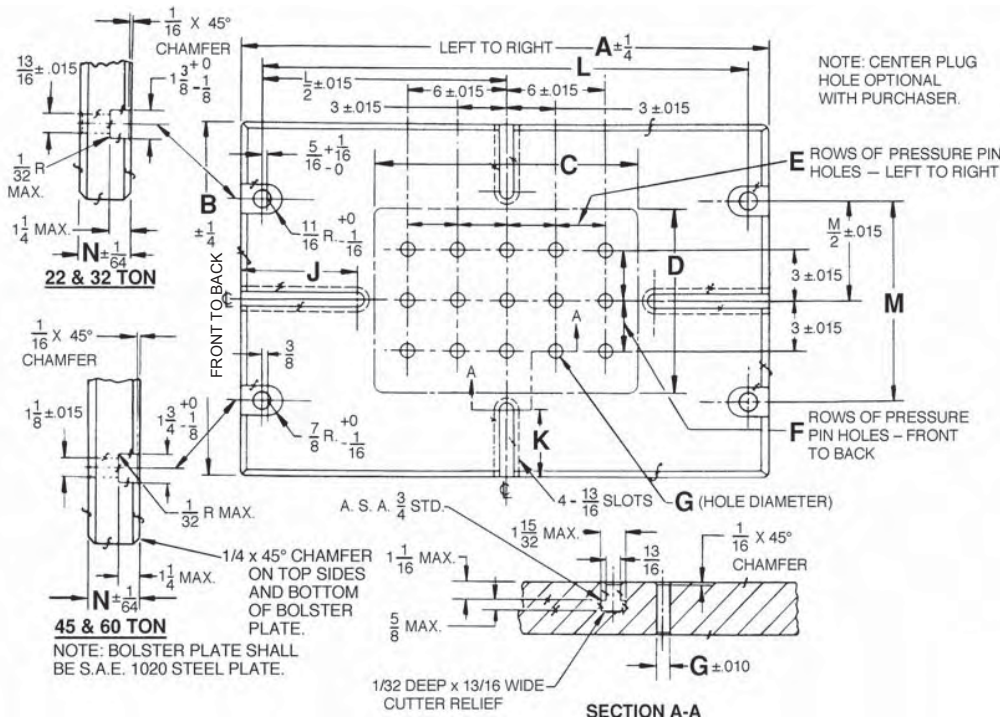
The advantages of J.I.C. standardization can be extended to users of presses which do not conform to these specifications through design of J.I.C.-type bolsters utilizing the regulated T-slot, mounting slot and pressure pin hole locations.

HOW TO ORDER...

1. Specify J. I. C., or non-J. I. C.
2. Specify steel.
3. Specify left to right, front to back, and thickness dimensions.
4. Specify locations and all dimensions pertaining to mounting slots, T-slots, and pressure pin holes.
5. If your non-J. I. C. bolster requires tapped mounting holes instead of mounting slots specify dimensions, locations, type thread.
6. Specify any special machining or burnouts required.
7. Send sketch.
8. Tell us how to ship. Otherwise, we will ship "best way" in our judgment.



J.I.C. Press Room Standards for O.B.I. Presses Bolster Plate Dimensions for 22, 32, 45 and 60 Ton Presses



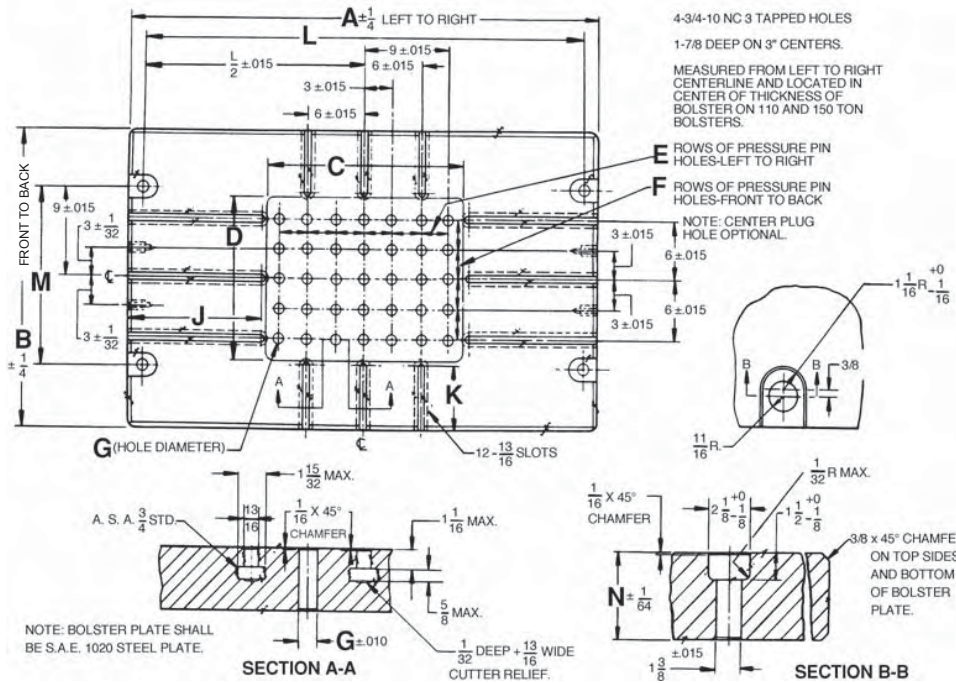
CONDENSED SPECIFICATIONS

REF.	PRESS TONNAGE			
	22	32	45	60
A	20	24	28	32
B	12	15	18	21
C	8	11	14	16
D	5	8	8	11
E	—	3	5	5
F	—	3	3	3
G	—	13/16	13/16	13/16
J	5	6	6	7
K	3	2 1/2	4	4
L	18	22	25 1/2	29 1/2
M	7 1/2	9	10 1/2	12
N	2 1/2	2 1/2	3	3



O.B.I. PRESS BOLSTERS, J.I.C. STANDARD

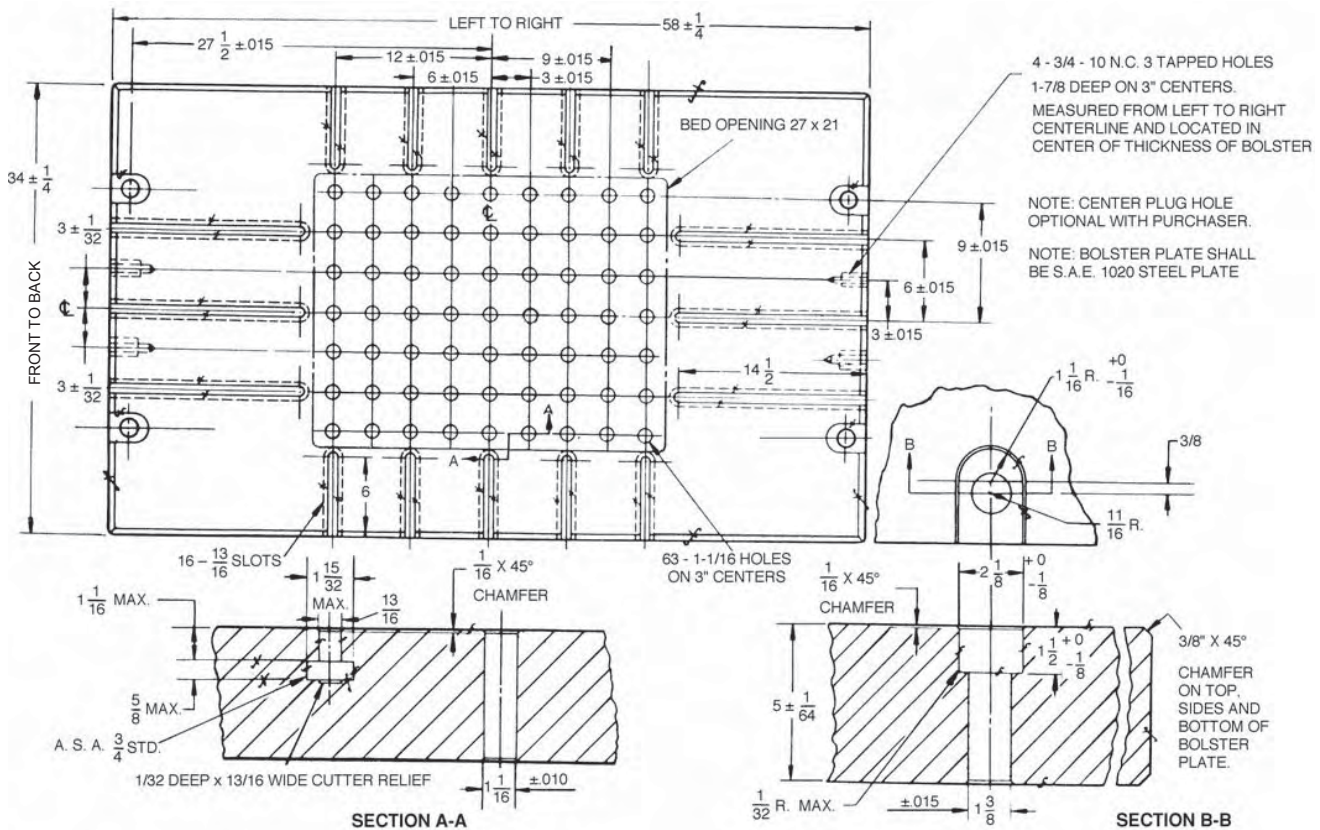
Bolster Plate Dimensions for 75, 110 and 150 Ton Presses



CONDENSED SPECIFICATIONS

REF.	PRESS TONNAGE		
	75	100	150
A	36	42	50
B	24	27	30
C	18	21	21
D	14	15	17
E	5	7	7
F	5	5	5
G	1 ¹ / ₁₆	1 ¹ / ₁₆	1 ¹ / ₁₆
J	8	9 ¹ / ₂	14
K	4	5	6
L	33	39	47
M	18	18	18
N	3 ¹ / ₂	4	4 ¹ / ₂

Bolster Plate Dimensions for 200 Ton Presses

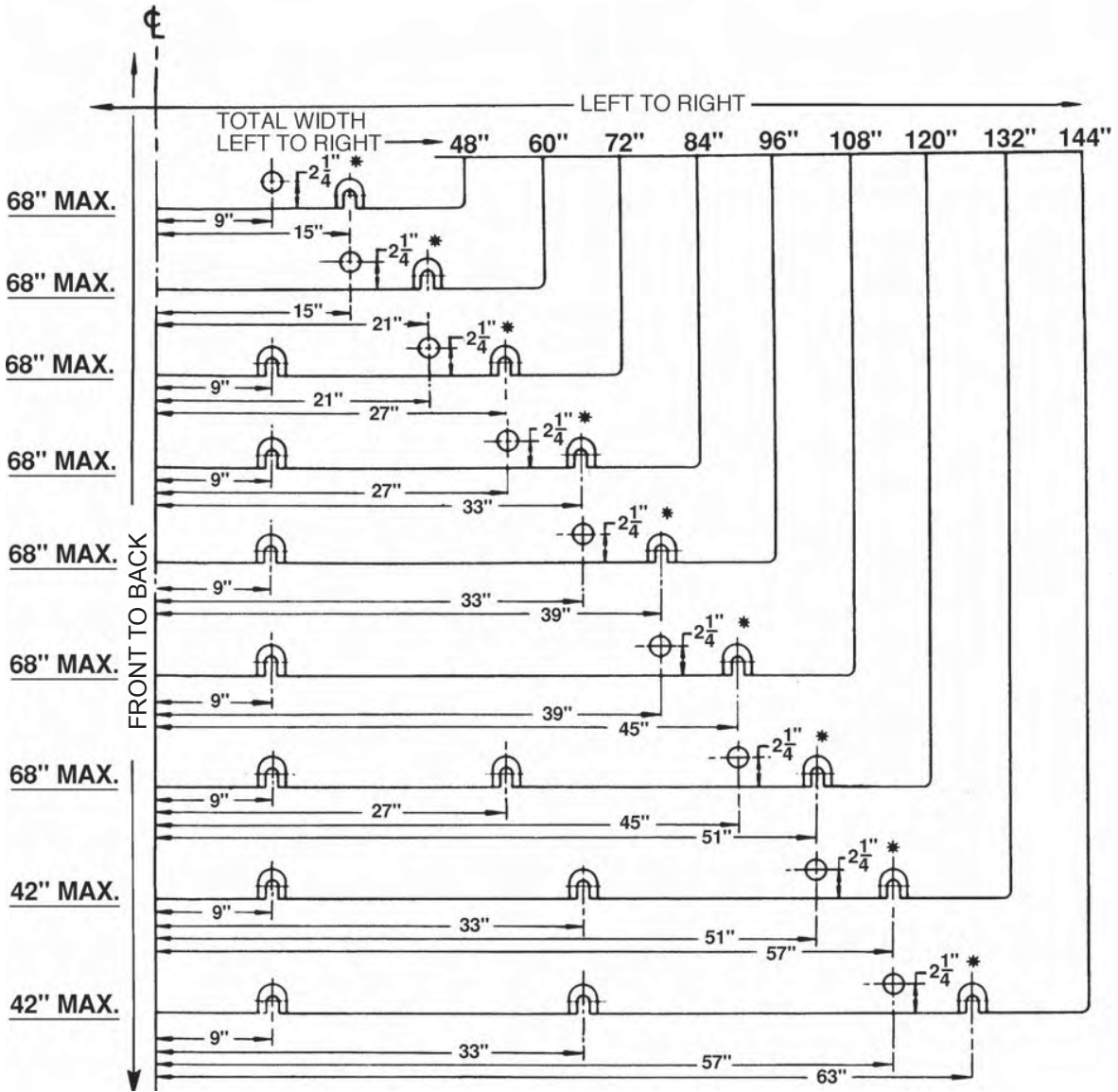




LARGE PRESS BOLSTERS

J.I.C. Press Room Standards

Spacing of Mounting Slots and Locating Pin Holes



*REFERENCE DIMENSION ONLY – SEE BELOW

IMPORTANT: EACH MOUNTING SLOT IS MEASURED FROM LEFT TO RIGHT AND FRONT TO BACK CENTERLINES OF THE BOLSTER PLATE WITHIN A TOLERANCE OF $\pm .032$.

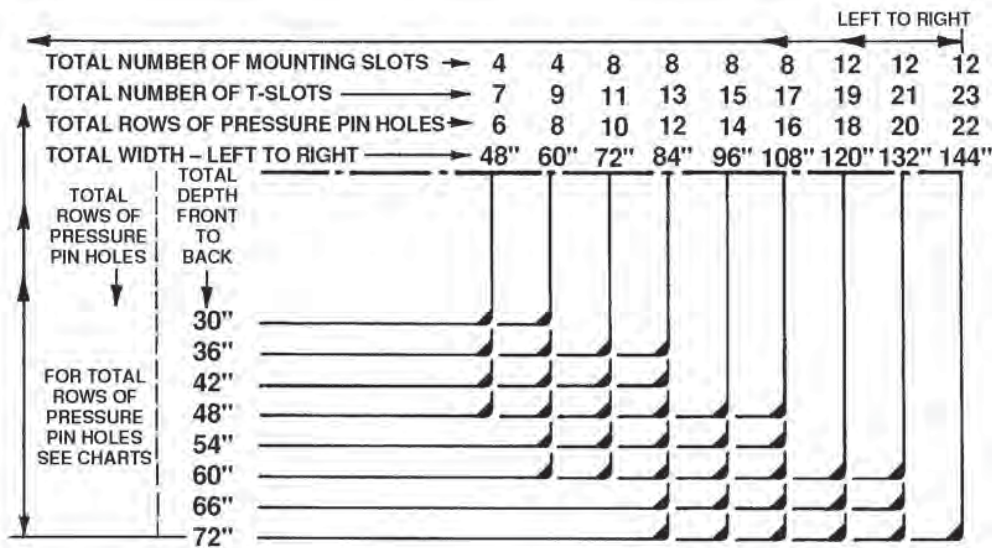
EACH LOCATING PIN HOLE IS MEASURED FROM THE LEFT TO RIGHT AND FRONT TO BACK CENTERLINES WITHIN A TOLERANCE OF $\pm .015$.

LARGE PRESS BOLSTERS



J.I.C. Press Room Standards

Press Sizes – Total Number of Mounting Slots, T-Slots, Rows of Pressure Pin Holes



CAPACITY OF PRESS IN TONS	BOLSTER PLATE		
	THICKNESS*	TOTAL DEPTH FRONT TO BACK	TOTAL ROWS OF PRESSURE PIN HOLES FRONT TO BACK
50	3 1/2	30	4
75	4	30, 36	4
100	4 1/2	30, 36	4
100	4 1/2	42	6
100	4 1/2	42	4†
125	5	30, 36	4
125	5	42	6
125	5	42	4†
150	5 1/2	36, 42	4
150	5 1/2	48	6
200	6	36, 42	4
200	6	48, 54	6
250	6 1/2	42	4
250	6 1/2	48, 54	6
250	7	60, 66	8

CAPACITY OF PRESS IN TONS	BOLSTER PLATE		
	THICKNESS*	TOTAL DEPTH FRONT TO BACK	TOTAL ROWS OF PRESSURE PIN HOLES FRONT TO BACK
300	7	48, 54	6
300	7	60	8
300	7 1/2	66	8
300	7 1/2	72	10
400	7 1/2	54, 60	6
400	7 1/2	66	8
400	8	72	8
500	8	54, 60	6
500	8	66	8
500	9 1/2	72	8
600	8 1/2	60	6
600	8 1/2	66	8
600	10	72	8
800	9	60	6
800	9	66	8
800	10 1/2	72	8
1000	11	72	8
1250	11	72	8

†Applies to 72 x 42 and 84 x 42 press sizes.

*Tolerance on thickness ±1/64 for widths up to and including 84" L-R; over 84" ±1/32.

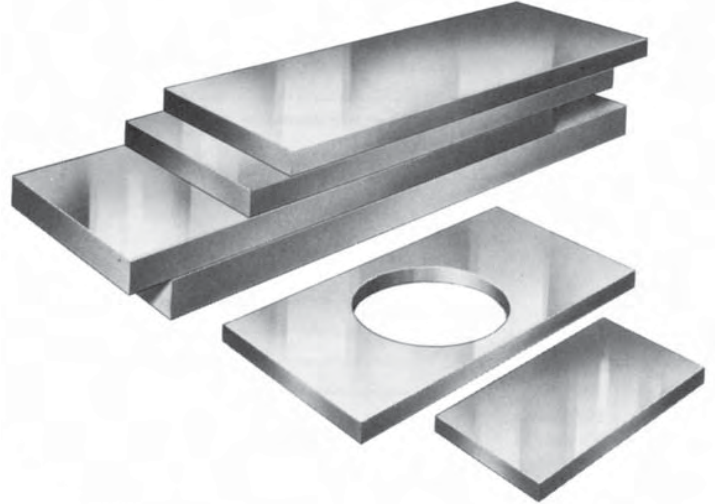


MACHINED STEEL PLATE

Lempco's volume production of die sets and press machinery requires maintenance of large inventories of steel plate, which can be drawn upon for fast delivery of customer orders for stripper plates, pressure plates, and riser blocks. Plate can be cut and machined to your exact requirements.

The "How to Order Steel Plate" chart shown below will assist you in specifying the finish you require, but any type of machining can be done to fill your needs. The chart is presented only to indicate the various combinations of surface and edge finishing commonly used. These recommendations may seem elementary, but it does sometimes happen that cost savings can be effected and delivery expedited by specifying no more accuracy in finishing than is actually required.

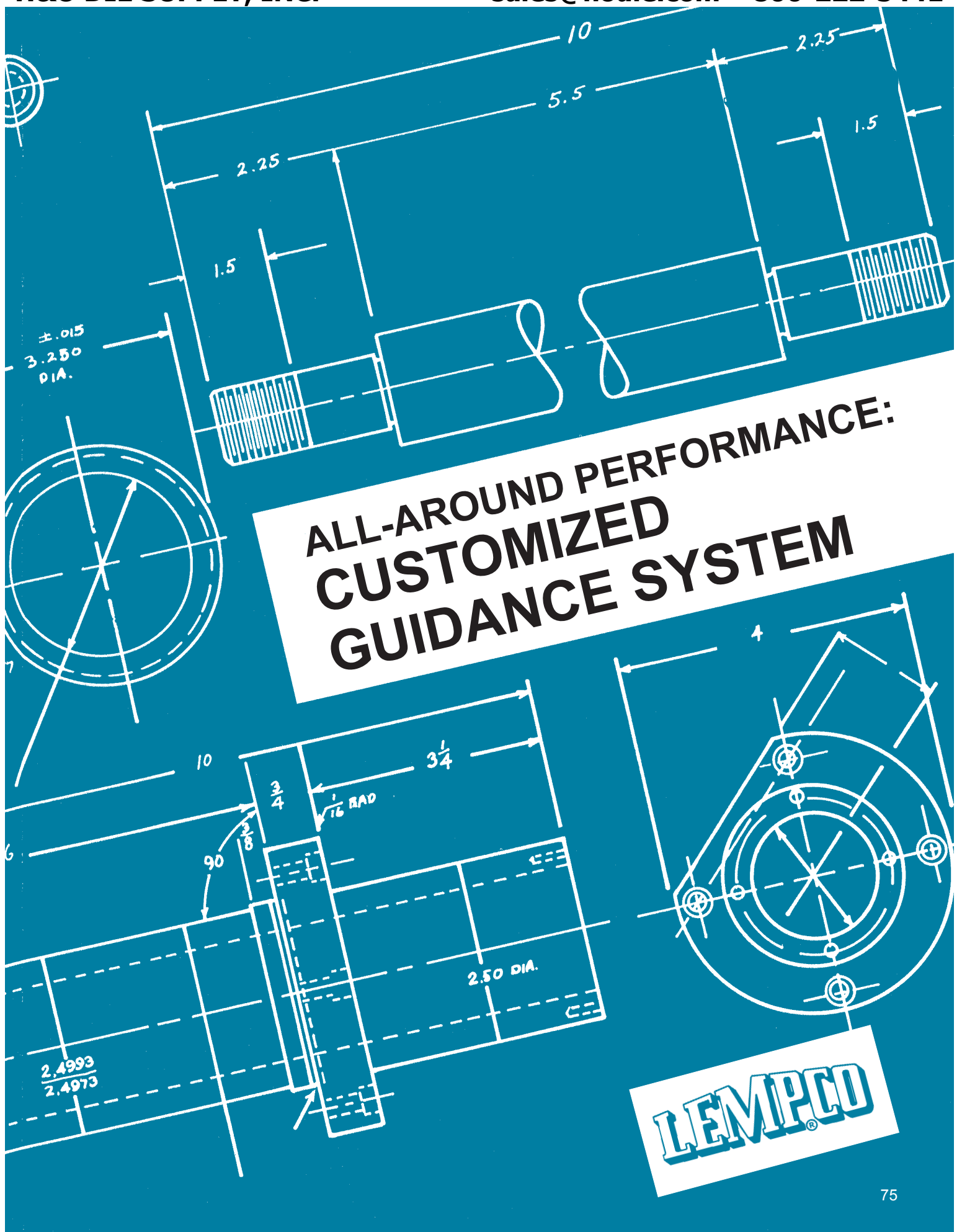
In ordering machined steel plate for any purpose, specify left to right and front to back dimensions, thickness, type of finish required, any special machining or torch cutting, and number of such plates. A drawing will be required if the required plates do not conform to the ordering code.



Finished steel plates may not be returned for credit.

HOW TO ORDER STEEL PLATE

PLATE TYPES		GENERAL DESCRIPTION	PLATE THICKNESSES																															
A	Clean Plate	Hot rolled steel, torch cut, machined to clean up, top and bottom	Stocked for immediate fabrication: <table style="margin-left: auto; margin-right: auto;"> <tr> <td>1/2</td> <td>5/8</td> <td>3/4</td> <td>7/8</td> </tr> <tr> <td>1</td> <td>1 1/8</td> <td>1 1/4</td> <td>1 3/8</td> </tr> <tr> <td>1 1/2</td> <td>1 5/8</td> <td>1 3/4</td> <td>1 7/8</td> </tr> <tr> <td>2</td> <td>2 1/4</td> <td>2 1/2</td> <td>2 3/4</td> </tr> <tr> <td>3</td> <td>3 1/4</td> <td>3 1/2</td> <td>4</td> </tr> <tr> <td>4 1/2</td> <td>5</td> <td>5 1/2</td> <td>6</td> </tr> <tr> <td>6 1/2</td> <td>7</td> <td></td> <td></td> </tr> </table>				1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7		
1/2	5/8	3/4					7/8																											
1	1 1/8	1 1/4					1 3/8																											
1 1/2	1 5/8	1 3/4					1 7/8																											
2	2 1/4	2 1/2					2 3/4																											
3	3 1/4	3 1/2					4																											
4 1/2	5	5 1/2					6																											
6 1/2	7																																	
B	Clean Edge Plate	Hot rolled steel, machined to clean up, top and bottom; edges machined to ±.015"																																
C	Clean Square Plate	Hot rolled steel, machined to clean up, top and bottom; edges machined to ±.005"																																
D	Finished Plate	Hot rolled steel, machined to ±.015", top and bottom; edges torch cut																																
E	Finished Edge Plate	Hot rolled steel, machined to ±.015", top and bottom; edges machined to ±.015"																																
F	Finished Square Plate	Hot rolled steel, machined to ±.015", top and bottom; edges machined to ±.005"																																
G	Accuracy Plate	Hot rolled steel, machined to ±.005", top and bottom; edges torch cut																																
H	Accuracy Edge Plate	Hot rolled steel, machined to ±.005", top and bottom; edges machined to ±.015"																																
I	Accuracy Square Plate	Hot rolled steel, machined to ±.005", top and bottom; edges machined to ±.005"																																



**ALL-AROUND PERFORMANCE:
CUSTOMIZED
GUIDANCE SYSTEM**





THE INDUSTRY STANDARD, CONFORMED TO YOUR NEEDS.

Lempco® customization services will go to virtually any length to satisfy your guidance system needs – any diameter; any material, hardness, or finish; in any component or configuration – anything!

Now the full range of answers to

your custom requirements is at your command. Guideposts, bushings, special shafts, etc., in the lengths and diameters you want, with materials and hardnesses to specs, ground to tolerance, and with smoothness to specs up to micro-finishes. The pride we have in our ability to perform (and

to provide you with profitable production performance) is stamped on every part we make.

That Lempco stamp means satisfaction in terms of quality, dependability and service since 1918. Other brands may appear the same: for a system to truly perform, look for the Lempco name.

It could be a simple modification of a plain bearing guidance system or a system with Rotainer® technology, or something quite exotic. Whatever your need, Lempco will work closely with you to make sure your specs are met .

In fact, no matter what kind of die, number of guideposts, die material, or application, Lempco can give you proven reliability that results in real benefits. From low downtime to consistent accuracy, Lempco guidance systems provide you with the stamp of success.

Lempco takes you to the peak of your die-forming potential with everything from chrome silicon steel die springs to complete die sets.



Typical Lempco customized guidance system components.

GET LEMPCO ADVANTAGES IN MORE AREAS THAN EVER.



You have a process or problem that standard guidance system solutions can't handle. That's where Lempco guidance systems come in.

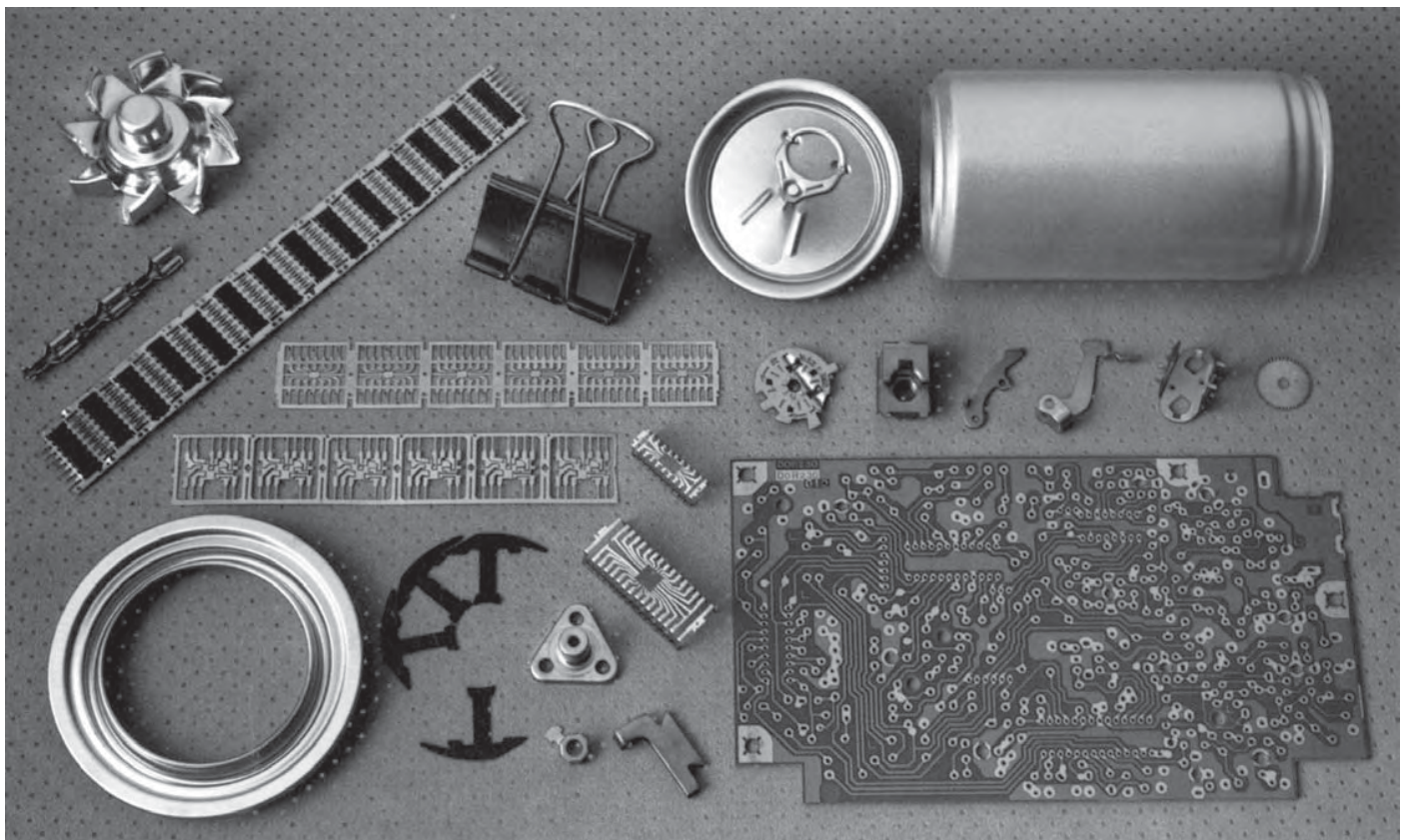
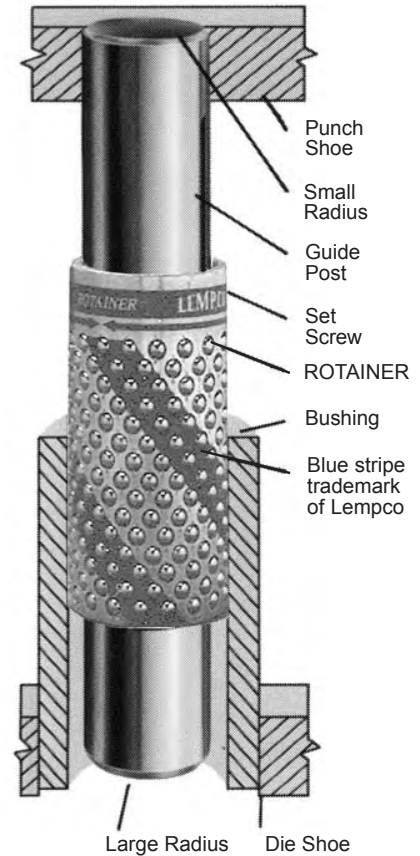
Whether it's a high level of production or an extremely critical tolerance or finish, Lempco excels in efficient operation. You can depend on us for precision in today's complicated high tech manufacturing of consumer products like beverage cans, semi-conductors, and automotive components.

Lempco offers you virtually any guidance system with components manufactured as you want.

Custom guidance systems with Retainers give you every superiority

you would expect from our ball-bearing pacesetter, especially in unusual arrangements. Wherever you need it, get the predictable, high-speed/high output accuracy of consistent pre-load "rolling press-fit" and reduced tracking – plus low-maintenance, easy-to-service operation.

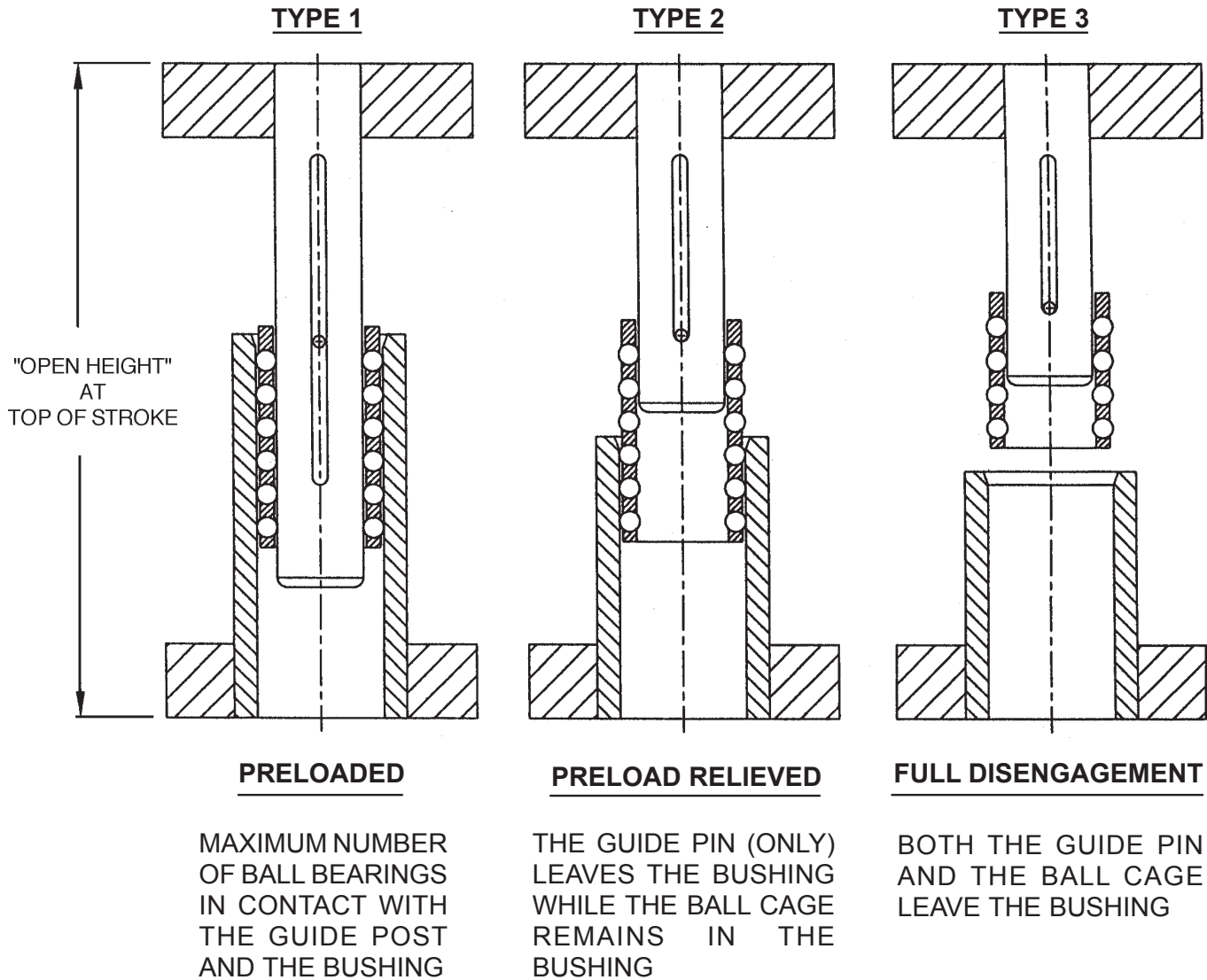
Find out more about exactly how Lempco innovations can answer many of your custom needs. Request more information or an appointment with our representative by calling 1 (800) 321-8632 or write to Lempco 6779 Engle Road, Suite A-F, Cleveland, Ohio 44130-7926.



A few of the products where Lempco guidance systems apply.



OPERATING CONDITIONS



BALL BEARING ASSEMBLY LUBRICATION RECOMMENDATION

IN OPERATION OF BALL ASSEMBLY, ADD LUBRICANT ONCE EACH 8-HOUR SHIFT BY SPRAY OR BRUSH APPLICATION.

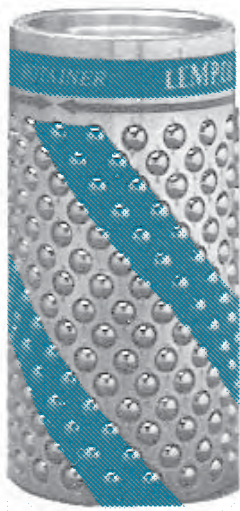
USE A LIGHTWEIGHT SPINDLE OIL OR AUTOMOTIVE TYPE AUTOMATIC TRANSMISSION FLUID.

CAUTION: NEVER USE GREASE!

Die Set Components & Customized Guidance Systems

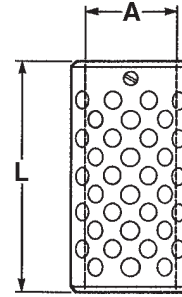


LEMPCO[®]



Lempco's Precision ROTAINER® gives ball bearing die sets a **NEW TWIST**

“LEMPCO RETAINERS AND ROTAINERS® ARE DISTINGUISHED BY THE BLUE COLLAR AND STRIPE”



“New Lengths Available 2-1/2 & 3”

Nom. Post Diameter A	Length – Inches L	Catalog Number
3/4"	1 1/2	361-0606
	1 3/4	361-0607
	2	361-0608
	2 1/4	361-0609
	2 1/2	361-0610
1"	1 1/2	361-0806
	1 3/4	361-0807
	2	361-0808
	2 1/4	361-0809
	2 1/2	361-0810
1 1/4"	2 3/16	361-1008
	2 5/16	361-1009
	2 11/16	361-1010
	2 15/16	361-1011
	3 3/16	361-1012
	3 5/16	361-1013
1 1/2"	2 11/16	361-1210
	2 15/16	361-1211
	3 3/16	361-1212
	3 5/16	361-1213
	3 11/16	361-1214
	3 15/16	361-1215
1 3/4"	2 15/16	361-1411
	3 3/16	361-1412
	3 5/16	361-1413
	3 11/16	361-1414
	3 15/16	361-1415
	4 3/16	361-1416
	4 5/16	361-1417
2"	3 1/2	361-1613
	3 3/4	361-1614
	4	361-1615
	4 1/4	361-1616
	4 1/2	361-1617
	4 3/4	361-1618
2 1/2"	3 1/4	361-2013
	4	361-2016
	4 1/2	361-2018
	5	361-2020
	6	361-2024
	6 1/2	361-2026
	7	361-2028
3"	5	361-2420
	6	361-2424
	7	361-2428

More than four decades ago we first offered you a Lempco ball bearing die set as an engineering achievement to help you manufacture a better product and to keep abreast of increasing production costs. We have remained responsive to your needs. TODAY, we offer you an even higher performance standard in the innovative, multi-directional ROTAINER®.

Designed to rotate on the post, as well as maintain its vertical motion, Lempco's ROTAINER® was developed to greatly reduce the amount of tracking. The disengagement of the guide post from the bushing by 1/4" at the top of the stroke will allow the ROTAINER® to rotate 360° on the guide post. The ROTAINER®, while still designed to track, (assuring a measurable amount of preload) will enable stampers to achieve high press production by reducing expensive replacement costs.

The Lempco ball bearing ROTAINER® possesses increased resistance to normal wear, is unaffected by high speed operation and offers precise die registration. In addition, the ROTAINER® is engineered without the loss of ball bearing area, thus giving you the benefit of increased accuracy.

The ROTAINER® is keyed to the guide post slot with a special Retainer Slide assembly to allow both vertical and revolving motion. When properly assembled with Lempco guide posts and bushings of the same nominal diameters, the ROTAINER® provides a preload which actually becomes a “rolling press fit”. *To achieve minimum wear with the ROTAINER®, Lempco guide posts and bushings must be used exclusively.* Note: Under a preloaded condition the ROTAINER® will only move vertically.

The LAST ROTAINER® length for each diameter shown in the table, should be used for general die set applications. Other lengths are for limited space and special applications.

Rotainer® Slide Replacement With Screw Assembly		Number Of Inserts
Nom.	Assembly Part No.	
3/4	899-9406	1
1	899-9408	1
1 1/4	899-9410	1
1 1/2	899-9412	1
1 3/4	899-9414	1
2	899-9416	2
2 1/2	899-9420	2
3	899-9424	2

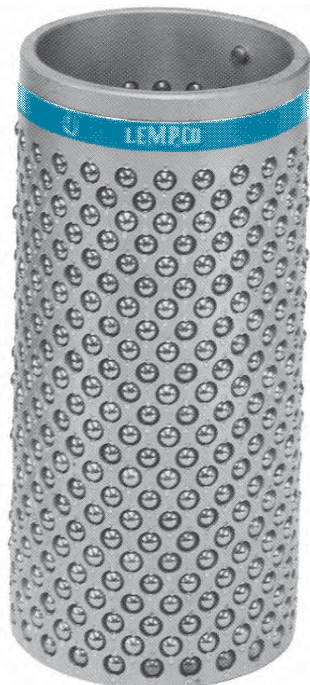
Lempco Ball Bearing Retainer® is manufactured under U.S. Patent No. 4,648,727.

Diameters and lengths not listed are available by special order per quote.

BALL BEARING COMPONENTS



Precision Ball Bearing Retainers



The Lempco Precision Ball Bearing Retainer possesses increased resistance to normal wear and to lateral motion, is smoother in highest speed operation and offers more precise die register. It is keyed to the guide post slot with a set screw.

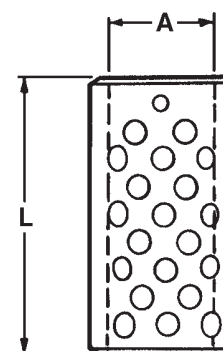
When properly assembled with guide posts and bushings of the same nominal diameters these retainers provide a pre-load which actually becomes a "rolling press fit". In addition to the sizes listed these retainers are also manufactured in other diameters and lengths on special order.

The LAST Retainer length for each diameter shown in the table, should be used for general die set applications. Other lengths are for limited space and special applications.

**"LEMPCO
RETAINERS AND ROTAINERS®
ARE DISTINGUISHED BY THE
BLUE COLLAR AND STRIPE"**

Nom. Post Diameter A	Length L	Catalog Numbers
3/4"	1 1/2	931-0606
	1 3/4	931-0607
	2	931-0608
	2 1/4	931-0609
	2 1/2	931-0610
1"	1 1/2	931-0806
	1 3/4	931-0807
	2	931-0808
	2 1/4	931-0809
1 1/4"	2	931-1008
	2 1/4	931-1009
	2 1/2	931-1010
	2 3/4	931-1011
	3	931-1012
1 1/2"	3 1/4	931-1013
	2 1/2	931-1210
	2 3/4	931-1211
	3	931-1212
1 1/2"	3 1/4	931-1213
	3 1/2	931-1214
	3 3/4	931-1215

Nom. Post Diameter A	Length L	Catalog Numbers
1 3/4"	2 3/4	931-1411
	3	931-1412
	3 1/4	931-1413
	3 1/2	931-1414
	3 3/4	931-1415
	4	931-1416
	4 1/4	931-1417
2"	3 1/4	931-1613
	3 1/2	931-1614
	3 3/4	931-1615
	4	931-1616
	4 1/4	931-1617
2 1/2"	4 1/2	931-1618
	3 1/4	931-2013
	4	931-2016
	4 1/2	931-2018
	5	931-2020
2 1/2"	6	931-2024
	6 1/2	931-2026
	7	931-2028
	3"	5	931-2420
6		931-2424
7		931-2428





BALL BEARING COMPONENTS

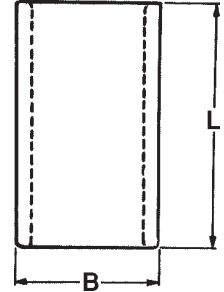
Press Fit Steel Sleeve Bushings



Lempco's Press Fit Steel Sleeve Bushings are manufactured from electric furnace 52100 tool steel, through hardened and precision machined. The I.D. is ground and honed to a superfine finish to minimize resistance to free action of the retainer/rotainer bearings.

Lempco ball bearing bushings are interchangeable and if mounted in accordance with instructions of Page 89 of this catalog will not require select fitting, honing, or other modification. The end radius is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.

Diameters and lengths not listed are available on special order.



Nom. Post Diameter	B	L	Catalog Numbers
3/4	1.387	1 3/4	961-0607
		2	961-0608
		2 1/4	961-0609
		2 1/2	961-0610
		2 3/4	961-0611
		3	961-0612
		3 1/4	961-0613
		3 1/2	961-0614
		3 3/4	961-0615
		4	961-0616
		4 1/2	961-0618
		5	961-0620
		6	961-0624
		1	1.717
2 1/4	961-0809		
2 1/2	961-0810		
2 3/4	961-0811		
3	961-0812		
3 1/4	961-0813		
3 1/2	961-0814		
3 3/4	961-0815		
4	961-0816		
4 1/4	961-0817		
4 1/2	961-0818		
4 3/4	961-0819		
5	961-0820		
5 1/2	961-0822		
6	961-0824		
6 1/2	961-0826		
7	961-0828		
1 1/4	2.107		
		2 3/4	961-1011
		3	961-1012
		3 1/4	961-1013
		3 1/2	961-1014
		3 3/4	961-1015
		4	961-1016
		4 1/4	961-1017
		4 1/2	961-1018
		5	961-1020
		5 1/2	961-1022
		6	961-1024
		6 1/2	961-1026
		7	961-1028
		8	961-1032
		9	961-1036

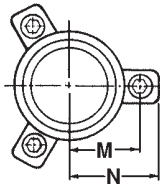
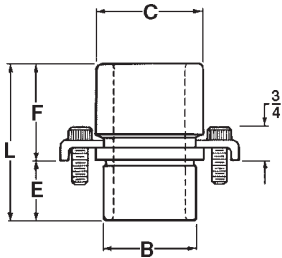
Nom. Post Diameter	B	L	Catalog Numbers
1 1/2	2.437	3	961-1212
		3 1/4	961-1213
		3 1/2	961-1214
		3 3/4	961-1215
		4	961-1216
		4 1/4	961-1217
		4 1/2	961-1218
		4 3/4	961-1219
		5	961-1220
		5 1/4	961-1221
		5 1/2	961-1222
		6	961-1224
		6 1/2	961-1226
		1 3/4	2.747
7 1/2	961-1230		
8	961-1232		
8 1/2	961-1234		
9	961-1236		
10	961-1240		
11	961-1244		
12	961-1248		
3	961-1412		
3 1/2	961-1414		
3 3/4	961-1415		
4	961-1416		
4 1/4	961-1417		
4 1/2	961-1418		
4 3/4	961-1419		
5	961-1420		
5 1/4	961-1421		
5 1/2	961-1422		
6	961-1424		
6 1/2	961-1426		
7	961-1428		
7 1/2	961-1430		
8	961-1432		
8 1/2	961-1434		
9	961-1436		
10	961-1440		
11	961-1444		
12	961-1448		
13	961-1452		

Nom. Post Diameter	B	L	Catalog Numbers
2	3.162	3	961-1612
		3 1/2	961-1614
		3 3/4	961-1615
		4	961-1616
		4 1/4	961-1617
		4 1/2	961-1618
		4 3/4	961-1619
		5	961-1620
		5 1/4	961-1621
		5 1/2	961-1622
		6	961-1624
		6 1/2	961-1626
		7	961-1628
		7 1/2	961-1630
2 1/2	3.682	8	961-1632
		8 1/2	961-1634
		9	961-1636
		10	961-1640
		11	961-1644
		12	961-1648
		13	961-1652
		14	961-1656
		6	961-2024
		6 1/2	961-2026
		7	961-2028
		7 1/2	961-2030
		8	961-2032
		8 1/2	961-2034
9	961-2036		
9 1/2	961-2038		
10	961-2040		
11	961-2044		
3	4.182	12	961-2048
		13	961-2052
		14	961-2056
		6	961-2424
		6 1/2	961-2426
		7	961-2428
		7 1/2	961-2430
		8	961-2432
		8 1/2	961-2434
		9	961-2436
		10	961-2440
		11	961-2444
		12	961-2448
		13	961-2452
14	961-2456		

BALL BEARING COMPONENTS



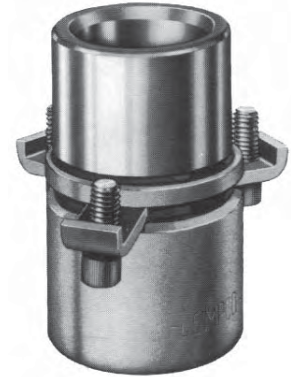
Demountable Steel Guide Post Bushings



Demountable Steel Guide Post Bushings are sometimes preferred for convenience in making die repairs or in building large ball bearing die sets. They are designed for tap fitting, seating flush to the ground surface of the shoe and secured by clamps and cap screws. Demountable bushings are easily removed and upon reinstallation the die set will register accurately.

Lempco Demountable Guide Post Bushings are manufactured from electric furnace 52100 tool steel, through hardened and precision machined. They are interchangeable, and if mounted in accordance with instructions on Page 89 of this catalog do not require select fitting, honing or other modification.

Diameters and lengths not listed are available on special order.



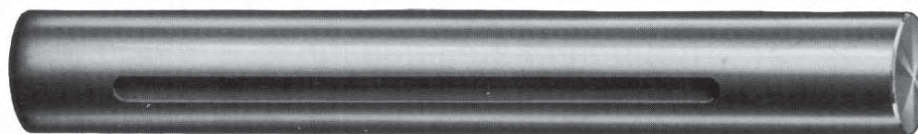
Nom. Post Diameter	B	C	E	F	Radius		L	Catalog Numbers	
					M	N			
1	1.7154	2	1	7/8	1.219	1.594	2 clamps Part No. 899-9025	2	962-0808
				1 1/8				2 1/4	962-0809
				1 3/8				2 1/2	962-0810
				1 5/8				2 3/4	962-0811
				1 7/8				3	962-0812
				2 1/8				3 1/4	962-0813
				2 3/8				3 1/2	962-0814
				2 5/8				3 3/4	962-0815
1 1/4	2.1054	2 3/8	1	1 3/8	1.442	1.864	3 clamps Part No. 899-9125	2 1/2	962-1010
				1 5/8				2 3/4	962-1011
				1 7/8				3	962-1012
				2 1/8				3 1/4	962-1013
				2 3/8				3 1/2	962-1014
				2 5/8				3 3/4	962-1015
				2 7/8				4	962-1016
				3 1/8				4 1/4	962-1017
				3 3/8				4 1/2	962-1018
				3 7/8				5	962-1020
4 3/8	5 1/2	962-1022							
4 7/8	6	962-1024							
1 1/2	2.4354	2 11/16	1 1/4	1 5/8	1.598	2.020	3 clamps Part No. 899-9125	3	962-1212
				1 7/8				3 1/4	962-1213
				2 1/8				3 1/2	962-1214
				2 3/8				3 3/4	962-1215
				2 5/8				4	962-1216
				2 7/8				4 1/4	962-1217
				3 1/8				4 1/2	962-1218
				3 3/8				4 3/4	962-1219
				3 5/8				5	962-1220
				3 7/8				5 1/4	962-1221
4 1/8	5 1/2	962-1222							
1 3/4	2.7454	3	1 1/4	1 5/8	1.754	2.176	4 clamps	3	962-1412
				2 1/8				3 1/2	962-1414
				2 3/8				3 3/4	962-1415
				2 5/8				4	962-1416

Nom. Post Diameter	B	C	E	F	Radius		L	Catalog Numbers	
					M	N			
1 3/4	2.7454	3	1 1/4	2 7/8	1.754	2.176	4 clamps Part No. 899-9125	4 1/4	962-1417
				3 1/8				4 1/2	962-1418
				3 3/8				4 3/4	962-1419
				3 5/8				5	962-1420
				3 7/8				5 1/4	962-1421
				4 1/8				5 1/2	962-1422
				4 5/8				6	962-1424
				5 1/8				6 1/2	962-1426
2	3.1604	3 9/16	1 1/4	5 5/8	2.035	2.457	4 clamps Part No. 899-9125	7	962-1428
				6 1/8				7 1/2	962-1430
				1 5/8				3	962-1612
				2 1/8				3 1/2	962-1614
				2 3/8				3 3/4	962-1615
				2 5/8				4	962-1616
2 1/2	3.6804	4 1/16	1 1/4	2 7/8	2.259	2.681	4 clamps Part No. 899-9125	4 1/4	962-1617
				3 1/8				4 1/2	962-1618
				3 3/8				4 3/4	962-1619
				3 5/8				5	962-1620
				3 7/8				5 1/4	962-1621
				4 1/8				5 1/2	962-1622
3	4.1804	4 9/16	1 1/4	4 5/8	2.531	2.953	4 clamps Part No. 899-9125	6	962-1624
				5 1/8				6 1/2	962-1626
				5 5/8				7	962-1628
				6 1/8				7 1/2	962-1630
				3 5/8				5	962-2020
				4 1/8				5 1/2	962-2022
2 1/2	3.6804	4 1/16	1 1/4	4 5/8	2.259	2.681	4 clamps Part No. 899-9125	6	962-2024
				5 1/8				6 1/2	962-2026
				5 5/8				7	962-2028
				6 1/8				7 1/2	962-2030
3	4.1804	4 9/16	1 1/4	4 5/8	2.531	2.953	4 clamps Part No. 899-9125	5	962-2420
				5 1/8				5 1/2	962-2422
				5 5/8				6	962-2424
				6 1/8				6 1/2	962-2426
3	4.1804	4 9/16	1 1/4	5 1/8	2.531	2.953	4 clamps Part No. 899-9125	7	962-2428
				5 5/8				7	962-2428
				6 1/8				7 1/2	962-2430
				6 1/8				7 1/2	962-2430



BALL BEARING COMPONENTS

Straight Guide Posts

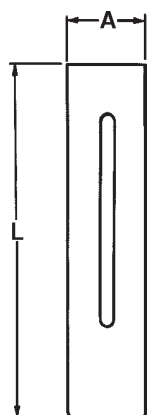


Lempco's Straight Guide Posts for ball bearing assemblies are manufactured from electric furnace 52100 chromium tool steel, through hardened to maintain the operating preload, and precision ground.

Like all other Lempco ball bearing guide posts, bushings and ball bearing retainers or rotainers, they are completely interchangeable and if mounted in accordance with instructions on Page 89 of this catalog will not require select fitting, honing or other modification.

A slot to maintain the ball bearing retainer or rotainer on the guide post is machined along its length. The end radius of the post is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement at high speeds.

Sizes other than those listed are available on special order.



Post Diameter A	Length L	Catalog Numbers
3/4 (.753)	3	951-0612
	3 1/4	951-0613
	3 1/2	951-0614
	3 3/4	951-0615
	4	951-0616
	4 1/4	951-0617
	4 1/2	951-0618
	4 3/4	951-0619
	5	951-0620
1 (1.003)	5 1/2	951-0622
	6	951-0624
	3 3/4	951-0815
	4	951-0816
	4 1/4	951-0817
	4 1/2	951-0818
	4 3/4	951-0819
	5	951-0820
	5 1/4	951-0821
	5 1/2	951-0822
	5 3/4	951-0823
	6	951-0824
6 1/2	951-0826	
7	951-0828	
7 1/2	951-0830	
8	951-0832	
8 1/2	951-0834	
9	951-0836	
10	951-0840	
11	951-0844	
12	951-0848	
1 1/4 (1.253)	4 1/2	951-1018
	4 3/4	951-1019
	5	951-1020
	5 1/4	951-1021
	5 1/2	951-1022
	5 3/4	951-1023
	6	951-1024
	6 1/2	951-1026
	7	951-1028
	7 1/2	951-1030
	8	951-1032
	8 1/2	951-1034
9	951-1036	
10	951-1040	
11	951-1044	
12	951-1048	

Post Diameter A	Length L	Catalog Numbers
1 1/2 (1.503)	4 1/2	951-1218
	4 3/4	951-1219
	5	951-1220
	5 1/4	951-1221
	5 1/2	951-1222
	5 3/4	951-1223
	6	951-1224
	6 1/2	951-1226
	7	951-1228
	7 1/2	951-1230
	8	951-1232
	8 1/2	951-1234
	9	951-1236
	9 1/2	951-1238
1 3/4 (1.753)	10	951-1240
	10 1/2	951-1242
	11	951-1244
	11 1/2	951-1246
	12	951-1248
	12 1/2	951-1250
	13	951-1252
	14	951-1256
	5	951-1420
	5 1/4	951-1421
	5 1/2	951-1422
	5 3/4	951-1423
	6	951-1424
	6 1/4	951-1425
6 1/2	951-1426	
7	951-1428	
7 1/2	951-1430	
8	951-1432	
8 1/2	951-1434	
9	951-1436	
9 1/2	951-1438	
10	951-1440	
10 1/2	951-1442	
11	951-1444	
11 1/2	951-1446	
12	951-1448	
12 1/2	951-1450	
13	951-1452	
14	951-1456	
15	951-1460	
17	951-1468	

Post Diameter A	Length L	Catalog Numbers
2 (2.003)	5 1/2	951-1622
	5 3/4	951-1623
	6	951-1624
	6 1/4	951-1625
	6 1/2	951-1626
	6 3/4	951-1627
	7	951-1628
	7 1/4	951-1629
	7 1/2	951-1630
	7 3/4	951-1631
	8	951-1632
	8 1/2	951-1634
	9	951-1636
	9 1/2	951-1638
	10	951-1640
	10 1/2	951-1642
	11	951-1644
	2 1/2 (2.503)	11 1/2	951-1646
12		951-1648
12 1/2		951-1650
13		951-1652
14		951-1656
15		951-1660
16		951-1664
17		951-1668
18		951-1672
8		951-2032
8 1/2	951-2034	
9	951-2036	
10	951-2040	
11	951-2044	
12	951-2048	
13	951-2052	
14	951-2056	
17	951-2068	
20	951-2080	
3 (3.003)	8	951-2432
	8 1/2	951-2434
	9	951-2436
	10	951-2440
	11	951-2444
	12	951-2448
	13	951-2452
	14	951-2456
17	951-2468	
20	951-2480	

BALL BEARING COMPONENTS



Flanged Demountable Guide Posts

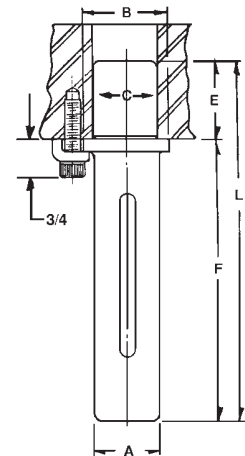


Diameter			Nominal Length					Catalog Numbers
Post A	Flange B	C	E	F	Radius		L	
					M	N		
1 (1.003)	1 ⁵ / ₁₆	1.0009 1.0006	1 ³ / ₁₆	1 ³ / ₁₆	1 ¹ / ₈	3 clamps Part No. 899-9225	2 ¹ / ₂	3 ³ / ₄ 956-0815
							2 ³ / ₄	4 956-0816
							3	4 ¹ / ₄ 956-0817
							3 ¹ / ₄	4 ¹ / ₂ 956-0818
							3 ¹ / ₂	4 ³ / ₄ 956-0819
							3 ³ / ₄	5 956-0820
							4	5 ¹ / ₄ 956-0821
							4 ¹ / ₄	5 ¹ / ₂ 956-0822
							4 ¹ / ₂	5 ³ / ₄ 956-0823
							4 ³ / ₄	6 956-0824
							5 ¹ / ₄	6 ¹ / ₂ 956-0826
							5 ³ / ₄	7 956-0828
							6 ¹ / ₄	7 ¹ / ₂ 956-0830
							6 ³ / ₄	8 956-0832
							1 ¹ / ₄ (1.253)	1 ⁹ / ₁₆	1.2509 1.2506	1^{3}/_{16}	6^{3}/_{64}	1^{25}/_{64}	3 clamps Part No. 899-9325	3^{1}/_{4}	4^{1}/_{2} 956-1018
3 ¹ / ₂	4 ³ / ₄ 956-1019							
3 ³ / ₄	5 956-1020							
4	5 ¹ / ₄ 956-1021							
4 ¹ / ₄	5 ¹ / ₂ 956-1022							
4 ¹ / ₂	5 ³ / ₄ 956-1023							
4 ³ / ₄	6 956-1024							
5 ¹ / ₄	6 ¹ / ₂ 956-1026							
5 ³ / ₄	7 956-1028							
6 ¹ / ₄	7 ¹ / ₂ 956-1030							
6 ³ / ₄	8 956-1032							
7 ¹ / ₄	8 ¹ / ₂ 956-1034							
7 ³ / ₄	9 956-1036							
8 ³ / ₄	10 956-1040							
1 ¹ / ₂ (1.503)	1 ⁷ / ₈	1.5009 1.5006	1 ⁷ / ₁₆	1 ¹ / ₈	1 ¹⁷ / ₃₂	3 clamps Part No. 899-9325								3	4^{1}/_{2} 956-1218
							3 ¹ / ₄	4 ³ / ₄ 956-1219
							3 ¹ / ₂	5 956-1220
							3 ³ / ₄	5 ¹ / ₄ 956-1221
							4	5 ¹ / ₂ 956-1222
							4 ¹ / ₄	5 ³ / ₄ 956-1223
							4 ¹ / ₂	6 956-1224
							5	6 ¹ / ₂ 956-1226
							5 ¹ / ₂	7 956-1228
							6	7 ¹ / ₂ 956-1230
							6 ¹ / ₂	8 956-1232
							7	8 ¹ / ₂ 956-1234
							7 ¹ / ₂	9 956-1236
							8	9 ¹ / ₂ 956-1238
							1 ³ / ₄ (1.753)	2 ¹ / ₄	1.7509 1.7506	1^{11}/_{16}	1^{19}/_{64}	1^{45}/_{64}	4 clamps Part No. 899-9325	3	5^{1}/_{2} 956-1420
3 ¹ / ₂	5 ³ / ₄ 956-1421							
3 ³ / ₄	5 ¹ / ₂ 956-1422							
4	5 ³ / ₄ 956-1423							
4 ¹ / ₄	6 956-1424							
4 ¹ / ₂	6 ¹ / ₄ 956-1425							
4 ³ / ₄	6 ¹ / ₂ 956-1426							
5 ¹ / ₄	7 956-1428							
5 ¹ / ₂	7 ¹ / ₂ 956-1430							
6 ¹ / ₄	8 956-1432							
6 ³ / ₄	8 ¹ / ₂ 956-1434							
7 ¹ / ₄	9 956-1436							
7 ³ / ₄	9 ¹ / ₂ 956-1438							
8 ¹ / ₄	10 956-1440							
8 ³ / ₄	10 ¹ / ₂ 956-1442							
9 ¹ / ₄	11 956-1444							
9 ³ / ₄	11 ¹ / ₂ 956-1446							
10 ¹ / ₄	12 956-1448							
10 ³ / ₄	12 ¹ / ₂ 956-1450							
11 ¹ / ₄	13 956-1452							

Diameter			Nominal Length					Catalog Numbers							
Post A	Flange B	C	E	F	Radius		L								
					M	N									
1 ³ / ₄ (1.753)	2 ¹ / ₄	1.7509 1.7506	1 ¹¹ / ₁₆	1 ¹⁹ / ₆₄	1 ⁴⁵ / ₆₄	4 clamps Part No. 899-9325	14	956-1456							
							15	956-1460							
							17	956-1468							
							2 (2.003)	2 ¹ / ₂	2.0009 2.0006	1 ¹⁵ / ₁₆	1 ²⁷ / ₆₄	1 ⁵³ / ₆₄	4 clamps Part No. 899-9325	5 ¹ / ₂	956-1622
														5 ³ / ₄	956-1623
														6	956-1624
														6 ¹ / ₄	956-1625
														6 ¹ / ₂	956-1626
														6 ³ / ₄	956-1627
														7	956-1628
														7 ¹ / ₄	956-1629
														7 ¹ / ₂	956-1630
														7 ³ / ₄	956-1631
														8	956-1632
														8 ¹ / ₂	956-1634
9	956-1636														
9 ¹ / ₂	956-1638														
2 ¹ / ₂ (2.503)	3	2.5009 2.5006	1 ¹⁵ / ₁₆	1 ⁴³ / ₆₄	2 ⁵ / ₆₄	4 clamps Part No. 899-9325								9 ¹ / ₂	956-1640
							10 ¹ / ₂	956-1642							
							11	956-1644							
							11 ¹ / ₂	956-1646							
							12	956-1648							
							12 ¹ / ₂	956-1650							
							13	956-1652							
							14	956-1656							
							15	956-1660							
							16	956-1664							
							17	956-1668							
							18	956-1672							
							8	956-2032							
							8 ¹ / ₂	956-2034							
							9	956-2036							
10	956-2040														
11	956-2044														
12	956-2048														
13	956-2052														
14	956-2056														
17	956-2068														
20	956-2080														
3 (3.003)	3 ¹ / ₂	3.0009 3.0006	2 ⁷ / ₁₆	1 ⁵⁹ / ₆₄	2 ²¹ / ₆₄	4 clamps Part No. 899-9325	8	956-2432							
							8 ¹ / ₂	956-2434							
							9	956-2436							
							10	956-2440							
							11	956-2444							
							12	956-2448							
							13	956-2452							
							14	956-2456							
							17	956-2468							
							20	956-2480							

The Lempco Flanged Demountable Guide Post for ball bearing assemblies is designed for those who prefer the convenience of a removable post to expedite die repairs. The post is tap fitted into the pin plate bore with the flange flush to the ground surface. See Page 89 for bore size data.

These ball bearing type Demountable Guide Posts are manufactured from electric furnace 52100 chromium tool steel.





BALL BEARING COMPONENTS

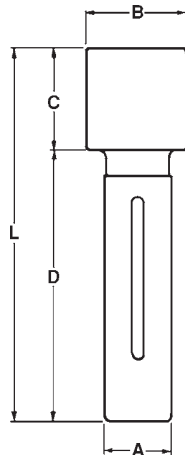
Shoulder Guide Posts



Shoulder Guide Posts when used with Shoulder Guide Post Bushings offer advantages in special ball bearing die set construction and rebuilding since the shoes may be clamped together and through bored. This type guide post is machined to a mounting diameter identical to that of the corresponding Shoulder Guide Post Bushing on opposite page.

Mounting diameters are a minimum of .008" over the sizes of Press Fit Steel Sleeve Bushings and .008" over the Demountable Steel Bushings to allow grind stock for precision fitting in new set construction and to allow reboring as necessary in replacing posts and bushings in used sets. These posts also may be used with Press Fit Sleeve Bushings and Demountable Bushings providing the through bore size accords with mounting diameters.

Lempco Shoulder Guide Posts are manufactured from electric furnace 52100 tool steel, through hardened and precision ground. They are interchangeable, and if mounted according to instructions on Page 89 of this catalog will not require modification. Mounting diameter lead edge should be smoothly blended after grinding to prevent broaching of bore or drift of component in assembly. Diameters and lengths not listed can be furnished on special order.

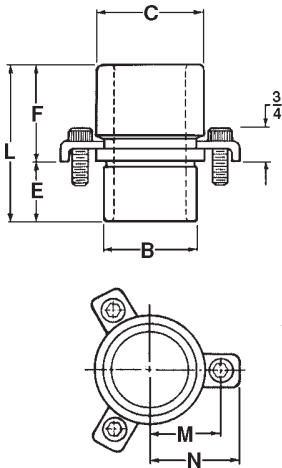


Diameter A	B	Length L	C	D	Catalog Numbers
1 (1.003)	1.725	4 ¹ / ₂	1 ³ / ₈	3	953-0818
		5		3 ¹ / ₂	953-0820
		5 ¹ / ₂		4	953-0822
		6		4 ¹ / ₂	953-0824
		6 ¹ / ₂		5	953-0826
		7		5 ¹ / ₂	953-0828
		7 ¹ / ₂		6	953-0830
		8		6 ¹ / ₂	953-0832
1 ¹ / ₄ (1.253)	2.115	5	1 ⁷ / ₈	3	953-1020
		5 ¹ / ₂		3 ¹ / ₂	953-1022
		6		4	953-1024
		6 ¹ / ₂		4 ¹ / ₂	953-1026
		7		5	953-1028
		7 ¹ / ₂		5 ¹ / ₂	953-1030
		8		6	953-1032
		8 ¹ / ₂		6 ¹ / ₂	953-1034
1 ¹ / ₂ (1.503)	2.445	7	2 ³ / ₈	4 ⁵ / ₈	953-1228
		7 ¹ / ₂		5 ¹ / ₈	953-1230
		8		5 ⁵ / ₈	953-1232
		8 ¹ / ₂		6 ¹ / ₈	953-1234
		9		6 ⁵ / ₈	953-1236
		9 ¹ / ₂		7 ¹ / ₈	953-1238
		10		7 ⁵ / ₈	953-1240
1 ³ / ₄ (1.753)	2.755	7 ¹ / ₂	2 ⁷ / ₈	4 ⁵ / ₈	953-1430
		8		5 ¹ / ₈	953-1432
		8 ¹ / ₂		5 ⁵ / ₈	953-1434
		9		6 ¹ / ₈	953-1436
		9 ¹ / ₂		6 ⁵ / ₈	953-1438
		10		7 ¹ / ₈	953-1440
2 (2.003)	3.170	8	3 ³ / ₈	4 ⁵ / ₈	953-1632
		9		5 ⁵ / ₈	953-1636
		10		6 ⁵ / ₈	953-1640
		11		7 ⁵ / ₈	953-1644
		12		8 ⁵ / ₈	953-1648
		13		9 ⁵ / ₈	953-1652
2 ¹ / ₂ (2.503)	3.690	9	3 ⁷ / ₈	5 ¹ / ₈	953-2036
		10		6 ¹ / ₈	953-2040
		11		7 ¹ / ₈	953-2044
		12		8 ¹ / ₈	953-2048
		13		9 ¹ / ₈	953-2052
		14		10 ¹ / ₈	953-2056

BALL BEARING COMPONENTS



Shoulder Guide Post Bushings



Steel Shoulder Guide Post Bushings are intended for use with Shoulder Guide Posts for Lempco ball bearing assemblies in special die set construction and rebuilding. They are similar to Lempco's Steel Demountable Bushings but are a minimum of .008" larger on the mounting diameter, corresponding to the additional material on the Shoulder Guide Post.

Shoulder Guide Post Bushings are manufactured from electric furnace 52100 tool steel, through hardened and precision ground. They may be installed either by tap or press fitting.

These bushings are interchangeable. If mounted according to instructions on Page 89 of this catalog they will not require select fitting, honing or other modification. Mounting diameter lead edge should be smoothly blended after grinding to prevent broaching of bore or drift during assembly. Diameters and lengths not listed are available on special order.



Nom. Post Diameter	B	C	E	F	Radius		L	Catalog Numbers
					M	N		
1	1.725	2	1	7/8	1.219	1.594	2	963-0808
				1 1/8			2 1/4	963-0809
				1 3/8			2 1/2	963-0810
				1 5/8			2 3/4	963-0811
				1 7/8			3	963-0812
				2 1/8			3 1/4	963-0813
				2 3/8			3 1/2	963-0814
				2 5/8			3 3/4	963-0815
				2 7/8			4	963-0816
1 1/4	2.115	2 3/8	1	1 3/8	1.442	1.864	2 1/2	963-1010
				1 5/8			2 3/4	963-1011
				1 7/8			3	963-1012
				2 1/8			3 1/4	963-1013
				2 3/8			3 1/2	963-1014
				2 5/8			3 3/4	963-1015
				2 7/8			4	963-1016
				3 1/8			4 1/4	963-1017
				3 3/8			4 1/2	963-1018
				3 7/8			5	963-1020
				4 3/8			5 1/2	963-1022
				4 7/8			6	963-1024
1 1/2	2.445	2 11/16	1 1/4	1 5/8	1.598	2.020	3	963-1212
				1 7/8			3 1/4	963-1213
				2 1/8			3 1/2	963-1214
				2 3/8			3 3/4	963-1215
				2 5/8			4	963-1216
				2 7/8			4 1/4	963-1217
				3 1/8			4 1/2	963-1218
				3 3/8			4 3/4	963-1219
				3 5/8			5	963-1220
				3 7/8			5 1/4	963-1221
				4 1/8			5 1/2	963-1222
				4 5/8			6	963-1224

Nom. Post Diameter	B	C	E	F	Radius		L	Catalog Numbers
					M	N		
1 3/4	2.755	3	1 1/4	1 5/8	1.754	2.176	3	963-1412
				2 1/8			3 1/2	963-1414
				2 3/8			3 3/4	963-1415
				2 5/8			4	963-1416
				2 7/8			4 1/4	963-1417
				3 1/8			4 1/2	963-1418
				3 3/8			4 3/4	963-1419
				3 5/8			5	963-1420
				3 7/8			5 1/4	963-1421
				4 1/8			5 1/2	963-1422
				4 5/8			6	963-1424
				5 1/8			6 1/2	963-1426
5 5/8	7	963-1428						
6 1/8	7 1/2	963-1430						
2	3.170	3 9/16	1 1/4	1 5/8	2.035	2.457	3	963-1612
				2 1/8			3 1/2	963-1614
				2 3/8			3 3/4	963-1615
				2 5/8			4	963-1616
				2 7/8			4 1/4	963-1617
				3 1/8			4 1/2	963-1618
				3 3/8			4 3/4	963-1619
				3 5/8			5	963-1620
				3 7/8			5 1/4	963-1621
				4 1/8			5 1/2	963-1622
				4 5/8			6	963-1624
				5 1/8			6 1/2	963-1626
5 5/8	7	963-1628						
6 1/8	7 1/2	963-1630						
2 1/2	3.690	4 1/16	1 1/4	3 5/8	2.259	2.681	5	963-2020
				4 1/8			5 1/2	963-2022
				4 5/8			6	963-2024
				5 1/8			6 1/2	963-2026
				5 5/8			7	963-2028
				6 1/8			7 1/2	963-2030



BALL BEARING COMPONENTS

Demountable Guide Post Supports and Boss Bushings

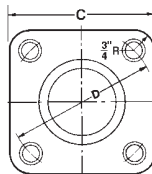
Demountable Guide Post Supports and Boss Bushings are offered for heavy duty ball bearing die set construction. Boss Bushings are castings, fitted with through hardened 52100 tool steel liners. Type A offers guidance entirely within the die set. Type B extends guidance within the dieholder. Type C provides guidance almost entirely within the dieholder.

Post Supports, also castings, are machined to accept related ball bearing guide posts. Type A supports the post entirely within the die set, Type B extends support within the punchholder. Type C supports the guide post almost entirely within the punchholder. Boss Bushings and Post Supports are intended either for tap or press fitting, and are held perpendicular to the surface by flanges and cap screws.

These Guide Post Supports and Boss Bushings are interchangeable and if mounted in accordance with instructions on Page 89 of this catalog will not require modification. Ball Bearing bushings and supports other than those listed can be obtained on special order.

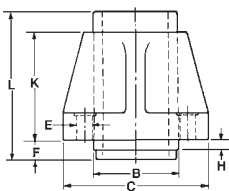


TYPES A, B

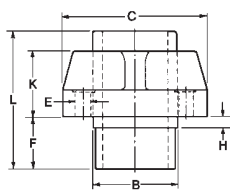


TYPE C

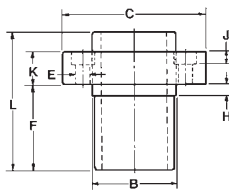
DEMOUNTABLE BOSS BUSHINGS



TYPE A

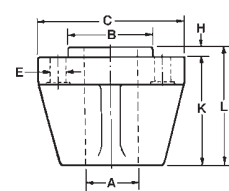


TYPE B

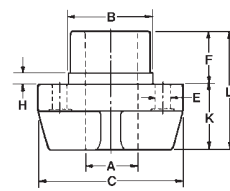


TYPE C

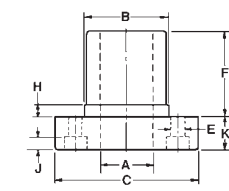
DEMOUNTABLE GUIDE POST SUPPORTS



TYPE A



TYPE B



TYPE C

TYPE A-DEMOUNTABLE BOSS BUSHINGS

Post Diameter		General Dimensions								Catalog Numbers	
Nom.	Dec.	B	C	D	E	F	H	K	L		
2	2.003	3.162	5 1/2	5 1/2	2 1/32	*	∅	2 5/8	*	960-1601	
								3 5/8			960-1602
								4 5/8			960-1603
2 1/2	2.503	3.682	6	6	2 1/32	*	∅	3 5/8	*	960-2001	
								4 5/8			960-2002
								5 5/8			960-2003
3	3.003	4.182	7	7	2 5/32	*	∅	4 1/8	*	960-2401	
								5 5/8			960-2402
								8 5/8			960-2403

TYPE B-DEMOUNTABLE BOSS BUSHINGS

Post Diameter		General Dimensions								Catalog Numbers
Nom.	Dec.	B	C	D	E	F	H	K	L	
2	2.003	3.162	5 1/2	5 1/2	2 1/32	*	∅	2	*	960-1604
2 1/2	2.503	3.682	6	6	2 1/32	*	∅	2 1/4	*	960-2004
3	3.003	4.182	7	7	2 5/32	*	∅	2 1/2	*	960-2404

TYPE C-DEMOUNTABLE BOSS BUSHINGS

Post Diameter		General Dimensions								Catalog Numbers	
Nom.	Dec.	B	C	D	E	J	F	H	K		L
2	2.003	3.162	5 1/2	5 1/2	2 1/32	2 1/32	*	∅	1 1/4	*	960-1607
2 1/2	2.503	3.682	6	6	2 1/32	2 1/32	*	∅	1 1/4	*	960-2007
3	3.003	4.182	7	7	2 5/32	2 5/32	*	∅	1 1/4	*	960-2407

TYPE A-DEMOUNTABLE GUIDE POST SUPPORTS

Post Diameter		General Dimensions								Catalog Numbers	
Nom.	Dec.	A	B	C	D	E	H	K	L		
2	2.003	2.002	3.162	5 1/2	5 1/2	2 1/32	3/8	2 5/8	3	960-1610	
								3 5/8	4		960-1611
								4 5/8	5		960-1612
2 1/2	2.503	2.502	3.682	6	6	2 1/32	3/8	3 5/8	3 3/4	960-2010	
								4 5/8	5		960-2011
								5 5/8	6 1/4		960-2012
3	3.003	3.002	4.182	7	7	2 5/32	3/8	4 1/8	4 1/2	960-2410	
								5 5/8	6		960-2411
								8 5/8	9		960-2412

TYPE B-DEMOUNTABLE GUIDE POST SUPPORTS

Post Diameter		General Dimensions								Catalog Numbers			
Nom.	Dec.	A	B	C	D	E	F	H	K		L		
2	2.003	2.002	3.162	5 1/2	5 1/2	2 1/32	1	3/8	2	3	960-1613		
							2					4	960-1614
							3					5	960-1615
2 1/2	2.503	2.502	3.682	6	6	2 1/32	1 1/2	3/8	2 1/4	5	960-2013		
							2 3/4					6 1/4	960-2015
							4					6 1/2	960-2016
3	3.003	3.002	4.182	7	7	2 5/32	2	3/8	2 1/2	6	960-2413		
							3 1/2					6	960-2414
							6 1/2					9	960-2415

TYPE C-DEMOUNTABLE GUIDE POST SUPPORTS

Post Diameter		General Dimensions								Catalog Numbers				
Nom.	Dec.	A	B	C	D	E	J	F	H		K	L		
2	2.003	2.002	3.162	5 1/2	5 1/2	2 1/32	2 1/32	1 3/4	3/8	1 1/4	3	960-1616		
								2 3/4					4	960-1617
								3 3/4					5	960-1618
2 1/2	2.503	2.502	3.682	6	6	2 1/32	2 1/32	2 1/2	3/8	1 1/4	5	960-2016		
								3 3/4					6 1/4	960-2017
								5					6 1/2	960-2018
3	3.003	3.002	4.182	7	7	2 5/32	2 5/32	3 1/4	3/8	1 1/4	4 1/2	960-2416		
								4 3/4					6	960-2417
								7 3/4					9	960-2418

* Customer must specify, and whether for tap or press fitting.
 ∅ If demountable Boss Bushings are specified for tap fitting "H" will be supplied 3/8" unless customer indicates otherwise. For satisfactory results ("K" plus "F") for PRESS FIT use or ("K" plus "H") for TAP FIT use should at least be equal to, and preferably 1 1/2 times, bushing sleeve outside diameter "B".

BALL BEARING ENGINEERING DATA

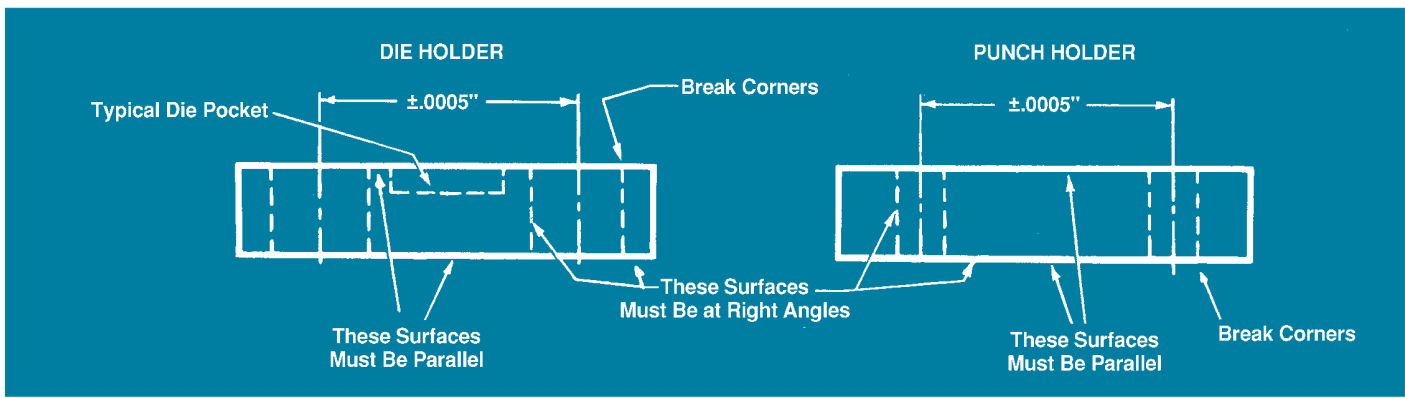
Boring Procedures and Dimensions

Holes for Lempco Ball Bearing Guide Posts and Bushings should be jig bored for best results. Punchholder and dieholder should be clamped together and bored in one setup in order to maintain dead center alignment between the upper and lower bores. If it is not possible to bore in this manner, a tolerance of $\pm .0005"$ between centers (see illustration) must be held. Bores should be smooth and free from tool marks to provide proper bearing area for the guide post and bushing.

Dieholder bores must be perpendicular to that surface

of the dieholder which will back up the die. The bottom surface of the dieholder must be parallel to the die back-up surface. The same holds true for the punchholder; the bores must be perpendicular to that surface which will back up the punches, and the top surface parallel to the punch back-up surface.

Break the corners of the bored holes to a generous chamfer. On sets with a symmetrical profile one pin and bushing should be offset to prevent accidental reversing of the punchholder during assembly.



All Lempco Ball Bearing Guide Posts, Bushings Retainers and Rotainers are completely interchangeable without any necessity whatsoever for select fitting of any kind, and if mounted in accordance with boring and assembly instructions given on this and the following page do not require any

grinding, honing, lapping, or any other modifications of any kind. Please note the dimensions given in the following table. Our experience over many years proves that these are optimum dimensions. Variations must be avoided.

BORE CHART BALL BEARING COMPONENTS (INCH)

Nominal Guide Post Diameter	#951-SERIES STRAIGHT GUIDE PIN	#956-SERIES DEMOUNTABLE GUIDE PIN	#953-SERIES SHOULDER GUIDE PIN	#961-SERIES STRAIGHT SLEEVE BUSHING	#962-SERIES DEMOUNTABLE SHOULDER BUSHING	#960-SERIES DEMOUNTABLE GUIDE POST SUPPORT AND BOSS BUSHING	#960-SERIES DEMOUNTABLE GUIDE POST SUPPORT AND BOSS BUSHING
	(PRESS FIT)	(TAP FIT)	(PRESS FIT)	(PRESS FIT)	(TAP FIT)	(TAP FIT)	(PRESS FIT)
	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE
3/4"	.7513 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	N/A	N/A	1.3858 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	N/A	N/A	N/A
1"	1.0013 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.0013 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	BORE HOLE .0009" TO .0019" SMALLER THAN SHOULDER DIAMETER OF GUIDE PIN	1.7158 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.7158 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	N/A	N/A
1 1/4"	1.2513 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.2513 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		2.1058 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	2.1058 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	N/A	N/A
1 1/2"	1.5013 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.5013 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		2.4358 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	2.4358 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	N/A	N/A
1 3/4"	1.7513 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.7513 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		2.7458 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	2.7458 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	N/A	N/A
2"	2.0013 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	2.0013 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		3.1608 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	3.1608 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	3.1621 $\begin{smallmatrix} +.0000 \\ -.0004 \end{smallmatrix}$	3.1612 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$
2 1/2"	2.5013 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	2.5013 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	3.6808 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	3.6808 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	3.6821 $\begin{smallmatrix} +.0000 \\ -.0004 \end{smallmatrix}$	3.6812 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	
3"	3.0013 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	3.0013 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	N/A	4.1808 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	4.1808 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	4.1821 $\begin{smallmatrix} +.0000 \\ -.0004 \end{smallmatrix}$	4.1812 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$



BALL BEARING ENGINEERING DATA

Installation and Assembly Instructions

In order to maintain die and punch alignment it is essential that the guide posts and bushings be at absolute right angles with the punch and die back-up surfaces.

FIGURE 1 represents a typical guide post and ROTAINER®. Please note that the end of the guide post with the *small* radius is press fit into the punch shoe, and that the ROTAINER® is assembled with the ROTAINER® Slide assembly toward the same end of the guide post. On the bushing, however, the end with the *large* outside diameter radius is press fit into the die shoe.

Note: Lempco Demountable Bushings and Flanged Demountable Guide Posts are tap fitted. Bores should be to specifications, and both bushings and guide posts should be seated flush to ground surface of support shoe and held securely by clamps and cap screws. These bushings and guide posts are removable; on installation the die will register accurately.

Check the squareness of the guide post or bushing with a precision square. Tap the sides slightly with a soft hammer until the guide post or bushing is perpendicular.

Press fit about 1/4" and check with the precision square again, tapping the sides with a soft hammer as necessary, to ensure squareness. A bronze, babbit

or fiber hammer is recommended .
Note: With Demountable Boss Bushings be sure to press against the hardened liner and not against the casting.

Press fit by small increments (not over 1/2" each) checking with the precision square after each press. Do not allow guide post or bushing to protrude through the lower side of the plate. It is advisable to place 1/64" shim under the guide post or bushing as a stop.

For Demountable Boss Bushings and Demountable Bushings – after the bushing is tap fit to the shoulder, the shoe may be drilled with the bushing in place. Tighten screws gradually, moving from one to another until all are tight.

After complete assembly of the bushings check the ID top and bottom for taper. Should taper be found, hone the ID until original size is obtained.

Note: This should not be necessary if boring instructions were strictly adhered to.

Assemble ROTAINER® to guide post (FIGURE 1) by screwing the set screw in until flush with special ROTAINER® slide. Vertical and rotational movement should now be

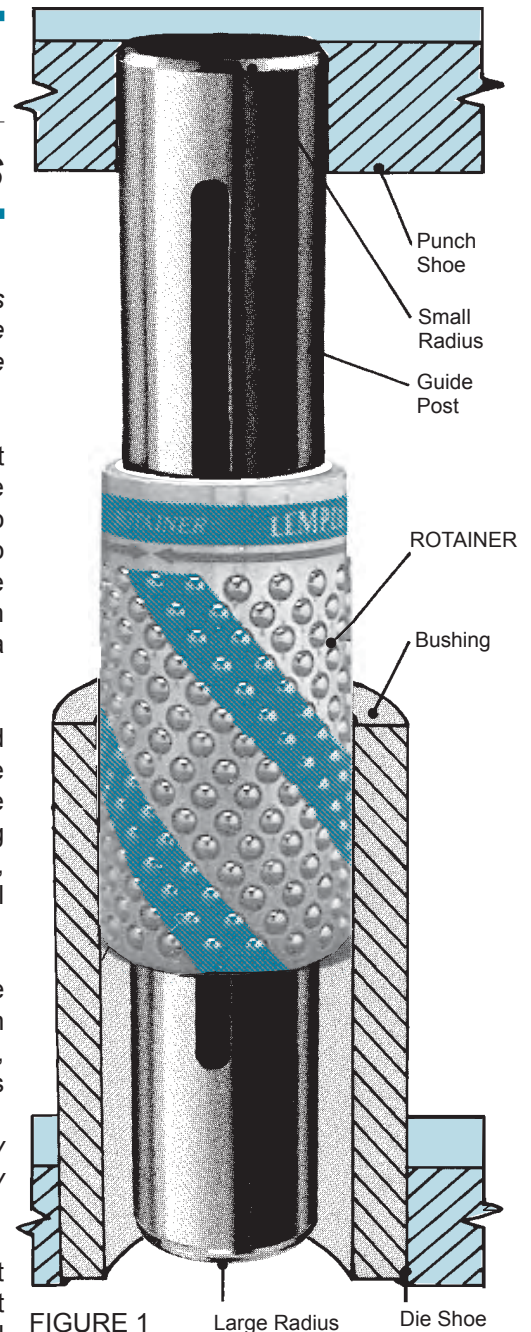


FIGURE 1 Large Radius Die Shoe

tested to insure freedom of movement. After testing is completed, stake set screw. Lubricate only with light spindle oil.
Note: The only tool necessary to assemble the ROTAINER® is a screw driver.

Assemble punch and die holder. Be sure to allow ROTAINERS® to hang free (see FIGURE 2) supported by the special ROTAINER® slide when assembling die set. Work punch holder up and down a few times to assure there is no binding.

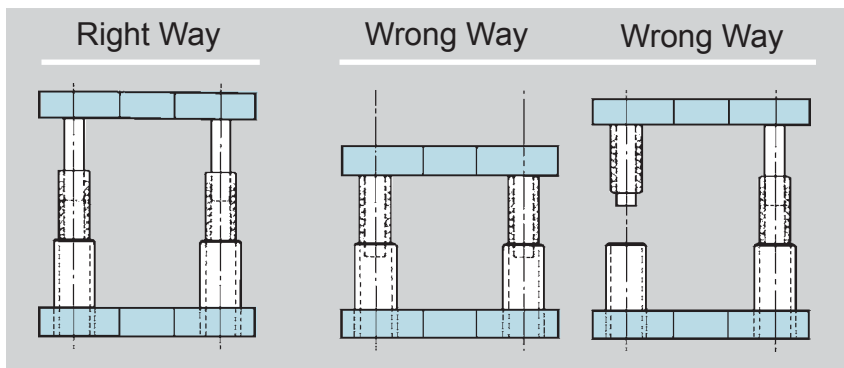


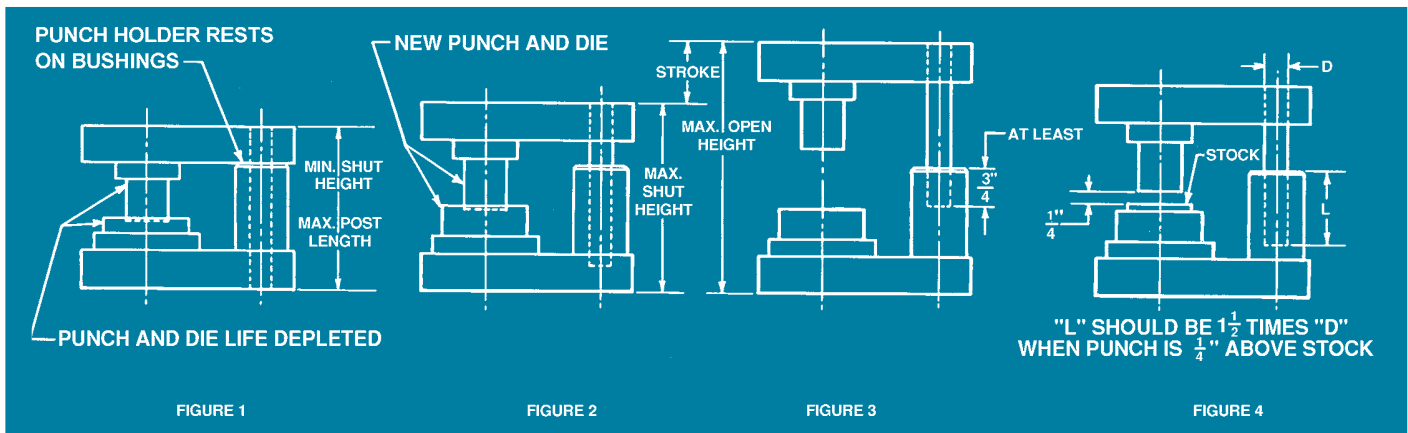
FIGURE 2

BALL BEARING ENGINEERING DATA

General Die Set Design Procedures

SPECIFICATIONS:

1. Maximum Shut Height – See Figure 2, below.
2. Minimum Shut Height – See Figure 1.
3. Stroke – See Figures 2 and 3.
4. Maximum Open Height – See Figures 2 and 3.



- A. Lay out die as in Figure 1 (Minimum Shut Height). This determines maximum guide post length and maximum bushing height.
- B. Lay out die as in Figure 2 (Maximum Shut Height).
- C. Maximum Open Height (Maximum Shut Height plus Stroke) as in Figure 3 shows minimum guide post engagement in bushing that is required. If this is at least $\frac{3}{4}$ " then conditions are ideal. However, if this dimension is less than $\frac{3}{4}$ " then Figure 4 should be considered. Actual work is done for only a fraction of the total stroke on most dies and if conditions shown in Figure 4 are satisfied in conjunction with Figure 1 and Figure 2 then full length of stroke and maximum open height can be disregarded.

ALSO NOTE HOWEVER THAT LONGER THAN NORMAL STROKES MAY BE UTILIZED BY DISENGAGING GUIDE POST AND, IF ABSOLUTELY NECESSARY, THE ROTAINER FROM BUSHING ON THE UPWARD TRAVEL PROVIDED: 1 – OPERATION IS VERTICAL, 2 – OPERATION IS NOT FASTER THAN 150 STROKES PER MINUTE, AND 3 – INSIDE DIAMETER OF BUSHING IS BELL MOUTHED MINIMUM $\frac{1}{4}$ ".

ON INCLINED OPERATIONS, OR AT SPEEDS IN EXCESS OF 150 STROKES PER MINUTE, THE GUIDE POST MUST ENGAGE THE BUSHING AT ALL TIMES AT LEAST $\frac{3}{4}$ " (THE ROTAINER MUST BE ENGAGED BY THE GUIDE POST AND BUSHINGS AT ALL TIMES).

WARNING

BECAUSE IT IS IMPOSSIBLE TO ANTICIPATE THE CONDITIONS UNDER WHICH LEMPCO MFG. ITEMS WILL BE OPERATED, SAFETY DEVICES AND METHODS MAY BE REQUIRED TO INSURE OPERATOR SAFETY. BESIDES CONFORMING TO ALL NATIONAL, STATE, AND LOCAL CODES, THE BUYER SHOULD CONSIDER THE SAFETY OF THE ENTIRE OPERATION INVOLVING ANY PRESS, AND SEE THAT ANY ADDITIONAL GUARDING, TRAINING, AND MAINTENANCE NECESSARY IS DEVELOPED AND ENFORCED TO PROTECT THE WELL BEING OF THE OPERATOR.



PLAIN BEARING COMPONENTS

Precision Bronze Plated Demountable Bushings

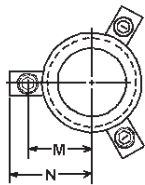
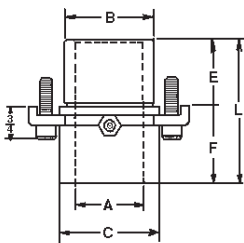
Lempco Precision Bronze Plated Demountable Bushings are designed for use under high speed operating conditions. Dimensions are closely held in machining and plating to permit interchangeability. They are intended for tap fitting, to be held securely with clamps and cap screws. They can be conveniently removed and upon re-installation the die set will register accurately.

These bushings must not be pressed in and must not be honed. Mounting instructions on Pages 101 and 102 of this catalog must be strictly adhered to. They are

equipped with figure-eight oil grooves. The Shoulder Bushing has a lubrication fitting, the Short Shoulder Bushing has an oil hole.

Clamps and screws are provided with bushings, from two to four sets per bushing, depending on diameter. Bushing sizes listed here will usually satisfy requirements, but other diameters and lengths are available on special order.

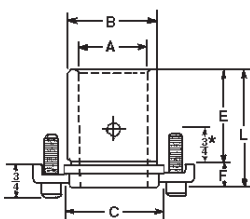
SHOULDER – Bronze Plated



Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.500	1 ³ / ₄	7 ⁷ / ₈	1 ¹ / ₄	2 ¹ / ₈	1.072	1.385	624-0809
1 ¹ / ₄	1.252	1.750	2 ¹ / ₁₆	1 ¹ / ₈	1 ¹ / ₂	2 ⁵ / ₈	1.281	1.703	624-1011
1 ¹ / ₂	1.502	2.000	2 ⁵ / ₁₆	1 ³ / ₈	1 ¹ / ₂	2 ⁷ / ₈	1.411	1.833	624-1212
1 ³ / ₄	1.752	2.250	2 ⁵ / ₈	1 ⁵ / ₈	1 ¹ / ₂	3 ¹ / ₈	1.567	1.989	624-1413
2	2.002	2.500	3 ¹ / ₃₂	1 ⁷ / ₈	1 ¹ / ₂	3 ³ / ₈	1.782	2.204	624-1614
2 ¹ / ₂	2.502	3.000	3 ⁵ / ₈	1 ⁷ / ₈	2	3 ⁷ / ₈	2.086	2.508	624-2016
3	3.002	3.625	4 ³ / ₈	1 ⁷ / ₈	2	3 ⁷ / ₈	2.468	2.889	624-2416



SHORT SHOULDER – Bronze Plated



Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.500	1 ³ / ₄	1 ³ / ₈	1 ¹ / ₂	1 ⁷ / ₈	1.082	1.395	623-0808
1 ¹ / ₄	1.252	1.750	2 ¹ / ₁₆	1 ⁷ / ₈	1 ¹ / ₂	2 ³ / ₈	1.286	1.708	623-1010
1 ¹ / ₂	1.502	2.000	2 ⁵ / ₁₆	1 ⁷ / ₈	1 ¹ / ₂	2 ³ / ₈	1.411	1.833	623-1210
1 ³ / ₄	1.752	2.250	2 ⁵ / ₈	2 ³ / ₈	1 ¹ / ₂	2 ⁷ / ₈	1.567	1.989	623-1412
2	2.002	2.500	2 ¹⁵ / ₁₆	2 ³ / ₈	1 ¹ / ₂	2 ⁷ / ₈	1.734	2.156	623-1612
2 ¹ / ₂	2.502	3.000	3 ³ / ₈	2 ⁵ / ₈	3 ³ / ₈	3	1.959	2.381	623-2012
3	3.002	3.500	3 ⁷ / ₈	3 ⁵ / ₈	3 ³ / ₈	4	2.214	2.636	623-2416



*1¹/₄" on 2¹/₂ and 3" diameter bushings

PLAIN BEARING COMPONENTS

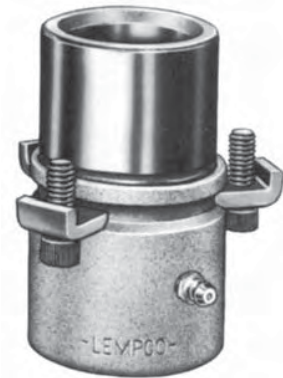


Precision Demountable Bushings

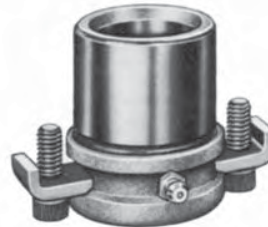
Lempco Precision Demountable Bushings, also see Page 94, which are manufactured from electric furnace 52100 tool steel include the Steel Shoulder, Steel Short Shoulder, Steel Extra Long Shoulder types, and the Bronze Shoulder and Bronze Plated Shoulder and Short Shoulder types. The Bronze Plated bushings are described on the preceding page.

All Lempco Demountable Bushings are designed for tap fitting. They should not be pressed in. They will not require select fitting, honing or modification of any kind if mounted in accordance with instructions on Pages 101 and 102 of this catalog. They are assembled to the shoe with clamps and cap screws, seating flush to the surface with the bore perpendicular. These bushings can be conveniently removed, and on reinstallation the die set will register accurately.

The end radius of the bushing is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement. All Precision Demountable Bushings have oil grooves and lubrication fittings. For practical purposes the bushings listed here are adequate, but different diameters and lengths can be obtained on special order.



SHOULDER – Steel



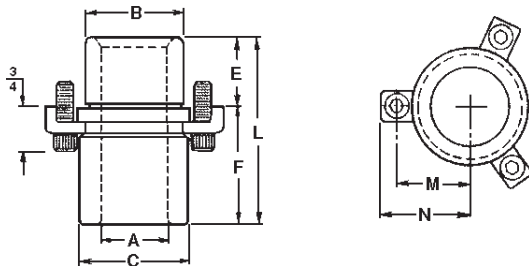
SHORT SHOULDER – Steel



EXTRA LONG SHOULDER – Steel



SHOULDER – Bronze



CLAMPS FOR ASSEMBLY

Inside Dia. A		Number Clamps
Nom.	Clamp No.	
1/2 to 1	899-9025	2
1 1/4 to 1 1/2	899-9125	3
1 3/4 to 3	899-9125	4



PLAIN BEARING COMPONENTS

Precision Demountable Bushings

SHOULDER – Steel

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1/2	.502	.812	15/16	5/8	1 1/2	2 1/8	.697	1.010	664-0409
5/8	.627	1.000	1 3/16	5/8	1 1/2	2 1/8	13/16	1 1/8	664-0509
3/4	.752	1.125	1 5/16	7/8	1 3/4	2 5/8	7/8	1 3/16	664-0611
1	1.002	1.500	1 11/16	7/8	1 3/4	2 5/8	1 1/16	1 3/8	664-0811
1 1/4	1.252	1.750	1 15/16	1 1/8	2	3 1/8	1 7/32	1 17/32	664-1013
1 1/2	1.502	2.000	2 3/16	1 3/8	2	3 3/8	1 11/32	1 21/32	664-1214
1 3/4	1.752	2.250	2 1/2	1 3/8	2	3 3/8	1 1/2	1 13/16	664-1414
2	2.002	2.500	2 7/8	1 13/16	2	3 13/16	1 45/64	2 1/64	664-1616
2 1/2	2.502	3.250	3 5/8	1 13/16	2 1/2	4 5/16	2 5/64	2 25/64	664-2018
3	3.002	3.750	4 1/8	1 13/16	2 1/2	4 5/16	2 11/32	2 21/32	664-2418

SHORT SHOULDER – Steel

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1/2	.502	.812	15/16	5/8	1 3/16	1 7/16	.697	1.010	663-0406
5/8	.627	1.000	1 3/16	5/8	1 3/16	1 7/16	13/16	1 1/8	663-0506
3/4	.752	1.125	1 5/16	7/8	1 3/16	1 11/16	7/8	1 3/16	663-0607
1	1.002	1.500	1 11/16	7/8	1 3/16	1 11/16	1 1/16	1 3/8	663-0807
1 1/4	1.252	1.750	1 15/16	1 1/8	1 3/16	1 15/16	1 7/32	1 17/32	663-1008
1 1/2	1.502	2.000	2 3/16	1 3/8	1 3/16	2 3/16	1 11/32	1 21/32	663-1209
1 3/4	1.752	2.250	2 1/2	1 3/8	1	2 3/8	1 1/2	1 13/16	663-1410
2	2.002	2.500	2 7/8	1 13/16	1	2 13/16	1 45/64	2 1/64	663-1612
2 1/2	2.502	3.250	3 5/8	1 13/16	1	2 13/16	2 5/64	2 25/64	663-2012
3	3.002	3.750	4 1/8	1 13/16	1	2 13/16	2 11/32	2 21/32	663-2412

EXTRA LONG SHOULDER – Steel

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.500	1 11/16	7/8	3	3 7/8	1 1/16	1 3/8	655-0816
1 1/4	1.252	1.750	1 15/16	1 1/8	3	4 1/8	1 7/32	1 17/32	655-1017
1 1/2	1.502	2.000	2 3/16	1 3/8	3	4 3/8	1 11/32	1 21/32	655-1218
1 3/4	1.752	2.250	2 1/2	1 3/8	3	4 3/8	1 1/2	1 13/16	655-1418
2	2.002	2.500	2 7/8	1 13/16	3 1/2	5 5/16	1 45/64	2 1/64	655-1622
2 1/2	2.502	3.250	3 5/8	1 13/16	3 1/2	5 5/16	2 5/64	2 25/64	655-2022
3	3.002	3.750	4 1/8	1 13/16	3 1/2	5 7/16	2 11/32	2 21/32	655-2422

EXTRA LONG SHOULDER – Bronze

"NEW"

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.500	1 11/16	7/8	3	3 7/8	1 1/16	1 3/8	648-0816
1 1/4	1.252	1.750	1 15/16	1 1/8	3	4 1/8	1 7/32	1 17/32	648-1017
1 1/2	1.502	2.000	2 3/16	1 3/8	3	4 3/8	1 11/32	1 21/32	648-1218
1 3/4	1.752	2.250	2 1/2	1 3/8	3	4 3/8	1 1/2	1 13/16	648-1418
2	2.002	2.500	2 7/8	1 13/16	3 1/2	5 5/16	1 45/64	2 1/64	648-1622
2 1/2	2.502	3.250	3 5/8	1 13/16	3 1/2	5 5/16	2 5/64	2 25/64	648-2022
3	3.002	3.750	4 1/8	1 13/16	3 1/2	5 7/16	2 11/32	2 21/32	648-2422

SHOULDER – Bronze

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.500	1 11/16	7/8	1 3/4	2 5/8	1 1/16	1 3/8	648-0811
1 1/4	1.252	1.750	1 15/16	1 1/8	2	3 1/8	1 7/32	1 17/32	648-1013
1 1/2	1.502	2.000	2 3/16	1 3/8	2	3 3/8	1 11/32	1 21/32	648-1214
1 3/4	1.752	2.250	2 1/2	1 3/8	2	3 3/8	1 1/2	1 13/16	648-1414
2	2.002	2.500	2 7/8	1 13/16	2	3 13/16	1 45/64	2 1/64	648-1616
2 1/2	2.502	3.250	3 5/8	1 13/16	2 1/2	4 5/16	2 5/64	2 25/64	648-2018
3	3.002	3.750	4 1/8	1 13/16	2 1/2	4 5/16	2 11/32	2 21/32	648-2418

PLAIN BEARING COMPONENTS



Precision Press Fit Bushings

Precision Press Fit Bushings for Lempcoplain bearing assemblies are offered in five designs. The Steel Shoulder, Short Shoulder, Short Sleeve and Extra Long Sleeve types are manufactured from high grade electric furnace 52100 tool steel. Bronze Shoulder Bushings are made from hard bronze alloy.

Since all of these bushings are designed for press fitting a nominal allowance is provided on the inside diameter for honing after assembly. Mounting instructions on Pages 101

and 102 of this catalog should be strictly followed.

All Precision Press Fit Bushings have figure-eight oil grooves. Steel and Bronze Shoulder types have lubrication fittings. The end radius of the bushing is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.

Bushing sizes listed here are in common use, but others can be obtained on special order.



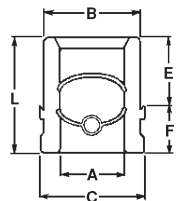
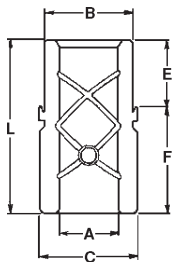
SHOULDER – Bronze

SHOULDER – Steel or Bronze

Inside Dia. A		B	C	E	F	L	Catalog Numbers Steel	Catalog Numbers Bronze
Nom.	Dec.							
1/2	.502	.815	15/16	5/8	1 1/2	2 1/8	662-0409	644-0409
5/8	.627	1.002	13/16	5/8	1 1/2	2 1/8	662-0509	644-0509
3/4	.752	1.127	15/16	7/8	1 3/4	2 5/8	662-0611	644-0611
1	1.002	1.502	1 11/16	7/8	1 3/4	2 5/8	662-0811	644-0811
1 1/4	1.252	1.752	1 15/16	1 1/8	2	3 1/8	662-1013	644-1013
1 1/2	1.502	2.002	2 3/16	1 3/8	2	3 3/8	662-1214	644-1214
1 3/4	1.752	2.252	2 1/2	1 3/8	2	3 3/8	662-1414	644-1414
2	2.002	2.502	2 7/8	1 13/16	2	3 13/16	662-1616	644-1616
2 1/2	2.502	3.252	3 5/8	1 13/16	2 1/2	4 5/16	662-2018	644-2018
3	3.002	3.752	4 1/8	1 13/16	2 1/2	4 5/16	662-2418	644-2418



SHOULDER – Steel



SHORT SHOULDER – Steel

Inside Dia. A		B	C	E	F	L	Catalog Numbers
Nom.	Dec.						
1/2	.502	.815	15/16	5/8	13/16	1 7/16	661-0406
5/8	.627	1.002	13/16	5/8	13/16	1 7/16	661-0506
3/4	.752	1.127	15/16	7/8	13/16	1 11/16	661-0607
1	1.002	1.502	1 11/16	7/8	13/16	1 11/16	661-0807
1 1/4	1.252	1.752	1 15/16	1 1/8	13/16	1 15/16	661-1008
1 1/2	1.502	2.002	2 3/16	1 3/8	13/16	2 3/16	661-1209
1 3/4	1.752	2.252	2 1/2	1 3/8	1	2 3/8	661-1410
2	2.002	2.502	2 7/8	1 13/16	1	2 13/16	661-1612
2 1/2	2.502	3.252	3 5/8	1 13/16	1	2 13/16	661-2012
3	3.002	3.752	4 1/8	1 13/16	1	2 13/16	661-2412



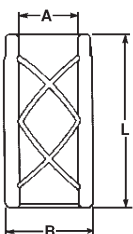
SHORT SHOULDER – Steel

SHORT SLEEVE or EXTRA LONG SLEEVE – Steel

Inside Dia. A		B	L		Catalog Numbers	
Nom.	Dec.		Short Sleeve	Ex. Lg. Sleeve	Short Sleeve	Ex. Lg. Sleeve
1/2	.502	.815	1 1/2	3	601-0406	603-0412
5/8	.627	1.002	1 1/2	3	601-0506	603-0512
3/4	.752	1.127	1 3/4	3	601-0607	603-0612
1	1.002	1.502	1 3/4	3	601-0807	603-0812
1 1/4	1.252	1.752	2	3	601-1008	603-1012
1 1/2	1.502	2.002	2	3	601-1208	603-1212
1 3/4	1.752	2.252	—	3	—	603-1412
2	2.002	2.502	—	3	—	603-1612
2 1/2	2.502	3.252	—	3	—	603-2012



EXTRA LONG SLEEVE – Steel



SHORT SLEEVE – Steel



PLAIN BEARING COMPONENTS

Straight Guide Posts



Lempco's "501" series Plain Bearing Precision Guide Posts are manufactured from electric furnace 52100 tool steel, through-hardened and precision ground. These chromium alloy steel posts will give you better wear with accuracy than any other precision rated product on the market.

Although classified "Precision", these guide posts are for use with all of Lempco's plain bearing bushings, and are now provided as standard in all Lempco plain bearing die sets, stock and special.

They replace the chrome plated precision guide post of older design.

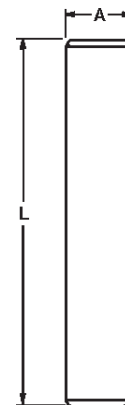
The end radius of the guide post is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement at high speeds. Sizes listed here are most commonly used, but Lempco will manufacture these highest quality guide posts in other diameters and lengths on special order.

Post Diameter A	Length L	Catalog Numbers
1/2 (.502)	3 1/2	501-0414
	4	501-0416
	4 1/4	501-0417
	4 1/2	501-0418
	4 3/4	501-0419
	5	501-0420
	5 1/4	501-0421
	5 1/2	501-0422
5/8 (.627)	4	501-0516
	4 1/4	501-0517
	4 1/2	501-0518
	4 3/4	501-0519
	5	501-0520
	5 1/2	501-0522
	6	501-0524
3/4 (.752)	4	501-0616
	4 1/4	501-0617
	4 1/2	501-0618
	4 3/4	501-0619
	5	501-0620
	6	501-0624
1 (1.002)	4	501-0816
	4 1/4	501-0817
	4 1/2	501-0818
	4 3/4	501-0819
	5	501-0820
	5 1/4	501-0821
	5 1/2	501-0822
	5 3/4	501-0823
	6	501-0824
	6 1/2	501-0826
	7	501-0828
7 1/2	501-0830	

Post Diameter A	Length L	Catalog Numbers
1 (1.002)	8	501-0832
	8 1/2	501-0834
	9	501-0836
	10	501-0840
	11	501-0844
	12	501-0848
	1 1/4 (1.252)	4 1/2	501-1018
4 3/4		501-1019
5		501-1020
5 1/4		501-1021
5 1/2		501-1022
5 3/4		501-1023
6		501-1024
6 1/2		501-1026
7		501-1028
7 1/2		501-1030
8		501-1032
8 1/2		501-1034
1 1/2 (1.502)	4 1/2	501-1218
	4 3/4	501-1219
	5	501-1220
	5 1/4	501-1221
	5 1/2	501-1222
	5 3/4	501-1223
	6	501-1224
	6 1/2	501-1226
	7	501-1228
	7 1/2	501-1230
	8	501-1232

Post Diameter A	Length L	Catalog Numbers	
1 1/2 (1.502)	8 1/2	501-1234	
	9	501-1236	
	10	501-1240	
	11	501-1244	
	12	501-1248	
	1 3/4 (1.752)	6	501-1424
6 1/2		501-1426	
7		501-1428	
7 1/2		501-1430	
8		501-1432	
8 1/2		501-1434	
9		501-1436	
10		501-1440	
11		501-1444	
12		501-1448	
14		501-1456	
2 (2.002)		6	501-1624
		6 1/2	501-1626
		7	501-1628
	7 1/2	501-1630	
	8	501-1632	
	8 1/2	501-1634	
	9	501-1636	
	10	501-1640	
	11	501-1644	
	12	501-1648	
	13	501-1652	
	14	501-1656	
	17	501-1668	
	20	501-1680	
2 1/2 (2.502)	8	501-2032	
	8 1/2	501-2034	
	9	501-2036	

Post Diameter A	Length L	Catalog Numbers
2 1/2 (2.502)	10	501-2040
	11	501-2044
	12	501-2048
	13	501-2052
	14	501-2056
	17	501-2068
	20	501-2080
3 (3.002)	8	501-2432
	8 1/2	501-2434
	9	501-2436
	10	501-2440
	11	501-2444
	12	501-2448
	13	501-2452
	14	501-2456
	17	501-2468
	20	501-2480



PLAIN BEARING COMPONENTS



Flanged Demountable Guide Posts

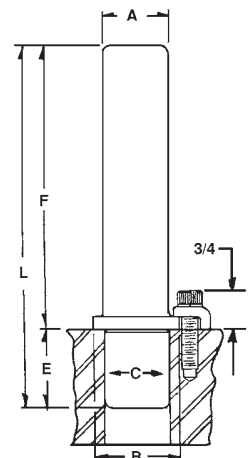


Diameter			Nominal Length					Catalog Numbers	
Post A	Flange B	C	E	F	Radius		L		
					M	N			
1 (1.002)	1 ⁵ / ₁₆	1.0009 1.0005	1 ³ / ₁₆	2 ³ / ₄	1 ³ / ₁₆	1 ¹ / ₈	3 clamps Part No. 899-9225	4	506-0816
				3				4 ¹ / ₄	506-0817
				3 ¹ / ₄				4 ¹ / ₂	506-0818
				3 ¹ / ₂				4 ³ / ₄	506-0819
				3 ³ / ₄				5	506-0820
				4				5 ¹ / ₄	506-0821
				4 ¹ / ₄				5 ¹ / ₂	506-0822
				4 ¹ / ₂				5 ³ / ₄	506-0823
				4 ³ / ₄				6	506-0824
				5 ¹ / ₄				6 ¹ / ₂	506-0826
				5 ³ / ₄				7	506-0828
				6 ¹ / ₄				7 ¹ / ₂	506-0830
				6 ³ / ₄				8	506-0832
7 ¹ / ₄	8 ¹ / ₂	506-0834							
7 ³ / ₄	9	506-0836							
1 ¹ / ₄ (1.252)	1 ⁹ / ₁₆	1.2509 1.2506	1 ³ / ₁₆	3 ¹ / ₄	6 ³ / ₆₄	1 ²⁵ / ₆₄	3 clamps Part No. 899-9325	4 ¹ / ₂	506-1018
				3 ¹ / ₂				4 ³ / ₄	506-1019
				3 ³ / ₄				5	506-1020
				4				5 ¹ / ₄	506-1021
				4 ¹ / ₄				5 ¹ / ₂	506-1022
				4 ¹ / ₂				5 ³ / ₄	506-1023
				4 ³ / ₄				6	506-1024
				5 ¹ / ₄				6 ¹ / ₂	506-1026
				5 ³ / ₄				7	506-1028
				6 ¹ / ₄				7 ¹ / ₂	506-1030
				6 ³ / ₄				8	506-1032
				7 ¹ / ₄				8 ¹ / ₂	506-1034
				7 ³ / ₄				9	506-1036
8 ¹ / ₄	10	506-1040							
8 ³ / ₄	11	506-1044							
9 ¹ / ₄	12	506-1048							
10 ¹ / ₄									
1 ¹ / ₂ (1.502)	1 ⁷ / ₈	1.5009 1.5006	1 ⁷ / ₁₆	3	1 ¹ / ₈	1 ¹⁷ / ₃₂	3 clamps Part No. 899-9325	4 ¹ / ₂	506-1218
				3 ¹ / ₄				4 ³ / ₄	506-1219
				3 ¹ / ₂				5	506-1220
				3 ³ / ₄				5 ¹ / ₄	506-1221
				4				5 ¹ / ₂	506-1222
				4 ¹ / ₄				5 ³ / ₄	506-1223
				4 ¹ / ₂				6	506-1224
				5				6 ¹ / ₂	506-1226
				5 ¹ / ₂				7	506-1228
				6				7 ¹ / ₂	506-1230
				6 ¹ / ₂				8	506-1232
				7				8 ¹ / ₂	506-1234
				7 ¹ / ₂				9	506-1236
8 ¹ / ₂	10	506-1240							
9 ¹ / ₂	11	506-1244							
10 ¹ / ₂	12	506-1248							
1 ³ / ₄ (1.752)	2 ¹ / ₄	1.7509 1.7506	1 ¹¹ / ₁₆	4 ¹ / ₄	1 ¹⁹ / ₆₄	1 ¹⁴⁵ / ₆₄	4 clamps Part No. 899-9325	6	506-1424
				4 ³ / ₄				6 ¹ / ₂	506-1426
				5 ¹ / ₄				7	506-1428
				5 ³ / ₄				7 ¹ / ₂	506-1430
				6 ¹ / ₄				8	506-1432
				6 ³ / ₄				8 ¹ / ₂	506-1434
				7 ¹ / ₄				9	506-1436
				8 ¹ / ₄				10	506-1440
				9 ¹ / ₄				11	506-1444
				10 ¹ / ₄				12	506-1448
				12 ¹ / ₄				14	506-1456

Diameter			Nominal Length					Catalog Numbers	
Post A	Flange B	C	E	F	Radius		L		
					M	N			
2 (2.002)	2 ¹ / ₂	2.0009 2.0006	1 ¹⁵ / ₁₆	4	1 ²⁷ / ₆₄	1 ⁵³ / ₆₄	4 clamps Part No. 899-9325	6	506-1624
				4 ¹ / ₂				6 ¹ / ₂	506-1626
				5				7	506-1628
				5 ¹ / ₂				7 ¹ / ₂	506-1630
				6				8	506-1632
				6 ¹ / ₂				8 ¹ / ₂	506-1634
				7				9	506-1636
				7 ¹ / ₂				10	506-1640
				8				11	506-1644
				8 ¹ / ₂				12	506-1648
				9				13	506-1652
				9 ¹ / ₂				14	506-1656
				10				17	506-1668
				11				20	506-1680
				12					
				15					
				18					
				2 ¹ / ₂ (2.502)				3	2.5009 2.5006	1^{15}/_{16}	6	1^{43}/_{64}	2^{5}/_{64}	4 clamps Part No. 899-9325	8	506-2032
6 ¹ / ₂	8 ¹ / ₂	506-2034							
7	9	506-2036							
8	10	506-2040							
8 ¹ / ₂	11	506-2044							
9	12	506-2048							
9 ¹ / ₂	13	506-2052							
10	14	506-2056							
10 ¹ / ₂	17	506-2068							
11	20	506-2080							
12									
15									
3 (3.002)	3 ¹ / ₂	3.0009 3.0006	2 ⁷ / ₁₆	5 ¹ / ₂	1 ⁵⁹ / ₆₄	2 ²¹ / ₆₄	4 clamps Part No. 899-9325	8	506-2432
				6				8 ¹ / ₂	506-2434
				6 ¹ / ₂				9	506-2436
				7 ¹ / ₂				10	506-2440
				8 ¹ / ₂				11	506-2444
				9 ¹ / ₂				12	506-2448
				10 ¹ / ₂				13	506-2452
				11 ¹ / ₂				14	506-2456
				14 ¹ / ₂				17	506-2468
				17 ¹ / ₂				20	506-2480

The Lempco Flanged Demountable Guide Post for plain bearing assemblies is manufactured from electric furnace 52100 chromium tool steel, through-hardened and precision ground for longest wear with all Lempco plain bearing bushings, steel, bronze, bronze plated, precision grade.

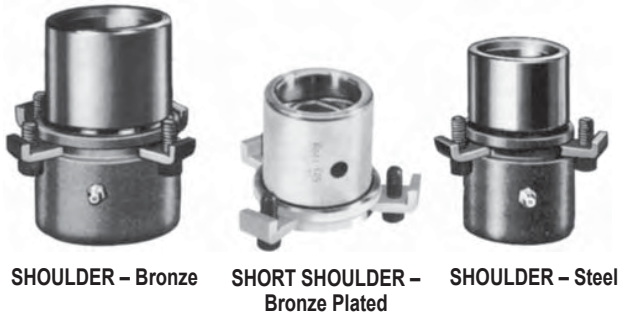
This removable type post is tap fit into the dieholder bore with the flange flush to the ground surface of the shoe. It is secured with clamps and cap screws. It may be removed, and on re-installation the die set will register accurately. The end radius is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.





PLAIN BEARING COMPONENTS

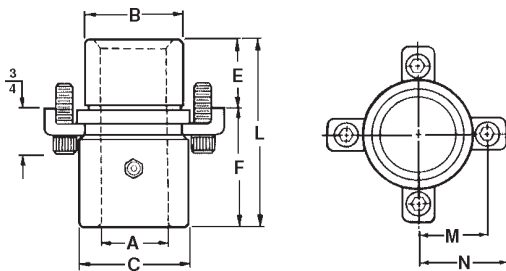
Shoulder Guide Post Bushings



Shoulder Guide Post Bushings are offered with the related Shoulder Guide Posts for convenience in building large die sets for repair of used sets. Punchholder and dieholder are clamped together and through bored for fitting of both bushings and guide posts. *The mounting diameters of the bushing and guide post are the same, as explained in detail on Page 99, opposite.*

The Steel Shoulder, Steel Short Shoulder bushings, which are manufactured from 52100 tool steel and Bronze Shoulder bushings may be either tap or press fitted. When tap fitted these bushings will not require select fitting, honing or other modification if mounting instructions on Pages 101 and 102 are strictly followed.

Bronze Plated Shoulder Bushings are for demountable use only, consequently must be tap fitted. Instructions on Pages 101 and 102 should be strictly followed. *They should not be pressed in and must not be honed.* Mounting diameter lead edge should be smoothly blended after grinding to prevent broaching of bore or drift component during assembly.



CLAMPS PROVIDED FOR TAP FITTING					
Inside Dia. A		Number Clamps	Inside Dia. A		Number Clamps
Nom.	Clamp No.		Nom.	Clamp No.	
1	899-9025	2	1 3/4	899-9125	4
1 1/4	899-9125	3	2	899-9125	4
1 1/2	899-9125	3	2 1/2	899-9125	4

SHORT SHOULDER – Steel

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.509	1 11/16	7/8	13/16	1 11/16	1 1/16	1 3/8	625-0807
1 1/4	1.252	1.759	1 15/16	1 1/8	13/16	1 15/16	1 7/32	1 17/32	625-1008
1 1/2	1.502	2.009	2 3/16	1 3/8	13/16	2 3/16	1 11/32	1 21/32	625-1209
1 3/4	1.752	2.259	2 1/2	1 3/8	1	2 3/8	1 1/2	1 13/16	625-1410
2	2.002	2.509	2 7/8	1 13/16	1	2 13/16	1 45/64	2 1/64	625-1612
2 1/2	2.502	3.259	3 5/8	1 13/16	1	2 13/16	2 5/64	2 25/64	625-2012

SHORT SHOULDER – Bronze Plated

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.509	1 3/4	1 3/8	1/2	1 7/8	1 1/16	1 3/8	621-0808
1 1/4	1.252	1.759	2 1/16	1 7/8	1/2	2 3/8	1 7/32	1 17/32	621-1010
1 1/2	1.502	2.009	2 5/16	1 7/8	1/2	2 3/8	1 11/32	1 21/32	621-1210
1 3/4	1.752	2.259	2 5/8	2 3/8	1/2	2 7/8	1 1/2	1 13/16	621-1412
2	2.002	2.509	2 15/16	2 3/8	1/2	2 7/8	1 43/64	1 61/64	621-1612
2 1/2	2.502	3.009	3 3/8	2 5/8	3/8	3	1 57/64	2 11/64	621-2012

SHOULDER – Steel

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.509	1 11/16	7/8	1 3/4	2 5/8	1 1/16	1 3/8	626-0811
1 1/4	1.252	1.759	1 15/16	1 1/8	2	3 1/8	1 7/32	1 17/32	626-1013
1 1/2	1.502	2.009	2 3/16	1 3/8	2	3 3/8	1 11/32	1 21/32	626-1214
1 3/4	1.752	2.259	2 1/2	1 3/8	2	3 3/8	1 1/2	1 13/16	626-1414
2	2.002	2.509	2 7/8	1 13/16	2	3 13/16	1 45/64	2 1/64	626-1616
2 1/2	2.502	3.259	3 5/8	1 13/16	2 1/2	4 1/16	2 5/64	2 25/64	626-2018

SHOULDER – Bronze

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.509	1 11/16	7/8	1 3/4	2 5/8	1 1/16	1 3/8	629-0811
1 1/4	1.252	1.759	1 15/16	1 1/8	2	3 1/8	1 7/32	1 17/32	629-1013
1 1/2	1.502	2.009	2 3/16	1 3/8	2	3 3/8	1 11/32	1 21/32	629-1214
1 3/4	1.752	2.259	2 1/2	1 3/8	2	3 3/8	1 1/2	1 13/16	629-1414
2	2.002	2.509	2 7/8	1 13/16	2	3 13/16	1 45/64	2 1/64	629-1616
2 1/2	2.502	3.259	3 5/8	1 13/16	2 1/2	4 5/16	2 5/64	2 25/64	629-2018

SHOULDER – Bronze Plated

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.002	1.509	1 3/4	7/8	1 1/4	2 1/8	1 1/16	1 3/8	622-0809
1 1/4	1.252	1.759	2 1/16	1 1/8	1 1/2	2 5/8	1 7/32	1 17/32	622-1011
1 1/2	1.502	2.009	2 5/16	1 3/8	1 1/2	2 7/8	1 11/32	1 21/32	622-1212
1 3/4	1.752	2.259	2 5/8	1 5/8	1 1/2	3 1/8	1 1/2	1 13/16	622-1413
2	2.002	2.509	3 1/32	1 7/8	1 1/2	3 3/8	1 45/64	2 1/64	622-1614
2 1/2	2.502	3.009	3 5/8	1 7/8	2	3 7/8	2 1/32	2 5/16	622-2016

PLAIN BEARING COMPONENTS



Shoulder Guide Posts

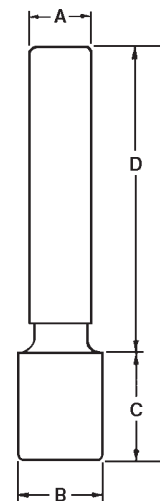


Diameter A	B	Length L	C	D	Catalog Numbers
1 (1.002)	1.509	4 1/2	1 3/8	3	503-0818
		5		3 1/2	503-0820
		5 1/2		4	503-0822
		6		4 1/2	503-0824
		6 1/2		5	503-0826
		7		5 1/2	503-0828
		7 1/2		6	503-0830
		8		6 1/2	503-0832
1 1/4 (1.252)	1.759	5	1 7/8	3	503-1020
		5 1/2		3 1/2	503-1022
		6		4	503-1024
		6 1/2		4 1/2	503-1026
		7		5	503-1028
		7 1/2		5 1/2	503-1030
		8		6	503-1032
		8 1/2		6 1/2	503-1034
1 1/2 (1.502)	2.009	7	2 3/8	4 5/8	503-1228
		7 1/2		5 1/8	503-1230
		8		5 5/8	503-1232
		8 1/2		6 1/8	503-1234
		9		6 5/8	503-1236
		9 1/2		7 1/8	503-1238
		10		7 5/8	503-1240
1 3/4 (1.752)	2.259	7 1/2	2 7/8	4 5/8	503-1430
		8		5 1/8	503-1432
		8 1/2		5 5/8	503-1434
		9		6 1/8	503-1436
		9 1/2		6 5/8	503-1438
		10		7 1/8	503-1440
2 (2.002)	2.509	8	3 3/8	4 5/8	503-1632
		9		5 5/8	503-1636
		10		6 5/8	503-1640
		11		7 5/8	503-1644
		12		8 5/8	503-1648
		13		9 5/8	503-1652
2 1/2 (2.502)	3.259	9	3 7/8	5 1/8	503-2036
		10		6 1/8	503-2040
		11		7 1/8	503-2044
		12		8 1/8	503-2048
		13		9 1/8	503-2052
		14		10 1/8	503-2056

Shoulder Guide Posts are intended for use with Shoulder Guide Post Bushings and therefore the mounting diameters of the posts are the same as those of related bushings on the preceding page. *These mounting diameters are a minimum of .007" over the size of Precision Press Fit Bushings and .009" over Precision Demountable Bushings so as to allow grind stock for precision fitting in the construction of new sets and to allow reboring where necessary to replace guide posts and bushings in used sets.*

Lempco Shoulder Guide Posts are manufactured of electric furnace 52100 tool steel, through hardened and precision ground. Mounting instructions on Pages 101 and 102 of this catalog should be strictly followed. Mounting diameter lead edge should be smoothly blended after grinding to prevent hole broaching or drift during assembly. The end radius of the guide post is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.

Other diameters and lengths not listed can be provided on special order.





PLAIN BEARING COMPONENTS

Demountable Bosses



TYPE 1 – Demountable Boss



TYPE 2 – Demountable Boss



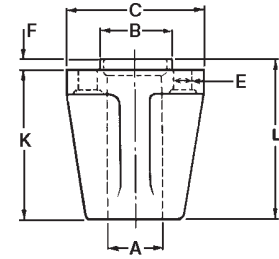
TYPE 3 – Demountable Boss

Lempco manufactures three general types of Demountable Bosses for construction of plain bearing heavy duty special die sets. **When ordering customer must specify whether for use as boss bushing or as guide post support.**

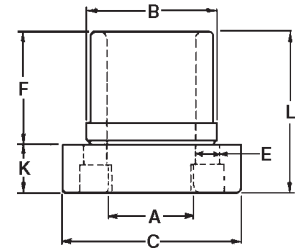
Type 1 mounts the post or bushing above the surface of the shoe. Type 2 mounts the major part of the bearing surface within the die set shoe. Type 3 is similar to Type 2 but has a lesser portion of the bearing surface extending within the shoe.

All inside diameters will provide a press fit when used as guide post supports. When used as boss bushings the nominal amount of stock provided must be honed to the desired fit with the guide post. Demountable bosses are designed to be tap fitted to the die set shoe. Mounting instructions on Pages 101 and 102 must be followed.

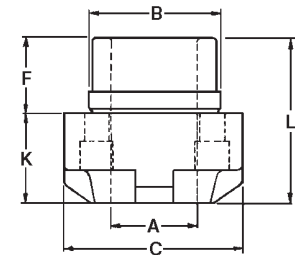
Lempco manufactures other heavy duty demountable bosses to special order, prices on application.



TYPE 1 – Demountable Boss



TYPE 2 – Demountable Boss



TYPE 3 – Demountable Boss

TYPE 1 – DEMOUNTABLE BOSS

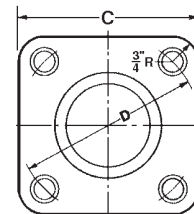
Inside Dia. A		General Dimensions							Catalog Numbers
Nom.	Dec.	K	B	C	D	E	F	L	
2	2.0035	1 1/2	2.500	5	4 5/8	2 1/32	5 1/16	1 13/16	660-1611
	2.0031	3 1/2						3 13/16	660-1612
		5 1/2						5 13/16	660-1613
2 1/2	2.5037	1 1/2	3.250	6	6	2 1/32	5 1/16	1 13/16	660-2011
	2.5032	3 1/2						3 13/16	660-2012
		5 1/2						5 13/16	660-2013
3	3.0001	3 1/2	3.750	7	7 1/16	2 5/32	5 1/16	3 13/16	660-2412
	3.0000	5 1/2						5 13/16	660-2413

TYPE 2 – DEMOUNTABLE BOSS

Inside Dia. A		General Dimensions							Catalog Numbers
Nom.	Dec.	K	B	C	D	E	F	L	
2	2.0035	1 1/2	2.688	4	3 1/2	1 7/32	2 1/2	4	660-1618
	2.0031								
2 1/2	2.5037	1 1/2	3.438	5	4 5/8	2 1/32	3	4 1/2	660-2018
	2.5032								

TYPE 3 – DEMOUNTABLE BOSS

Inside Dia. A		General Dimensions							Catalog Numbers
Nom.	Dec.	K	B	C	D	E	F	L	
2	2.0035	2 1/2	2.688	4	3 1/2	1 7/32	1 1/2	4	660-1619
	2.0031								
2 1/2	2.5037	2 1/2	3.438	5	4 5/8	2 1/32	2	4 1/2	660-2019
	2.5032								



PLAIN BEARING ENGINEERING DATA

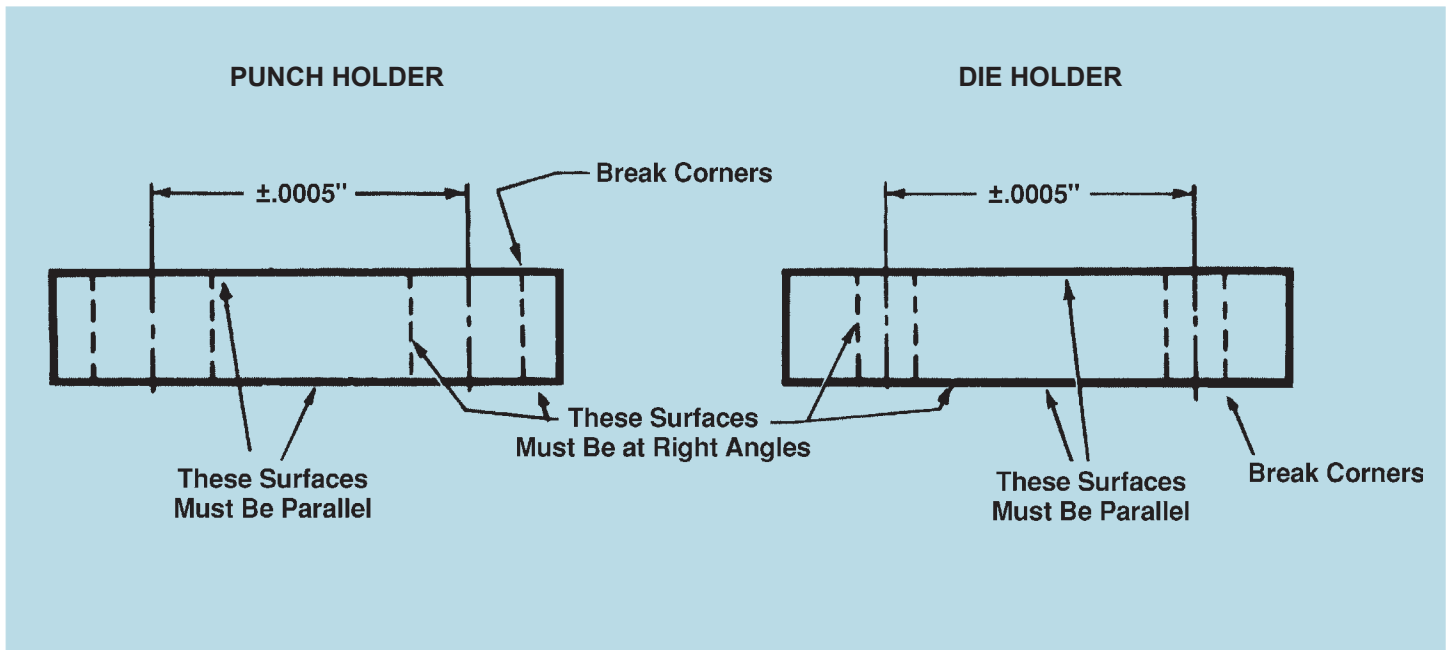


Boring Procedures and Dimensions

Holes for Lempco Plain Bearing Guide Posts and Bushings should be jig bored for best results. Punchholder and dieholder should be clamped together and bored in one set up to maintain dead center alignment between upper and lower bores. If this is not possible a tolerance of $\pm.0005$ " between centers (see illustration) must be held. Bores should be smooth and free from tool marks to provide proper bearing area for the guide post or bushing. Dieholder bores must be perpendicular to that surface

which will back up the die. The bottom surface of the die holder must be parallel to the die back-up surface. The punchholder bores must be perpendicular to the surface that will back up the punches, and the top surface parallel to the punch back-up surface.

Break the corners of the bored holes to a generous chamfer. On sets with a symmetrical profile one pin and bushing should be offset to prevent accidental reversing of the punchholder during assembly.



All Lempco Plain Bearing Precision Guide Posts and Bushings are interchangeable without select fitting, and when mounted in accordance with the instructions and bore sizes given on page 102, do not require honing for fits except in

the case of press fit mounted bushings. Please note the dimensions given in the tables. Experience proves that these are optimum dimensions and variations may cause trouble.



PLAIN BEARING ENGINEERING DATA

Boring Procedures and Dimensions

BORE CHART PLAIN BEARING COMPONENTS (INCH)

Nominal Guide Post Diameter	#501-SERIES STRAIGHT GUIDE PIN		#506-SERIES DEMOUNTABLE GUIDE PIN		#503-SERIES SHOULDER GUIDE PIN		#601-SERIES #603-SERIES STRAIGHT STEEL SLEEVE BUSHING		#644-SERIES #651-SERIES #652-SERIES #661-SERIES #662-SERIES PRESS FIT STYLE SHOULDER BUSHING		#648-SERIES #653-SERIES #654-SERIES #655-SERIES #663-SERIES #664-SERIES DEMOUNTABLE STYLE SHOULDER BUSHING	
	(PRESS FIT)		(TAP FIT)		(PRESS FIT)		(PRESS FIT)		(PRESS FIT)		(TAP FIT)	
	BORE SIZE		BORE SIZE		BORE SIZE		BORE SIZE		BORE SIZE		BORE SIZE	
1/2"	.5000	+0.0006 -0.0004	N/A	N/A	N/A	N/A	.8125	+0.0004 -0.0000	.8125	+0.0004 -0.0000	.8125	+0.0004 -0.0000
5/8"	.6250	+0.0006 -0.0004	N/A	N/A	N/A	N/A	1.0000	+0.0004 -0.0000	1.0000	+0.0004 -0.0000	1.0000	+0.0004 -0.0000
3/4"	.7500	+0.0006 -0.0004	N/A	N/A	N/A	N/A	1.1250	+0.0004 -0.0000	1.1250	+0.0004 -0.0000	1.1250	+0.0004 -0.0000
1"	1.0000	+0.0006 -0.0004	1.0013	+0.0000 -0.0005	BORE HOLE .0012" TO .0018" SMALLER THAN SHOULDER DIAMETER OF GUIDE PIN	BORE HOLE .0015" TO .0022" SMALLER THAN SHOULDER DIAMETER OF GUIDE PIN	1.5000	+0.0004 -0.0000	1.5000	+0.0004 -0.0000	1.5000	+0.0004 -0.0000
1 1/4"	1.2500	+0.0006 -0.0004	1.2513	+0.0000 -0.0005			1.7500	+0.0004 -0.0000	1.7500	+0.0004 -0.0000	1.7500	+0.0004 -0.0000
1 1/2"	1.5000	+0.0006 -0.0004	1.5013	+0.0000 -0.0005			2.0000	+0.0004 -0.0000	2.0000	+0.0004 -0.0000	2.0000	+0.0004 -0.0000
1 3/4"	1.7500	+0.0006 -0.0004	1.7513	+0.0000 -0.0005	BORE HOLE .0015" TO .0022" SMALLER THAN SHOULDER DIAMETER OF GUIDE PIN	BORE HOLE .0015" TO .0022" SMALLER THAN SHOULDER DIAMETER OF GUIDE PIN	2.2500	+0.0004 -0.0000	2.2500	+0.0004 -0.0000	2.2500	+0.0004 -0.0000
2"	2.0000	+0.0006 -0.0004	2.0013	+0.0000 -0.0005			2.5000	+0.0004 -0.0000	2.5000	+0.0004 -0.0000	2.5000	+0.0004 -0.0000
2 1/2"	2.5000	+0.0006 -0.0004	2.5013	+0.0000 -0.0005			3.2500	+0.0004 -0.0000	3.2500	+0.0004 -0.0000	3.2500	+0.0004 -0.0000
3"	3.0000	+0.0006 -0.0004	3.0013	+0.0000 -0.0005	N/A	N/A	N/A	N/A	3.7500	+0.0004 -0.0000	3.7500	+0.0004 -0.0000

BORE CHART PLAIN BEARING COMPONENTS (INCH)

Nominal Guide Post Diameter	#623-SERIES DEMOUNTABLE SHORT SHOULDER BUSHING		#624-SERIES DEMOUNTABLE SHOULDER BUSHING		TYPE - 1 DEMOUNTABLE BOSS BUSHING & PIN SUPPORT		TYPE - 2 DEMOUNTABLE BOSS BUSHING & PIN SUPPORT		TYPE - 3 DEMOUNTABLE BOSS BUSHING & PIN SUPPORT		
	(TAP FIT)		(TAP FIT)		(TAP FIT)		(TAP FIT)		(TAP FIT)		
BORE SIZE		BORE SIZE		BORE SIZE		BORE SIZE		BORE SIZE		BORE SIZE	
1"	1.5000	+0.0004 -0.0000	1.5000	+0.0004 -0.0000	N/A	N/A	N/A	N/A	N/A	N/A	
1 1/4"	1.7500	+0.0004 -0.0000	1.7500	+0.0004 -0.0000	N/A	N/A	N/A	N/A	N/A	N/A	
1 1/2"	2.0000	+0.0004 -0.0000	2.0000	+0.0004 -0.0000	N/A	N/A	N/A	N/A	N/A	N/A	
1 3/4"	2.2500	+0.0004 -0.0000	2.2500	+0.0004 -0.0000	N/A	N/A	N/A	N/A	N/A	N/A	
2"	2.5000	+0.0004 -0.0000	2.5000	+0.0004 -0.0000	2.5000	+0.0004 -0.0000	2.6880	+0.0004 -0.0000	2.6880	+0.0004 -0.0000	
2 1/2"	3.0000	+0.0004 -0.0000	3.0000	+0.0004 -0.0000	3.2500	+0.0004 -0.0000	3.4380	+0.0004 -0.0000	3.4380	+0.0004 -0.0000	
3"	3.5000	+0.0004 -0.0000	3.6250	+0.0004 -0.0000	3.7500	+0.0004 -0.0000	N/A	N/A	N/A	N/A	

* Bore sizes for 2 1/2 and 3" Bronze Plated Demountable Bushings available from factory.

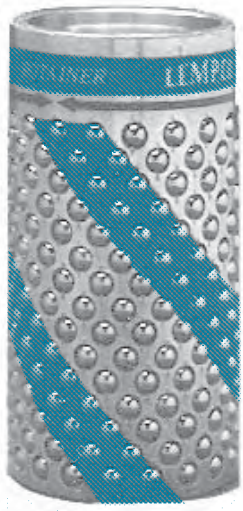
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LEMIPCO

Inch Catalog
Available
Upon Request

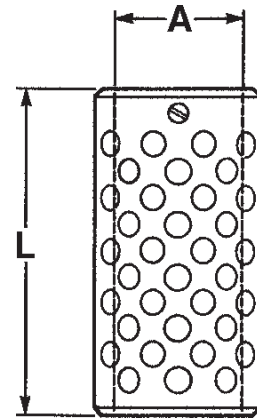
Die Sets, Components and Customized Guidance Systems





Lempco's Precision ROTAINER® gives ball bearing die sets a **NEW TWIST**

“LEMPCO RETAINERS AND ROTAINERS® ARE DISTINGUISHED BY THE BLUE COLLAR AND STRIPE”



(Dimensions are given in millimeters.)

Nom. Post Diameter A	Length L	Catalog Numbers
19	39	367-19390
	51	367-19510
	65	367-19650
25	39	367-25390
	51	367-25510
	65	367-25650
32	62	367-32580
	75	367-32700
	87	367-32830
40	68	367-40650
	81	367-40770
	100	367-40960
44	75	367-44700
	87	367-44830
	113	367-44108
50	89	367-50830
	108	367-50102
	121	367-50114
63	178	367-63178
80	178	367-80178

Metric

More than four decades ago we first offered you a Lempco ball bearing die set as an engineering achievement to help you manufacture a better product and to keep abreast of increasing production costs. We have remained responsive to your needs. TODAY, we offer you an even higher performance standard in the innovative, multi-directional ROTAINER®.

Designed to rotate on the post, as well as maintain its vertical motion, Lempco's ROTAINER® was developed to greatly reduce the amount of tracking. The disengagement of the guide post from the bushing by 1/4" at the top of the stroke will allow the ROTAINER® to rotate 360° on the guide post. The ROTAINER®, while still designed to track, (assuring a measurable amount of preload) will enable stampers to achieve high press production by reducing expensive replacement costs.

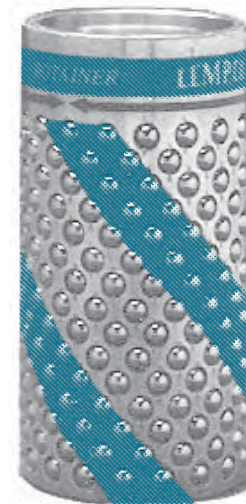
The Lempco ball bearing ROTAINER® possesses increased resistance to normal wear, is unaffected by high speed operation and offers precise die registration. In addition, the ROTAINER® is engineered without the loss of ball bearing area, thus giving you the benefit of increased accuracy.

The ROTAINER® is keyed to the guide post slot with a special Rotainer Slide assembly to allow both vertical and revolving motion. When properly assembled with Lempco guide posts and bushings of the same nominal diameters, the ROTAINER® provides a preload which actually becomes a "rolling press fit". *To achieve minimum wear with the ROTAINER®, Lempco guide posts and bushings must be used exclusively.* Note: Under a preloaded condition the ROTAINER® will only move vertically.

The LAST ROTAINER® length for each diameter shown in the table, should be used for general die set applications. Other lengths are for limited space and special applications.

Rotainer® Slide Replacement With Screw Assembly		Number Of Inserts
Nom.	Assembly Part No.	
3/4	899-9406	1
1	899-9408	1
1 1/4	899-9410	1
1 1/2	899-9412	1
1 3/4	899-9414	1
2	899-9416	2
2 1/2	899-9420	2
3	899-9424	2

Lempco Ball Bearing Rotainer® is manufactured under U.S. Patent No. 4,648,727.

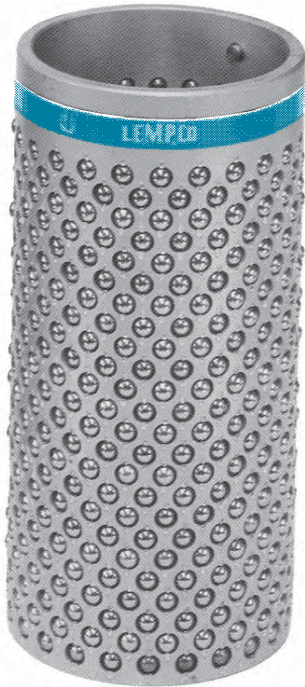


BALL BEARING COMPONENTS



Ball Bearing Retainers

Precision



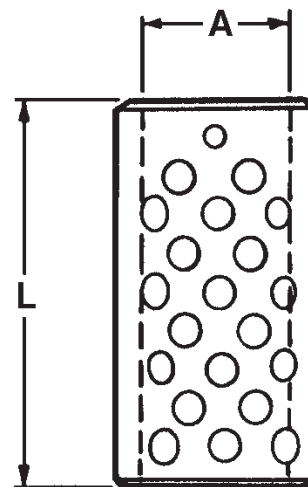
The Lempco Precision Ball Bearing Retainer possesses increased resistance to normal wear and to lateral motion, is smoother in highest speed operation and offers more precise die register. It is keyed to the guide post slot with a set screw.

When properly assembled with guide posts and bushings of the same nominal diameters these retainers provide a pre-load which actually becomes a "rolling press fit". In addition to the sizes listed these retainers are also manufactured in other diameters and lengths on special order.

The LAST Retainer length for each diameter shown in the table, should be used for general die set applications. Other lengths are for limited space and special applications.

**"LEMPCO
RETAINERS AND ROTAINERS®
ARE DISTINGUISHED BY THE
BLUE COLLAR AND STRIPE"**

Nom. Post Diameter A	Length L	Catalog Numbers
19	39	937-19390
	51	937-19510
	65	937-19650
25	39	937-25390
	51	937-25510
	65	937-25650
32	58	937-32580
	70	937-32700
	83	937-32830
40	65	937-40650
	77	937-40770
	96	937-40960
44	70	937-44700
	83	937-44830
	108	937-44108
50	83	937-50830
	102	937-50102
	114	937-50114
63	178	937-63178
80	178	937-80178





BALL BEARING COMPONENTS

Straight Guide Posts

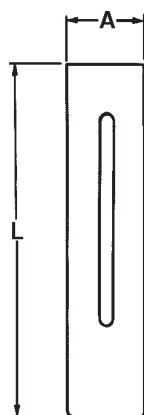


(Dimensions are given in millimeters.)

Lempco's Straight Guide Posts for ball bearing assemblies are manufactured from electric furnace 52100 chromium tool steel, through hardened to maintain the operating preload, and precision ground.

Like all other Lempco ball bearing guide posts, bushings and ball bearing retainers or rotainers, they are completely interchangeable and if mounted in accordance with instructions on Page 111 of this catalog will not require select fitting, honing or other modification.

A slot to maintain the ball bearing retainer or retainer on the guide post is machined along its length. The end radius of the post is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement at high speeds.



Post Diameter A	Length L	Catalog Numbers	Post Diameter A	Length L	Catalog Numbers	Post Diameter A	Length L	Catalog Numbers	
19	75	957-19750	40	145	957-40145	50	200	957-50200	
	90	957-19900		150	957-40150		215	957-50215	
	100	957-19100		165	957-40165		230	957-50230	
	110	957-19110		175	957-40175		240	957-50240	
	115	957-19115		190	957-40190		250	957-50250	
	120	957-19120		200	957-40200		265	957-50265	
	125	957-19125		215	957-40215		280	957-50280	
	150	957-19150		230	957-40230		290	957-50290	
25	100	957-25100		240	957-40240		300	957-50300	
	110	957-25110		250	957-40250		315	957-50315	
	115	957-25115		265	957-40265		330	957-50330	
	120	957-25120		280	957-40280		360	957-50360	
	125	957-25125		290	957-40290		380	957-50380	
	135	957-25135		300	957-40300		400	957-50400	
	140	957-25140		315	957-40315		430	957-50430	
	145	957-25145		330	957-40330		460	957-50460	
	150	957-25150		360	957-40360		63	200	957-63200
	165	957-25165		44	125			957-44125	215	957-63215
	175	957-25175	135		957-44135	230		957-63230	
	190	957-25190	140		957-44140	240		957-63240	
200	957-25200	145	957-44145		250	957-63250			
215	957-25215	150	957-44150		265	957-63265			
230	957-25230	165	957-44165		280	957-63280			
32	125	957-32125	175		957-44175	300		957-63300	
	135	957-32135	190		957-44190	315		957-63315	
	140	957-32140	200		957-44200	330		957-63330	
	145	957-32145	215		957-44215	360		957-63360	
	150	957-32150	230		957-44230	380		957-63380	
	165	957-32165	240		957-44240	430	957-63430		
	175	957-32175	250	957-44250	500	957-63500			
	190	957-32190	265	957-44265	80	200	957-80200		
	200	957-32200	280	957-44280		215	957-80215		
	215	957-32215	290	957-44290		230	957-80230		
	230	957-32230	300	957-44300		250	957-80250		
	250	957-32250	315	957-44315		280	957-80280		
260	957-32260	330	957-44330	300		957-80300			
280	957-32280	360	957-44360	330		957-80330			
300	957-32300	50	150	957-50150		360	957-80360		
40	125		957-40125	165		957-50165	430	957-80430	
	135		957-40135	175		957-50175	500	957-80500	
	140		957-40140	190		957-50190			

BALL BEARING COMPONENTS



Flanged Demountable Guide Posts

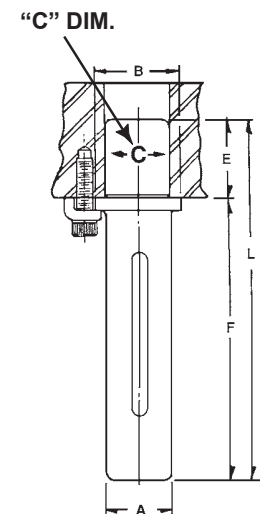


(Dimensions are given in millimeters.)

Diameter			Nominal Length			Catalog Numbers	Diameter			Nominal Length			Catalog Numbers
Post A	Flange B	C	E	F	L		Post A	Flange B	C	E	F	L	
24.953 24.940	33	.9824 .9819	30	60	90	958-25090	43.952 43.939	57	1.7304 1.7299	43	147	190	958-44190
				70	100	958-25100					157	200	958-44200
				80	110	958-25110					172	215	958-44215
				85	115	958-25115					187	230	958-44230
				90	120	958-25120					197	240	958-44240
				95	125	958-25125					207	250	958-44250
				105	135	958-25135					217	260	958-44260
				110	140	958-25140					237	280	958-44280
				115	145	958-25145					247	290	958-44290
				120	150	958-25150					257	300	958-44300
				135	165	958-25165					272	315	958-44315
				145	175	958-25175					287	330	958-44330
				31.953 31.940	40	1.2580 1.2575					30	160	190	958-25190	49.952 49.939	63	1.9666 1.9661	49	337	380	958-44380
170	200	958-25200	387				430	958-44430					
185	215	958-25215	91				140	958-50140					
200	230	958-25230	96				145	958-50145					
85	115	958-32115	101				150	958-50150					
90	120	958-32120	106				155	958-50155					
95	125	958-32125	116				165	958-50165					
105	135	958-32135	121				170	958-50170					
110	140	958-32140	126				175	958-50175					
115	145	958-32145	131				180	958-50180					
120	150	958-32150	141				190	958-50190					
135	165	958-32165	146				195	958-50195					
145	175	958-32175	151				200	958-50200					
160	190	958-32190	166	215	958-50215								
170	200	958-32200	181	230	958-50230								
185	215	958-32215	191	240	958-50240								
200	230	958-32230	201	250	958-50250								
220	250	958-32250	211	260	958-50260								
250	280	958-32280	231	280	958-50280								
270	300	958-32300	241	290	958-50290								
39.952 39.939	48	1.5729 1.5724	36	79	115	958-40115	62.952 62.939	76	2.4784 2.4779	49	251	300	958-50300
				84	120	958-40120					266	315	958-50315
				89	125	958-40125					281	330	958-50330
				99	135	958-40135					311	360	958-50360
				104	140	958-40140					331	380	958-50380
				109	145	958-40145					351	400	958-50400
				114	150	958-40150					381	430	958-50430
				129	165	958-40165					411	460	958-50460
				139	175	958-40175					151	200	958-63200
				154	190	958-40190					166	215	958-63215
				164	200	958-40200					181	230	958-63230
				179	215	958-40215					201	250	958-63250
				194	230	958-40230					231	280	958-63280
204	240	958-40240	251	300	958-63300								
214	250	958-40250	281	330	958-63330								
224	260	958-40260	311	360	958-63360								
244	280	958-40280	381	430	958-63430								
254	290	958-40290	451	500	958-63500								
264	300	958-40300	138	200	958-80200								
279	315	958-40315	153	215	958-80215								
294	330	958-40330	168	230	958-80230								
324	360	958-40360	188	250	958-80250								
43.952 43.939	57	1.7304 1.7299	43	82	125	958-44125	79.952 79.939	93	3.1477 3.1472	62	218	280	958-80280
				92	135	958-44135					238	300	958-80300
				97	140	958-44140					268	330	958-80330
				102	145	958-44145					298	360	958-80360
				107	150	958-44150					368	430	958-80430
				112	155	958-44155					438	500	958-80500
				122	165	958-44165							
				132	175	958-44175							

The Lempco Flanged Demountable Guide Post for ball bearing assemblies is designed for those who prefer the convenience of a removable post to expedite die repairs. The post is tap fitted into the pin plate bore with the flange flush to the ground surface. See Page 111 for bore size data.

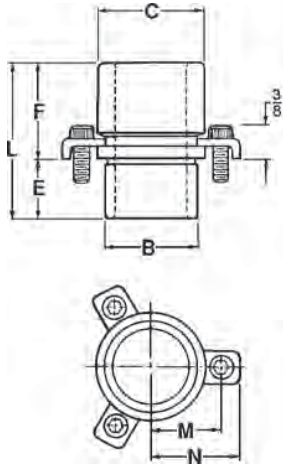
These ball bearing type Demountable Guide Posts are manufactured from electric furnace 52100 chromium tool steel. Like other guide posts and the bushings in the Lempco ball bearing line these new-style removable posts are through-hardened to maintain dependable preload with accuracy despite normal wear long after the die set has been placed in production.





BALL BEARING COMPONENTS – METRIC

Demountable Steel Guide Post Bushings



Lempco Demountable Steel Guide Post Bushings, now available in metric sizes, are sometimes preferred for convenience in making die repairs or in building large ball bearing die sets. They are designed for tap fitting, seating flush to the ground surface of the shoe and secured by cap screws and clamps. Like other ball bearing guidance assembly components, these bushings are manufactured from electric furnace 52100 chrome tool steel, through hardened and precision machined. Demountable bushings are easily removed and upon reinstallation the die set will register accurately.



Nom. Post Diameter	B	C	E	F	L	Radius		Catalog Numbers
						M	N	
25	43.956	51	30	25	55	31	40.5	966-25055
				30	60			966-25060
				35	65			966-25065
				40	70			966-25070
				45	75			966-25075
				50	80			966-25080
				55	85			966-25085
				60	90			966-25090
				65	95			966-25095
32	53.959	61	30	35	65	36.627	47.346	966-32065
				40	70			966-32070
				45	75			966-32075
				50	80			966-32080
				55	85			966-32085
				60	90			966-32090
				65	95			966-32095
				75	105			966-32105
				80	110			966-32110
				85	115			966-32115
				100	130			966-32130
				110	140			966-32140
125	155	966-32155						
40	64.960	72	35	40	75	42.190	52.908	966-40075
				45	80			966-40080
				50	85			966-40085
				55	90			966-40090
				60	95			966-40095
				65	100			966-40100
				75	110			966-40110
				80	115			966-40115
				85	120			966-40120
				90	125			966-40125
				100	135			966-40135
				105	140			966-40140
				120	155			966-40155

Nom. Post Diameter	B	C	E	F	L	Radius		Catalog Numbers
						M	N	
44	73.959	81	35	40	75	46.939	57.658	966-44075
				55	90			966-44090
				60	95			966-44095
				65	100			966-44100
				75	110			966-44110
				80	115			966-44115
				90	125			966-44125
				100	135			966-44135
				105	140			966-44140
				120	155			966-44155
				130	165			966-44165
				145	180			966-44180
50	80.959	91	35	40	75	51.714	62.408	966-50075
				55	90			966-50090
				60	95			966-50095
				65	100			966-50100
				75	110			966-50110
				80	115			966-50115
				90	125			966-50125
				100	135			966-50135
				105	140			966-50140
				120	155			966-50155
				130	165			966-50165
				145	180			966-50180
155	190	966-50190						
63	94.960	105	35	90	125	58.852	69.571	966-63125
				105	140			966-63140
				120	155			966-63155
				130	165			966-63165
				145	180			966-63180
				155	190			966-63190
				90	125			966-80125
80	111.960	122	35	105	140	67.590	78.283	966-80140
				120	155			966-80155
				130	165			966-80165
				145	180			966-80180
				155	190			966-80190

BALL BEARING COMPONENTS

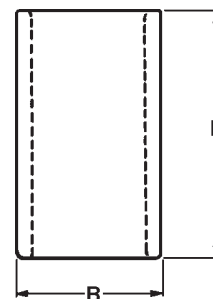


Press Fit Steel Sleeve Bushings



Lempco's Press Fit Steel Sleeve Bushings are manufactured from electric furnace 52100 tool steel, through hardened and precision machined. The I.D. is ground and honed to a superfine finish to minimize resistance to free action of the retainer bearings.

Lempco ball bearing bushings are interchangeable and if mounted in accordance with instructions on Pages 110 and 111 of this catalog will not require select fitting, honing, or other modification.



(Dimensions are given in millimeters.)

Nom. Post Diameter	B	L	Catalog Numbers
19	36.000	50	967-19500
		55	967-19550
		65	967-19650
		70	967-19700
		75	967-19750
		80	967-19800
		90	967-19900
		95	967-19950
		100	967-19100
		110	967-19110
		125	967-19125
		150	967-19150
25	44.000	75	967-25750
		80	967-25800
		90	967-25900
		95	967-25950
		100	967-25100
		105	967-25105
		115	967-25115
		120	967-25120
		125	967-25125
		140	967-25140
		150	967-25150
		165	967-25165
175	967-25175		
32	54.000	75	967-32750
		80	967-32800
		90	967-32900
		95	967-32950
		100	967-32100
		105	967-32105
		115	967-32115
		125	967-32125
		140	967-32140
		150	967-32150
		165	967-32165
		175	967-32175

Nom. Post Diameter	B	L	Catalog Numbers
32	54.000	200	967-32200
		230	967-32230
40	65.000	100	967-40100
		105	967-40105
		115	967-40115
		120	967-40120
		125	967-40125
		135	967-40135
		140	967-40140
		150	967-40150
		165	967-40165
		175	967-40175
		190	967-40190
		200	967-40200
		215	967-40215
		230	967-40230
44	74.000	125	967-44125
		135	967-44135
		140	967-44140
		150	967-44150
		165	967-44165
		175	967-44175
		190	967-44190
		200	967-44200
		215	967-44215
		230	967-44230
		250	967-44250
		280	967-44280
300	967-44300		
50	81.000	125	967-50125
		135	967-50135
		140	967-50140
		150	967-50150

Nom. Post Diameter	B	L	Catalog Numbers
50	81.000	165	967-50165
		175	967-50175
		190	967-50190
		200	967-50200
		215	967-50215
		230	967-50230
		250	967-50250
		280	967-50280
		300	967-50300
		330	967-50330
		350	967-50350
		63	95.000	150	967-63150
165	967-63165		
175	967-63175		
190	967-63190		
200	967-63200		
215	967-63215		
230	967-63230		
250	967-63250		
280	967-63280		
300	967-63300		
330	967-63330		
350	967-63350		
80	112.000	150	967-80150
		165	967-80165
		175	967-80175
		190	967-80190
		200	967-80200
		215	967-80215
		230	967-80230
		250	967-80250
		280	967-80280
		300	967-80300
		330	967-80330
		350	967-80350



BALL BEARING COMPONENTS

Demountable Guide Post Supports and Boss Bushings

Demountable Guide Post Supports and Boss Bushings are offered for heavy duty ball bearing die set construction. Boss Bushings are castings, fitted with through hardened 52100 tool steel liners. Type A offers guidance entirely within the die set. Type B extends guidance within the dieholder. Type C provides guidance almost entirely within the dieholder.

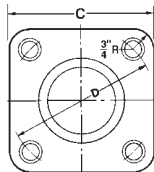
Post Supports, also castings, are machined to accept related ball bearing guide posts. Type A supports the post entirely within the die set, Type B extends support within the punchholder. Type C supports the guide post almost entirely within the punchholder. Boss Bushings and Post Supports are intended either for tap or press fitting, and are held perpendicular to the surface by flanges and cap screws.

These Guide Post Supports and Boss Bushings are interchangeable and if mounted in accordance with instructions on Page 111 of this catalog will not require modification. Ball Bearing bushings and supports other than those listed can be obtained on special order.

(Dimensions are given in millimeters)

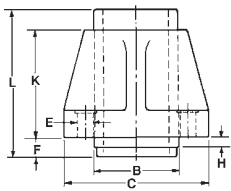


TYPES A, B

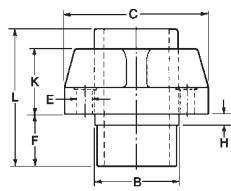


TYPE C

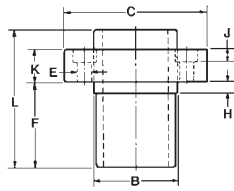
DEMOUNTABLE BOSS BUSHINGS



TYPE A

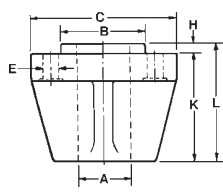


TYPE B

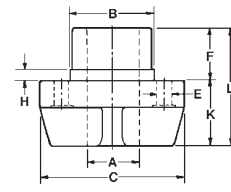


TYPE C

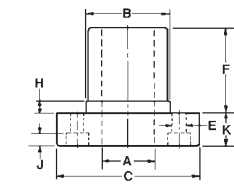
DEMOUNTABLE GUIDE POST SUPPORTS



TYPE A



TYPE B



TYPE C

TYPE A-DEMOUNTABLE BOSS BUSHINGS

Post Dia.	General Dimensions								Catalog Numbers
	B	C	D	E	F	H	K	L	
50	81	140	140	17	*	∅		67	*
								92	
								117	
63	95	153	153	17	*	∅		86	*
								117	
								149	
80	112	178	178	20	*	∅		105	*
								143	
								219	

TYPE B-DEMOUNTABLE BOSS BUSHINGS

Post Dia.	General Dimensions								Catalog Numbers	
	B	C	D	E	F	H	K	L		
50	81	140	140	17	*	∅	50		*	
										968-5004
										968-5005 968-5006
63	95	153	153	17	*	∅	57		*	
										968-6304
										968-6305 968-6306
80	112	178	178	20	*	∅	63		*	
										968-8004
										968-8005 968-8006

TYPE C-DEMOUNTABLE BOSS BUSHINGS

Post Dia.	General Dimensions									Catalog Numbers	
	B	C	D	E	J	F	H	K	L		
50	81	140	140	17	17	*	∅	32		*	
											968-5007
											968-5008 968-5009
63	95	153	153	17	17	*	∅	32		*	
											968-6307
											968-6308 968-6309
80	112	178	178	20	20	*	∅	32		*	
											968-8007
											968-8008 968-8009

TYPE A-DEMOUNTABLE GUIDE POST SUPPORTS

Post Dia.	General Dimensions									Catalog Numbers
	A	B	C	D	E	H	K	L		
50	49.95	81	140	140	17	10	*			76
										102
										127
										95
63	62.95	95	153	153	17	10	*			127
										159
										114
										152
80	79.95	112	178	178	20	10	*			229
										968-8012

TYPE B-DEMOUNTABLE GUIDE POST SUPPORTS

Post Dia.	General Dimensions									Catalog Numbers
	A	B	C	D	E	F	H	K	L	
50	49.95	81	140	140	17	25	10	50		76
						50				
						76				
						38				
63	62.95	95	153	153	17	70	10	57		127
						102				
						159				
						114				
80	79.95	112	178	178	20	50	10	63		152
						89				
						165				
						229				

TYPE C-DEMOUNTABLE GUIDE POST SUPPORTS

Post Dia.	General Dimensions									Catalog Numbers
	A	B	C	D	E	J	F	H	K		L
50	49.95	81	140	140	17	17	44	10	32	76
							70			
							95			
							63			
63	62.95	95	153	153	17	17	95	10	32	95
							95			
							127			
							159			
80	79.95	112	178	178	20	20	83	10	32	114
							121			
							197			
							229			

* Customer must specify, and whether for tap or press fitting.
 ∅ If demountable Boss Bushings are specified for tap fitting "H" will be supplied 9.5 mm. unless customer indicates otherwise. For satisfactory results ("K" plus "F") for PRESS FIT use or ("K" plus "H") for TAP FIT use should at least be equal to, and preferably 1½ times, bushing sleeve outside diameter "B".

BALL BEARING ENGINEERING DATA

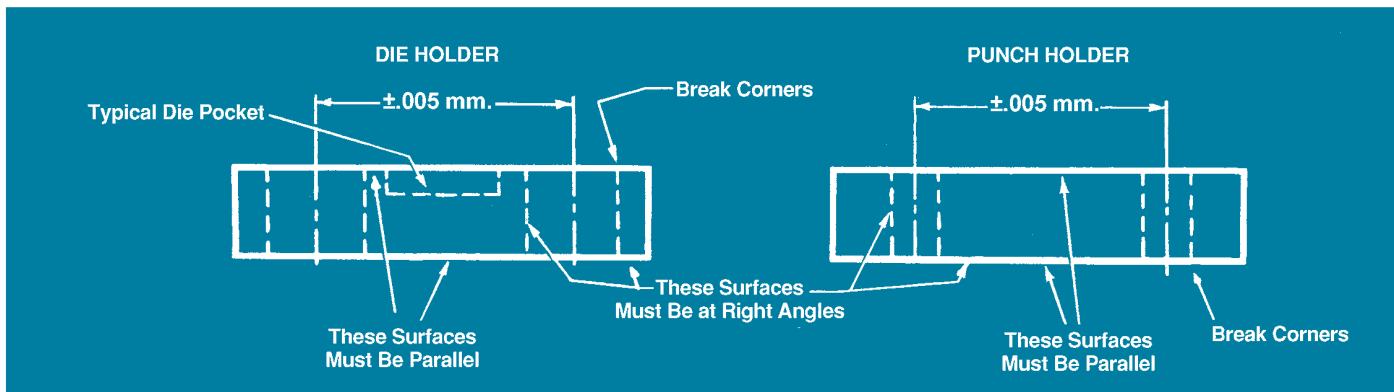
Boring Procedures and Dimensions

Holes for Lempco Ball Bearing Guide Posts and Bushings should be jig bored for best results. Punchholder and dieholder should be clamped together and bored in one setup in order to maintain dead center alignment between the upper and lower bores. If it is not possible to bore in this manner, a tolerance of ± 0.005 mm. between centers (see illustration) must be held. Bores should be smooth and free from tool marks to provide proper bearing area for the guide post or bushing.

Dieholder bores must be perpendicular to that surface

of the dieholder which will back up the die. The bottom surface of the dieholder must be parallel to the die back-up surface. The same holds true for the punchholder; the bores must be perpendicular to the surface which will back up the punches, and the top surface parallel to the punch back-up surface.

Break the corners of the bored holes to a generous chamfer. On sets with a symmetrical profile one pin and bushing should be offset to prevent accidental reversing of the punchholder during assembly.



All Lempco Ball Bearing Guide Posts, Bushings Retainers and Rotainers are completely interchangeable without any necessity whatsoever for select fitting of any kind, and if mounted in accordance with boring and assembly instructions given on this and the following page do not require any

grinding, honing, lapping, or any other modifications of any kind. Please note the dimensions given in the following table. Our experience over many years proves that these are optimum dimensions. Variations must be avoided.

BORE CHART BALL BEARING COMPONENTS (METRIC)

Nominal Guide Post Diameter	#957-SERIES STRAIGHT GUIDE PIN	#958-SERIES DEMOUNTABLE GUIDE PIN	#967-SERIES STRAIGHT SLEEVE BUSHING	#966-SERIES DEMOUNTABLE SHOULDER BUSHING	#968-SERIES DEMOUNTABLE GUIDE POST SUPPORT AND BOSS BUSHING	#968-SERIES DEMOUNTABLE GUIDE POST SUPPORT AND BOSS BUSHING
	(PRESS FIT)	(TAP FIT)	(PRESS FIT)	(TAP FIT)	(TAP FIT)	(PRESS FIT)
	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE
19mm	.7468 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	N/A	1.4161 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	N/A	N/A	N/A
25mm	.9831 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	.9828 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	1.7311 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	1.7311 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	N/A	N/A
32mm	1.2587 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	1.2584 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	2.1248 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	2.1248 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	N/A	N/A
40mm	1.5736 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	1.5733 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	2.5579 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	2.5579 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	N/A	N/A
44mm	1.7311 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	1.7308 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	2.9122 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	2.9122 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	N/A	N/A
50mm	1.9673 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	1.9670 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	3.1878 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	3.1878 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	3.1887 $\begin{matrix} +.0004 \\ -.0000 \end{matrix}$	3.1878 $\begin{matrix} +.0004 \\ -.0000 \end{matrix}$
63mm	2.4791 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	2.4788 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	3.7390 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	3.7390 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	3.7399 $\begin{matrix} +.0004 \\ -.0000 \end{matrix}$	3.7390 $\begin{matrix} +.0004 \\ -.0000 \end{matrix}$
80mm	3.1484 $\begin{matrix} +.000 \\ -.001 \end{matrix}$	3.1481 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	4.4083 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	4.4083 $\begin{matrix} +.0000 \\ -.0005 \end{matrix}$	4.4092 $\begin{matrix} +.0004 \\ -.0000 \end{matrix}$	4.4083 $\begin{matrix} +.0004 \\ -.0000 \end{matrix}$

(ALL DIMENSIONS IN INCHES)

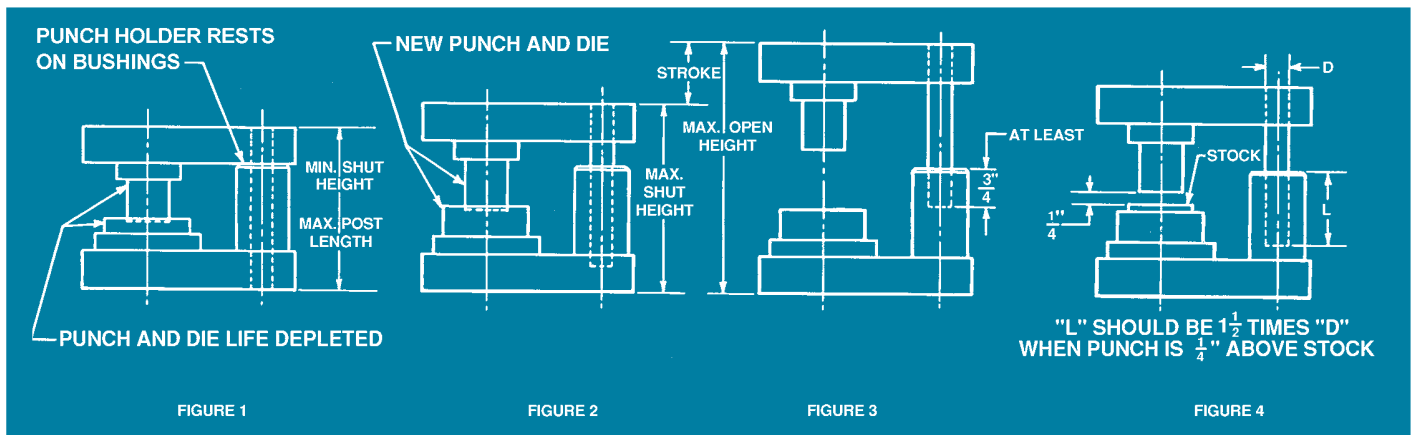


BALL BEARING ENGINEERING DATA

General Die Set Design Procedures

SPECIFICATIONS:

1. Maximum Shut Height – See Figure 2, below.
2. Minimum Shut Height – See Figure 1.
3. Stroke – See Figures 2 and 3.
4. Maximum Open Height – See Figures 2 and 3.



- A. Lay out die as in Figure 1 (Minimum Shut Height). This determines maximum guide post length and maximum bushing height.
- B. Lay out die as in Figure 2 (Maximum Shut Height).
- C. Maximum Open Height (Maximum Shut Height plus Stroke) as in Figure 3 shows minimum guide post engagement in bushing that is required. If this is at least $\frac{3}{4}$ " then conditions are ideal. However, if this dimension is less than $\frac{3}{4}$ " then Figure 4 should be considered. Actual work is done for only a fraction of the total stroke on most dies and if conditions shown in Figure 4 are satisfied in conjunction with Figure 1 and Figure 2 then full length of stroke and maximum open height can be disregarded.

ALSO NOTE HOWEVER THAT LONGER THAN NORMAL STROKES MAY BE UTILIZED BY DISENGAGING GUIDE POST AND, IF ABSOLUTELY NECESSARY, THE ROTAINER FROM BUSHING ON THE UPWARD TRAVEL PROVIDED: 1 – OPERATION IS VERTICAL, 2 – OPERATION IS NOT FASTER THAN 150 STROKES PER MINUTE, AND 3 – INSIDE DIAMETER OF BUSHING IS BELL MOUTHED MINIMUM $\frac{1}{4}$ ".

ON INCLINED OPERATIONS, OR AT SPEEDS IN EXCESS OF 150 STROKES PER MINUTE, THE GUIDE POST MUST ENGAGE THE BUSHING AT ALL TIMES AT LEAST $\frac{3}{4}$ " (THE ROTAINER MUST BE ENGAGED BY THE GUIDE POST AND BUSHINGS AT ALL TIMES).

WARNING

BECAUSE IT IS IMPOSSIBLE TO ANTICIPATE THE CONDITIONS UNDER WHICH LEMPCO MFG. ITEMS WILL BE OPERATED, SAFETY DEVICES AND METHODS MAY BE REQUIRED TO INSURE OPERATOR SAFETY. BESIDES CONFORMING TO ALL NATIONAL, STATE, AND LOCAL CODES, THE BUYER SHOULD CONSIDER THE SAFETY OF THE ENTIRE OPERATION INVOLVING ANY PRESS, AND SEE THAT ANY ADDITIONAL GUARDING, TRAINING, AND MAINTENANCE NECESSARY IS DEVELOPED AND ENFORCED TO PROTECT THE WELL BEING OF THE OPERATOR.

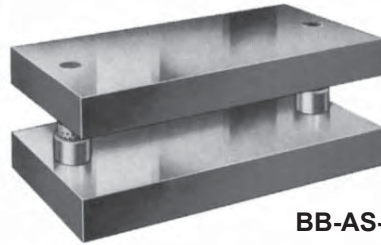
BALL BEARING ALL-STEEL DIE SETS



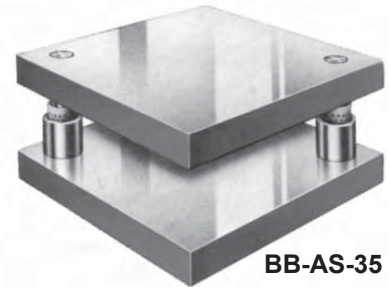
Large Two Post Styles



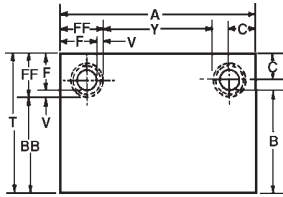
BB-AS-33



BB-AS-34



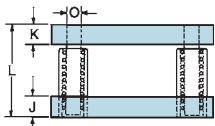
BB-AS-35



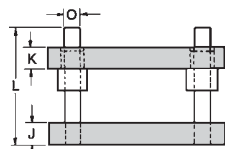
AS-33 STYLE

These Large Two Post All-Steel Die Sets are offered in Ball Bearing and Plain Bearing designs, in Back Post, Center Post and Diagonal Post styles, and in Precision grade.

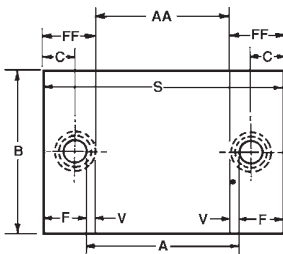
Suggested minimum dimensions are shown in the charts. Sizes are not limited to these suggestions, since customer specifies "A" and "B" dimensions as well as "J" and "K" thicknesses. Sets with "A" dimensions more than 2500 mm. and "B" dimensions more than 1700 mm. can be provided, as well as reverse sets with "B" greater than "A". Special machining, torch cutting and welded components are available to the details of your print. These die sets may not be returned for credit.



BALL BEARING



PLAIN BEARING



AS-34 STYLE

BALL BEARING SETS

1. Specify **Ball Bearing**.
2. Specify Series AS-33, Series AS-34, or Series AS-35. **Prefix** to the series designation the symbol **BB**. Example: BB-AS-33. Follow steps 3 through 10 below

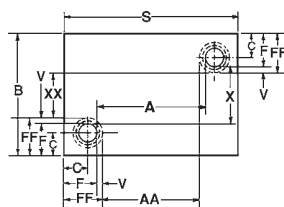
PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series AS-33, Series AS-34, or Series AS-35. **Prefix** to the series designation the symbol **P**. Example: P-AS-33. Follow steps 3 through 10 below

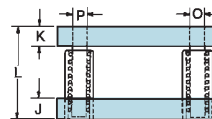
3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with Steel Demountable Bushings. See this catalog for details of these optional bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this

- is dimension from bottom of die holder to top of Guide Post. Guide Post lengths are shown in this catalog.
8. Specify diameter of Guide Post if other than listed. Larger or smaller diameter guide posts than listed will cause dimensional variations. See "Dimensional Variations" data.
9. Specify "no shank", or Lempcoshank". Specify shank diameter and length. If "Lempcoshank" give catalog number of kit desired. Specify exact location of shank relative to guide post locations. All shanks furnished at extra cost.
10. Tell us how to ship; otherwise we will ship "Best way" in our judgment.

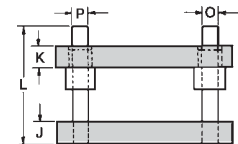
(Dimensions are given in millimeters)



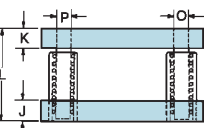
AS-35 STYLE



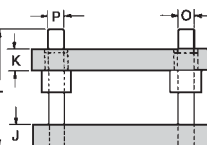
BALL BEARING



PLAIN BEARING



BALL BEARING

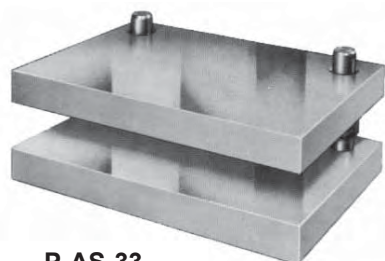


PLAIN BEARING



PLAIN BEARING ALL-STEEL DIE SETS

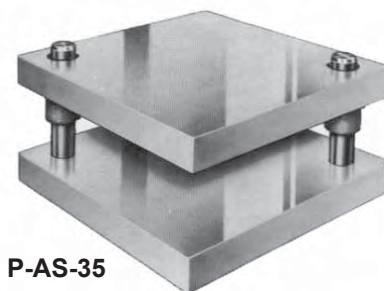
Large Two Post Styles



P-AS-33



P-AS-34



P-AS-35

SUGGESTED MINIMUM DIMENSIONS

WHEN	A = 150 to 300				A = 300 to 450				A = 450 to 600				A = 600 to 750			
B=	J	K	O	P	J	K	O	P	J	K	O	P	J	K	O	P
150 to 200	38	38	32	25	38	38	32	25	38	38	40	32	38	38	40	32
200 to 300	38	38	40	32	38	38	40	32	44	44	44	40	44	44	44	40
300 to 450			40	32	44	44	44	40	50	50	50	44	50	50	50	44
450 to 600			44	38			44	40	50	50	50	44	63	63	63	50
600 to 750			50	44			50	44			63	50	63	63	63	50
750 to 1100			63	50			63	50			63	50			76	63
1100 to 1700			76	63			76	63			76	63			76	63

WHEN	A = 750 to 1100				A = 1100 to 1700				A = 1700 to 2500			
B=	J	K	O	P	J	K	O	P	J	K	O	P
150 to 200	44	44	44	40	50	50	50	44	50	50	50	44
200 to 300	50	50	50	44	50	50	50	44	50	50	50	44
300 to 450	63	63	63	50	63	63	63	50	63	63	63	50
450 to 600	63	63	63	50	63	63	63	50	63	63	63	50
600 to 750	63	63	63	50	76	76	80	63	76	76	80	63
750 to 1100	76	76	63	50	76	76	80	63	76	76	80	63
1100 to 1700					76	76	80	63	89	89	80	63

DIMENSIONAL VARIATIONS

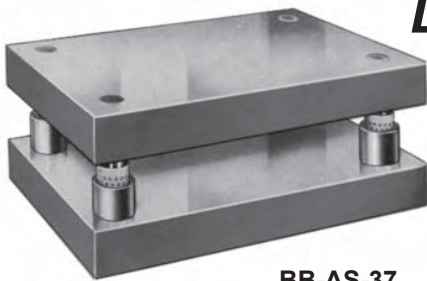
Nom. Guide Post Dia.	BALL BEARING SLEEVE BUSHINGS				PLAIN BEARING SHOULDER BUSHINGS											
	C	F	V	FF	C	F	V	FF								
	MM.	Inch	MM.	Inch	MM.	Inch	MM.	Inch	MM.	Inch						
25 .9843	38	1.496	51	2.008	10	.394	61	2.402	38	1.496	51	2.008	9	.354	60	2.362
32 1.2598	45	1.772	61	2.402	11	.433	72	2.835	45	1.772	61	2.402	9	.354	70	2.756
40 1.5748	53	2.087	73	2.874	13	.512	86	3.386	53	2.087	73	2.874	10	.394	83	3.268
44 1.7323	55	2.165	77	3.032	16	.630	93	3.661	55	2.165	77	3.032	11	.433	88	3.465
50 1.9685	61	2.402	86	3.386	16	.630	102	4.016	61	2.402	86	3.386	13	.512	99	3.898
63 2.4803	68	2.677	100	3.937	16	.630	116	4.567	68	2.677	100	3.937	14	.551	114	4.488
80 3.1496	79	3.110	119	4.685	16	.630	135	5.315	79	3.110	119	4.685	15	.591	134	5.276

FORMULAS		PLATE THICKNESSES STOCKED FOR IMMEDIATE FABRICATION				
AA = A - 2V	S = A + 2F	25	29	32	35	38
BB = B - V		41	44	48	50	57
Y = A - 2FF	T = B + F	63	70	76	83	89
XX = B - 2FF		102	114	127	140	152
	X = B - 2F	165				

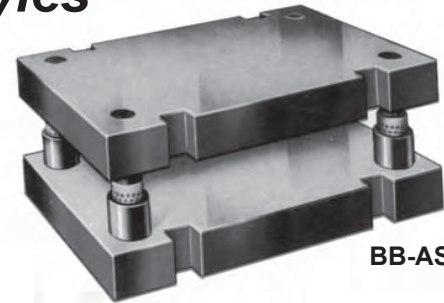
BALL BEARING ALL-STEEL DIE SETS



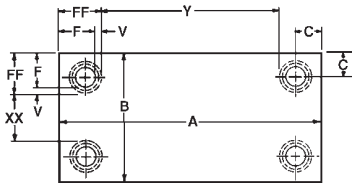
Large Four Post Styles



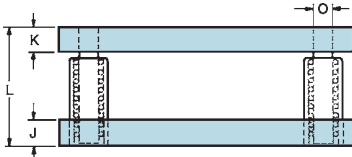
BB-AS-37



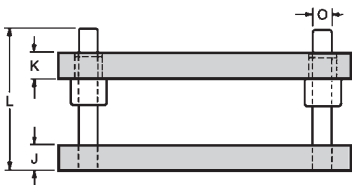
BB-AS-38



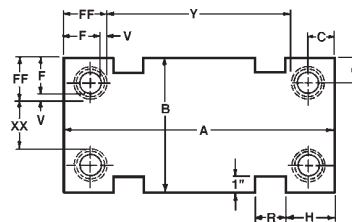
AS-37 STYLE



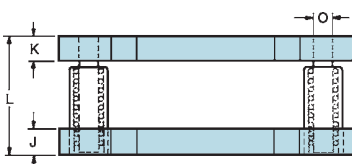
BALL BEARING



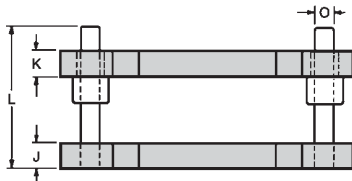
PLAIN BEARING



AS-38 STYLE



BALL BEARING



PLAIN BEARING

Lempco's Large Four Post All-Steel Die Sets are available in Ball Bearing and Plain Bearing types, in two designs of the die and punch holders, and in Precision grade.

Charted dimensions on the facing page are for your convenience in designing a die set to your special requirements, but sizes are not limited to these listed dimensions. Customer specifies "A" and "B" dimensions and "J" and "K" shoe thicknesses. Sets will be provided with "A" dimension in excess of 2500 mm. and "B" dimension in excess of 1700 mm., as well as reverse sets in which "B" is greater than "A". Special machining, torch cutting and welded components are available to your print. These die sets may not be returned for credit.

HOW TO ORDER . . .

BALL BEARING SETS

1. Specify **Ball Bearing**.
2. Specify Series AS-37, or Series AS-38. **Prefix** to the series designation the symbol **BB**. Example: BB-AS-37. Follow steps 3 through 10, below.

PLAIN BEARING SETS

1. Specify **Plain Bearing**.
2. Specify Series AS-37, or Series AS-38. **Prefix** to the series designation the symbol **P**. Example: P-AS-38. Follow steps 3 through 10, below.

3. Specify Precision.
4. Specify dimensions "A" and "B".
5. Specify thickness of die holder "J" and punch holder "K".
6. Specify type of bushing. Unless otherwise specified, Ball Bearing Sets will be furnished with Press Fit Steel Sleeve Bushings, and Plain Bearing Sets with Steel Demountable Bushings. See this catalog for details of these bushings, as well as descriptions of Precision Ball Bearing Retainers. Also note differences in "F", "V", and "FF" dimensions as shown in the Dimensional Variations Chart.
7. Specify length "L". For Ball Bearing sets this is Minimum Shut Height dimension. For Plain Bearing sets this

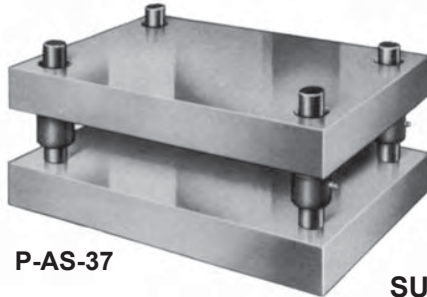
- is dimension from bottom of die holder to top of Guide Post. Guide Post lengths are shown in this catalog.
8. Specify diameter of Guide Post if other than listed. Larger or smaller diameter guide posts than listed will cause dimensional variations. See "Dimensional Variations" data.
9. Specify "no shank", or Lempcoshank". Specify shank diameter and length. If "Lempcoshank" give catalog number of kit desired. Specify exact location of shank relative to guide post locations. All shanks furnished at extra cost.
10. Tell us how to ship; otherwise we will ship "Best way" in our judgment.

(Dimensions are given in millimeters.)

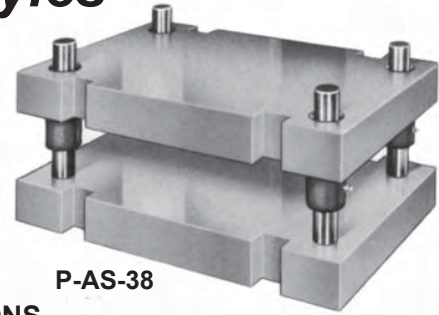


PLAIN BEARING ALL-STEEL DIE SETS

Large Four Post Styles



P-AS-37



P-AS-38

SUGGESTED MINIMUM DIMENSIONS

WHEN	A = 150 to 300					A = 300 to 450					A = 450 to 600					A = 600 to 750				
B=	J	K	O	H	R	J	K	O	H	R	J	K	O	H	R	J	K	O	H	R
150 to 200	32	25	25	—	—	38	25	32	—	—	38	32	40	—	—	38	32	44	—	—
200 to 300	38	25	25	—	—	38	32	32	—	—	38	32	40	—	—	44	38	44	—	—
300 to 450			31			38	32	32	—	—	44	38	40	—	—	44	38	44	—	—
450 to 600			38					38			44	38	40	—	—	50	44	44	—	—
600 to 750			44					44					44			50	44	44	—	—
750 to 1100			50					50					50					50		
1100 to 1700			50					50					50					50		

WHEN	A = 750 to 1100					A = 1100 to 1700					A = 1700 to 2500				
B=	J	K	O	H	R	J	K	O	H	R	J	K	O	H	R
150 to 200	44	38	50	127	76	50	38	50	127	102					
200 to 300	44	38	50	127	76	50	38	50	127	102	63	44	63	152	102
300 to 450	50	44	50	127	76	63	44	50	127	102	63	50	63	152	102
450 to 600	50	44	50	127	76	63	44	50	127	102	76	50	63	152	102
600 to 750	63	50	50	127	76	63	50	50	127	102	76	50	63	152	102
750 to 1100	63	50	50	127	76	76	50	50	127	102	89	63	63	152	102
1100 to 1700						76	50	50	127	102	89	63	63	152	102

DIMENSIONAL VARIATIONS

Nom. Guide Post Dia.	BALL BEARING SLEEVE BUSHINGS								PLAIN BEARING SHOULDER BUSHINGS							
	C		F		V		FF		C		F		V		FF	
	MM.	Inch	MM.	Inch	MM.	Inch	MM.	Inch	MM.	Inch	MM.	Inch	MM.	Inch	MM.	Inch
25 .9843	38	1.496	51	2.008	10	.394	61	2.402	38	1.496	51	2.008	9	.354	60	2.362
32 1.2598	45	1.772	61	2.402	11	.433	72	2.835	45	1.772	61	2.402	9	.354	70	2.756
40 1.5748	53	2.087	73	2.874	13	.512	86	3.386	53	2.087	73	2.874	10	.394	83	3.268
44 1.7323	55	2.165	77	3.032	14	.551	91	3.583	55	2.165	77	3.032	11	.433	88	3.465
50 1.9685	61	2.402	86	3.386	16	.630	102	4.016	61	2.402	86	3.386	13	.512	99	3.898
63 2.4803	68	2.677	100	3.937	16	.630	116	4.567	68	2.677	100	3.937	14	.551	114	4.488
80 3.1496	79	3.110	119	4.685	16	.630	135	5.315	79	3.110	119	4.685	15	.591	134	5.276

FORMULAS	PLATE THICKNESSES STOCKED FOR IMMEDIATE FABRICATION				
XX = B - 2FF	25	29	32	35	38
	41	44	48	50	57
	63	70	76	83	89
Y = A - 2FF	102	114	127	140	152
	165				

PLAIN BEARING COMPONENTS



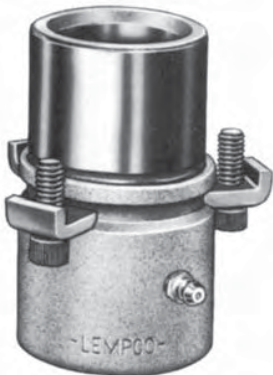
Precision Demountable Bushings

Lempco Precision Demountable bushings, which are manufactured from electric furnace 52100 tool steel include the Steel Shoulder, Steel Short Shoulder, Steel Extra Long Shoulder types, and the Bronze Shoulder and Short Shoulder types.

All Lempco Demountable Bushings are designed for tap fitting. They should not be pressed in. They will not require select fitting, honing or modification of any kind if mounted in accordance with instructions on Page 122 of this catalog. They are assembled to the shoe with clamps and cap screws, seating flush to the surface with the bore perpendicular. These bushings can be conveniently removed, and on reinstallation the die set will register accurately.

The end radius of the bushing is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement. All Precision Demountable Bushings have oil grooves and lubrication fittings.

(Dimensions are given in millimeters.)



SHOULDER – Steel



SHORT SHOULDER – Steel



SHOULDER – Bronze



EXTRA LONG SHOULDER – Steel

SHOULDER – Steel or Bronze

Inside Dia. A MM.	B	C	E	F	L	Radius		Catalog Numbers	
						M	N	Steel	Bronze
19.019	28	32	18	32	50	21.44	29.36	667-19500	647-19500
25.017	38	43	22	44	66	27	34.5	667-25660	647-25660
32.017	45	50	25	50	75	31.5	41.5	667-32750	647-32750
40.017	54	59	35	50	85	36	46	667-40850	647-40850
44.022	58	65	35	50	85	39	49	667-44850	647-44850
50.021	65	75	45	50	95	44	54	667-50950	647-50950
63.025	81	91	45	63	108	52	62	667-63108	647-63108
80.025	100	110	45	63	108	62	72	667-80108	647-80108

SHORT SHOULDER – Steel or Bronze

Inside Dia. A MM.	B	C	E	F	L	Radius		Catalog Numbers	
						M	N	Steel	Bronze
19.019	28	32	18	16	34	21.44	29.36	666-19340	646-19340
25.017	38	43	22	21	43	27	34.5	666-25430	646-25430
32.017	45	50	25	21	46	31.5	41.5	666-32460	646-32460
40.017	54	59	35	21	56	36	46	666-40560	646-40560
44.022	58	65	35	25	60	39	49	666-44600	646-44600
50.021	65	75	45	25	70	44	54	666-50700	646-50700
63.025	81	91	45	25	70	52	62	666-63700	646-63700
80.025	100	110	45	25	70	62	72	666-80700	646-80700

EXTRA LONG SHOULDER – Steel

Inside Dia. A MM.	B	C	E	F	L	Radius		Catalog Numbers
						M	N	
25.017	38	43	22	76	98	27	34.5	658-25980
32.017	45	50	25	76	101	31.5	41.5	658-32101
40.017	54	59	35	76	111	36	46	658-40111
44.022	58	65	35	76	111	39	49	658-44111
50.021	65	75	45	89	134	44	54	658-50134
63.025	81	91	45	89	134	52	62	658-63134
80.025	100	110	45	89	134	62	72	658-80134

CLAMPS PROVIDED FOR TAP FITTING

Inside Dia. A		Number Clamps
MM.	Inch	
19	.748	2
25	.984	2
32	1.260	3
40	1.575	3

Inside Dia. A		Number Clamps
MM.	Inch	
44	1.732	4
50	1.969	4
63	2.480	4
80	3.150	4



PLAIN BEARING COMPONENTS

Straight Guide Posts



Lempco's "510" series Plain Bearing Precision Guide Posts are manufactured from electric furnace 52100 tool steel, through-hardened and precision ground. These chromium alloy steel posts will give you better wear with accuracy than any other precision rated product on the market.

Although classified "Precision", these guide posts are for use with all of Lempco's plain bearing bushings, and are now provided as standard in all Lempco plain bearing die sets, stock and special.

They replace the chrome plated precision guide post of older design, and also the now discontinued commercial guide post

The end radius of the guide post is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement at high speeds. Sizes listed here are most commonly used, but Lempco will manufacture these highest quality guide posts in other diameters and lengths on special order.

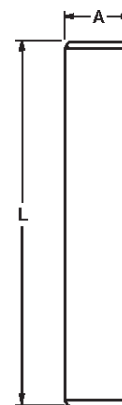
(Dimensions are given in millimeters)

Post Diameter A	Length L	Catalog Numbers
19	90	510-19900
	100	510-19100
	110	510-19110
	115	510-19115
	120	510-19120
	125	510-19125
	150	510-19150
25	125	510-25125
	135	510-25135
	140	510-25140
	145	510-25145
	150	510-25150
	165	510-25165
	175	510-25175
	190	510-25190
	200	510-25200
	215	510-25215
	230	510-25230
32	125	510-32125
	135	510-32135
	140	510-32140
	145	510-32145
	150	510-32150
	165	510-32165
	175	510-32175
	190	510-32190
	200	510-32200
	215	510-32215
	230	510-32230
	250	510-32250
	260	510-32260

Post Diameter A	Length L	Catalog Numbers
32	280	510-32280
	300	510-32300
40	150	510-40150
	165	510-40165
	175	510-40175
	190	510-40190
	200	510-40200
	215	510-40215
	230	510-40230
	240	510-40240
	250	510-40250
	265	510-40265
	280	510-40280
	290	510-40290
	300	510-40300
	315	510-40315
	330	510-40330
360	510-40360	
44	150	510-44150
	165	510-44165
	175	510-44175
	190	510-44190
	200	510-44200
	215	510-44215
	230	510-44230
	240	510-44240
	250	510-44250
	265	510-44265
	280	510-44280
	290	510-44290
	300	510-44300
	315	510-44315

Post Diameter A	Length L	Catalog Numbers
44	330	510-44330
	360	510-44360
50	150	510-50150
	165	510-50165
	175	510-50175
	190	510-50190
	200	510-50200
	215	510-50215
	230	510-50230
	240	510-50240
	250	510-50250
	265	510-50265
	280	510-50280
	300	510-50300
	315	510-50315
	330	510-50330
	360	510-50360
	380	510-50380
	400	510-50400
	430	510-50430
460	510-50460	
63	200	510-63200
	215	510-63215
	230	510-63230
	240	510-63240
	250	510-63250
	265	510-63265
	280	510-63280
	300	510-63300
	315	510-63315
	330	510-63330
360	510-63360	
380	510-63380	

Post Diameter A	Length L	Catalog Numbers
63	430	510-63430
	500	510-63500
80	200	510-80200
	215	510-80215
	230	510-80230
	240	510-80240
	250	510-80250
	280	510-80280
	300	510-80300
	330	510-80330
	360	510-80360
	430	510-80430
500	510-80500	



PLAIN BEARING COMPONENTS



Flanged Demountable Guide Posts



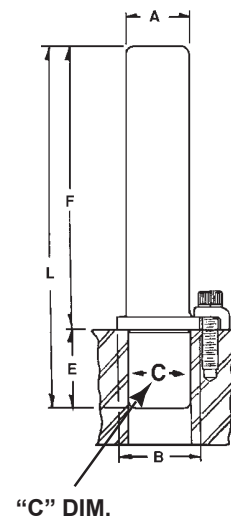
(Dimensions are given in millimeters.)

Diameter			Nominal Length			Catalog Numbers
Post A	Flange B	C	E	F	L	
25	33	24.961 24.953	30	70	100	508-25100
				80	110	508-25110
				85	115	508-25115
				90	120	508-25120
				95	125	508-25125
				105	135	508-25135
				110	140	508-25140
				115	145	508-25145
				120	150	508-25150
				135	165	508-25165
				145	175	508-25175
				160	190	508-25190
				170	200	508-25200
				185	215	508-25215
200	230	508-25230				
32	40	31.961 31.953	30	85	115	508-32115
				90	120	508-32120
				95	125	508-32125
				105	135	508-32135
				110	140	508-32140
				115	145	508-32145
				120	150	508-32150
				135	165	508-32165
				145	175	508-32175
				160	190	508-32190
				170	200	508-32200
				185	215	508-32215
				200	230	508-32230
				220	250	508-32250
250	280	508-32280				
270	300	508-32300				
40	48	39.959 39.951	36	79	115	508-40115
				84	120	508-40120
				89	125	508-40125
				99	135	508-40135
				104	140	508-40140
				109	145	508-40145
				114	150	508-40150
				129	165	508-40165
				139	175	508-40175
				154	190	508-40190
				164	200	508-40200
				179	215	508-40215
				194	230	508-40230
				214	250	508-40250
244	280	508-40280				
264	300	508-40300				
44	57	43.960 43.952	43	107	150	508-44150
				122	165	508-44165
				132	175	508-44175
				147	190	508-44190
				157	200	508-44200
				172	215	508-44215
				187	230	508-44230
				207	250	508-44250
				237	280	508-44280
				257	300	508-44300
				317	360	508-44360

Diameter			Nominal Length			Catalog Numbers
Post A	Flange B	C	E	F	L	
50	63	49.959 49.951	49	101	150	508-50150
				116	165	508-50165
				126	175	508-50175
				141	190	508-50190
				151	200	508-50200
				166	215	508-50215
				181	230	508-50230
				201	250	508-50250
				231	280	508-50280
				251	300	508-50300
				281	330	508-50330
				311	360	508-50360
				376	425	508-50425
				451	500	508-50500
63	76	62.959 62.951	49	151	200	508-63200
				166	215	508-63215
				181	230	508-63230
				201	250	508-63250
				231	280	508-63280
				251	300	508-63300
				281	330	508-63330
				311	360	508-63360
				381	430	508-63430
				451	500	508-63500
80	93	79.959 79.951	62	138	200	508-80200
				153	215	508-80215
				168	230	508-80230
				188	250	508-80250
				218	280	508-80280
				238	300	508-80300
				268	330	508-80330
				298	360	508-80360
				368	430	508-80430
				438	500	508-80500

The Lempco Flanged Demountable Guide Post for plain bearing assemblies is manufactured from electric furnace 52100 chromium tool steel, through-hardened and precision ground for longest wear with all Lempco plain bearing bushings, steel and bronze precision grade.

This removable type post is tap fit into the dieholder bore with the flange flush to the ground surface of the shoe. It is secured with clamps and cap screws. It may be removed, and on re-installation the die set will register accurately. The end radius is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.





PLAIN BEARING COMPONENTS

Shoulder Guide Posts



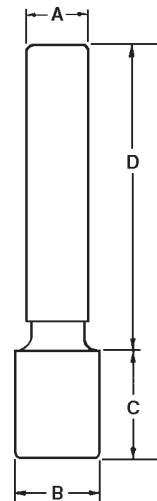
(Dimensions are given in millimeters.)

Diameter A	B	Length L	C	D	Catalog Numbers
25	38.227	115	35	80	509-25115
		125		90	509-25125
		140		105	509-25140
		150		115	509-25150
		165		130	509-25165
		175		140	509-25175
		190		155	509-25190
		200		165	509-25200
32	45.212	125	48	77	509-32125
		140		92	509-32140
		150		102	509-32150
		165		117	509-32165
		175		127	509-32175
		190		142	509-32190
		200		152	509-32200
		215		167	509-32215
40	54.229	175	60	115	509-40175
		190		130	509-40190
		200		140	509-40200
		215		155	509-40215
		230		170	509-40230
		240		180	509-40240
		250		190	509-40250
44	58.216	190	73	117	509-44190
		200		127	509-44200
		215		142	509-44215
		230		157	509-44230
		240		167	509-44240
		250		177	509-44250
50	65.227	200	86	114	509-50200
		230		144	509-50230
		250		164	509-50250
		280		194	509-50280
		300		214	509-50300
		330		244	509-50330
63	81.229	230	98	132	509-63230
		250		152	509-63250
		280		182	509-63280
		300		202	509-63300
		330		232	509-63330
		360		262	509-63360

Shoulder Guide Posts are intended for use with Shoulder Guide Post Bushings and therefore the mounting diameters of the posts are the same as those of related bushings on the preceding page. *These mounting diameters are a minimum of .007" over the size of Precision Press Fit Bushings and .009" over Precision Demountable Bushings so as to allow grind stock for precision fitting in the construction of new sets and to allow reboring where necessary to replace guide posts and bushings in used sets.*

Lempco Shoulder Guide Posts are manufactured of electric furnace 52100 tool steel, through hardened and precision ground. Mounting instructions on Page 122 of this catalog should be strictly followed. Mounting diameter lead edge should be smoothly blended after grinding to prevent hole broaching or drift during assembly. The end radius of the guide post is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.

Other diameters and lengths not listed can be provided on special order.



PLAIN BEARING COMPONENTS



Demountable Bosses



TYPE 1 – Demountable Boss



TYPE 2 – Demountable Boss



TYPE 3 – Demountable Boss

Lempco manufactures three general types of Demountable Bosses for construction of plain bearing heavy duty special die sets. **When ordering customer must specify whether for use as boss bushing or as guide post support.**

Type 1 mounts the post or bushing above the surface of the shoe. Type 2 mounts the major part of the bearing surface within the die set shoe. Type 3 is similar to Type 2 but has a lesser portion of the bearing surface extending within the shoe.

All inside diameters will provide a press fit when used as guide post supports. When used as boss bushings the nominal amount of stock provided must be honed to the desired fit with the guide post. Demountable bosses are designed to be tap fitted to the die set shoe. Mounting instructions on Page 122 must be followed.

Lempco manufactures other heavy duty demountable bosses to special order.

(Dimensions are given in millimeters.)

TYPE 1 – DEMOUNTABLE BOSS

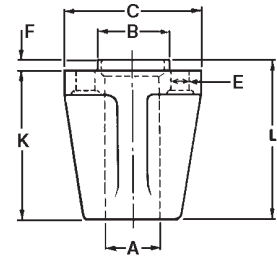
Post Dia.	General Dimensions							Catalog Numbers
	K	B	C	D	E	F	L	
50	38	65	127	117	17	8	46	668-5011
	89						97	668-5012
	140						148	668-5013
63	38	81	153	153	17	8	46	668-6311
	89						97	668-6312
	140						148	668-6313
80	89	100	178	180	20	8	97	668-8012
	140						146	668-8013

TYPE 2 – DEMOUNTABLE BOSS

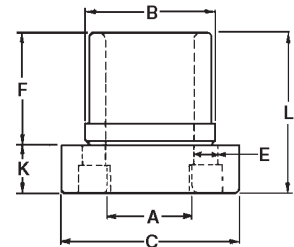
Post Dia.	General Dimensions							Catalog Numbers
	K	B	C	D	E	F	L	
50	38	69	102	89	14	63	101	668-5018
63	38	87	127	117	17	76	114	668-6318

TYPE 3 – DEMOUNTABLE BOSS

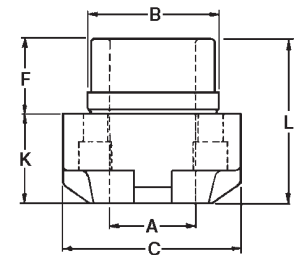
Post Dia.	General Dimensions							Catalog Numbers
	K	B	C	D	E	F	L	
50	63	69	102	89	14	38	101	668-5019
63	63	87	127	117	17	51	114	668-6319



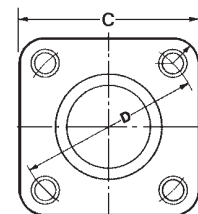
TYPE 1 – Demountable Boss



TYPE 2 – Demountable Boss



TYPE 3 – Demountable Boss



1. PIN SUPPORT: I.D. Bored to give a Press Fit on Guide Pin (No Oil Grooves).

2. BOSS BUSHING: I.D. Bored and Honed to give Clearance over Guide Pin (Oil Grooves on I.D.)



PLAIN BEARING ENGINEERING DATA

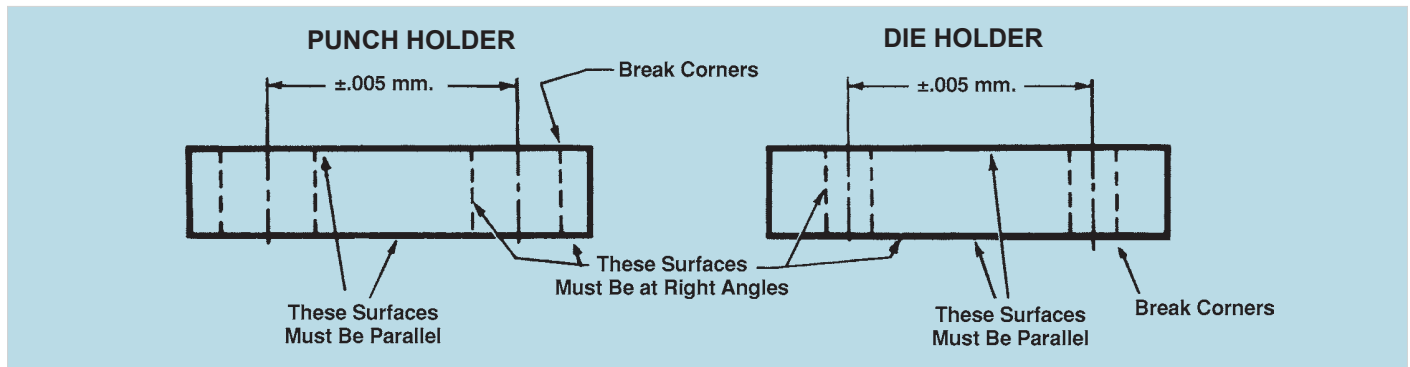
Boring Procedures and Dimensions

Holes for Lempco Plain Bearing Guide Posts and Bushings should be jig bored for best results. Punchholder and dieholder should be clamped together and bored in one set up to maintain dead center alignment between upper and lower bores. If this is not possible a tolerance of ± 0.005 mm. between centers (see illustration) must be held. Bores should be smooth and free from tool marks to provide proper bearing area for the guide post or bushing.

Dieholder bores must be perpendicular to that surface

which will back up the die. The bottom surface of the die holder must be parallel to the die back-up surface. The punchholder bores must be perpendicular to the surface that will back up the punches, and the top surface parallel to the punch back-up surface.

Break the corners of the bored holes to a generous chamfer. On sets with a symmetrical profile one pin and bushing should be offset to prevent accidental reversing of the punchholder during assembly.



All Lempco Plain Bearing Precision Guide Posts and Bushings are interchangeable without select fitting, and when mounted in accordance with the instructions and bore sizes given on this page do not require honing for fits except in the

case of press fit mounted bushings. Please note the dimensions given in the following table. Experience proves that these are optimum dimensions and variations may cause trouble.

BORE CHART PLAIN BEARING COMPONENTS (METRIC)

Nominal Guide Post Diameter	#510-SERIES STRAIGHT GUIDE PIN	#508-SERIES DEMOUNTABLE GUIDE PIN	#509-SERIES SHOULDER GUIDE PIN	#646-SERIES #647-SERIES #656-SERIES #657-SERIES #658-SERIES #666-SERIES #667-SERIES DEMOUNTABLE STYLE SHOULDER BUSHING	TYPE - 1 DEMOUNTABLE BOSS BUSHING & PIN SUPPORT	TYPE - 2 DEMOUNTABLE BOSS BUSHING & PIN SUPPORT	TYPE - 3 DEMOUNTABLE BOSS BUSHING & PIN SUPPORT
	(PRESS FIT)	(TAP FIT)	(PRESS FIT)	(TAP FIT)	(TAP FIT)	(TAP FIT)	(TAP FIT)
	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE	BORE SIZE
19mm	.7468 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	N/A	N/A	1.1024 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	N/A	N/A	N/A
25mm	.9831 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	.9831 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	BORE HOLE .0012" TO .0018" SMALLER THAN SHOULDER DIAMETER OF GUIDE PIN	1.4961 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	N/A	N/A	N/A
32mm	1.2587 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.2587 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		1.7717 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	N/A	N/A	N/A
40mm	1.5736 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.5736 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		2.1260 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	N/A	N/A	N/A
44mm	1.7311 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.7311 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	BORE HOLE .0015" TO .0022" SMALLER THAN SHOULDER DIAMETER OF GUIDE PIN	2.2835 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	N/A	N/A	N/A
50mm	1.9673 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	1.9673 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		2.5591 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	2.5591 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	2.7165 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	2.7165 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$
63mm	2.4791 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	2.4791 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$		3.1890 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	3.1890 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	3.4252 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	3.4252 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$
80mm	3.1484 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$	3.1484 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$	N/A	3.9370 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	3.9370 $\begin{smallmatrix} +.0004 \\ -.0000 \end{smallmatrix}$	N/A	N/A

(ALL DIMENSIONS IN INCHES)

CONVERSION TABLE



INCH FRACTIONS AND DECIMALS TO METRIC EQUIVALENTS

INCHES		m m	INCHES		m m	INCHES		m m
Fractions	Decimals		Fractions	Decimals		Fractions	Decimals	
1/64	.0156	.39	7/8	.8750	22.22	3	3.000	76.20
1/32	.03125	.79	57/64	.8906	22.62	3 1/16	3.062	77.78
3/64	.0469	1.19	29/32	.90625	23.01	3 1/8	3.125	79.37
1/16	.0625	1.58	59/64	.92187	23.41	3 3/16	3.1875	80.96
5/64	.0781	1.98	15/16	.9375	23.81	3 1/4	3.250	82.55
3/32	.094	2.38	61/64	.9531	24.20	3 5/16	3.312	84.13
7/64	.1093	2.77	31/32	.96875	24.60	3 3/8	3.375	85.72
1/8	.1250	3.17	1	1.000	25.4	3 7/16	3.438	87.31
9/64	.1406	3.57	1 1/32	1.0312	26.19	3 1/2	3.500	88.90
5/32	.15625	3.96	1 1/16	1.062	26.98	3 9/16	3.562	90.48
11/64	.17187	4.36	1 3/32	1.094	27.78	3 5/8	3.625	92.07
3/16	.1875	4.76	1 1/8	1.125	28.57	3 11/16	3.6875	93.66
13/64	.2031	5.15	1 5/32	1.156	29.36	3 3/4	3.750	95.25
7/32	.21875	5.55	1 3/16	1.1875	30.16	3 13/16	3.8125	96.83
15/64	.23437	5.95	1 7/32	1.219	30.95	3 7/8	3.875	98.42
1/4	.2500	6.35	1 1/4	1.250	31.75	3 15/16	3.9375	100.01
17/64	.2656	6.74	1 9/32	1.281	32.54	4	4.000	101.60
9/32	.28125	7.14	1 5/16	1.312	33.33	4 1/16	4.062	103.18
19/64	.29687	7.54	1 11/32	1.344	34.13	4 1/8	4.125	104.77
5/16	.3125	7.93	1 3/8	1.375	34.92	4 3/16	4.1875	106.36
21/64	.3281	8.33	1 13/32	1.406	35.71	4 1/4	4.250	107.95
11/32	.34375	8.73	1 7/16	1.438	36.51	4 5/16	4.312	109.53
23/64	.35937	9.12	1 15/32	1.469	37.30	4 3/8	4.375	111.12
3/8	.3750	9.52	1 1/2	1.500	38.10	4 7/16	4.438	112.71
25/64	.3906	9.92	1 17/32	1.531	38.89	4 1/2	4.500	114.30
13/32	.4062	10.31	1 9/16	1.562	39.68	4 9/16	4.562	115.88
27/64	.42187	10.71	1 19/32	1.594	40.48	4 5/8	4.625	117.47
7/16	.4375	11.11	1 5/8	1.625	41.27	4 3/4	4.750	120.65
29/64	.4531	11.50	1 21/32	1.6562	42.06	4 7/8	4.875	123.82
15/32	.46875	11.90	1 11/16	1.6875	42.86	5	5.000	127
31/64	.48437	12.30	1 23/32	1.719	43.65	5 1/4	5.250	133.35
1/2	.500	12.70	1 3/4	1.750	44.45	5 1/2	5.500	139.70
33/64	.5156	13.09	1 25/32	1.781	45.24	5 3/4	5.750	146.05
17/32	.53125	13.49	1 13/16	1.8125	46.03	6	6.000	152.40
35/64	.54687	13.89	1 27/32	1.844	46.83	6 1/4	6.250	158.75
9/16	.5625	14.28	1 7/8	1.875	47.62	6 1/2	6.500	165.10
37/64	.57812	14.68	1 29/32	1.9062	48.41	6 3/4	6.750	171.45
19/32	.59375	15.08	1 15/16	1.9375	49.21	7	7.000	177.80
39/64	.60937	15.47	1 31/32	1.969	50.00	7 1/2	7.500	190.50
5/8	.6250	15.87	2	2.000	50.80	8	8.000	203.20
41/64	.6406	16.27	2 1/16	2.062	52.38	8 1/2	8.500	215.90
21/32	.65625	16.66	2 1/8	2.125	53.97	9	9.000	228.60
43/64	.67187	17.06	2 3/16	2.1875	55.56	9 1/2	9.500	241.30
11/16	.6875	17.46	2 1/4	2.250	57.15	10	10.000	254.00
45/64	.7031	17.85	2 5/16	2.312	58.73	11	11.000	279.40
23/32	.71875	18.25	2 3/8	2.375	60.32	12	12.000	304.80
47/64	.73437	18.65	2 7/16	2.438	61.91	13	13.000	330.20
3/4	.7500	19.05	2 1/2	2.500	63.50	14	14.000	355.60
49/64	.7656	19.44	2 9/16	2.562	65.08	15	15.000	381
25/32	.78125	19.84	2 5/8	2.625	66.67	16	16.000	406.40
51/64	.79687	20.24	2 11/16	2.6875	68.26	17	17.000	431.80
13/16	.8125	20.63	2 3/4	2.750	69.85	18	18.000	457.20
53/64	.8281	21.03	2 13/16	2.8125	71.43	19	19.000	482.60
27/32	.84375	21.43	2 7/8	2.875	73.02	20	20.000	580
55/64	.85937	21.82	2 15/16	2.9375	74.61			



PLAIN BEARING



Die Set Components

Interchangeable* with
DANLY - LAMINA - PRODUCTO - SUPERIOR



* "B" DIMENSIONS OF 2.5 & 3.0 DIAMETER BUSHINGS MAY DIFFER.
CONSULT LEMPCO FOR CORRECT APPLICATION.



PLAIN BEARING COMPONENTS

Precision Bronze Plated Demountable Bushings

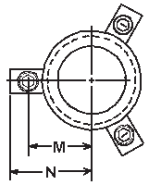
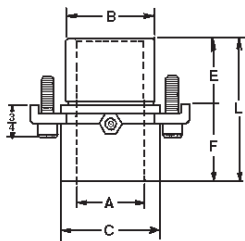
Lempco Precision Bronze Plated Demountable Bushings are designed for use under high speed operating conditions. Dimensions are closely held in machining and plating to permit interchangeability. They are intended for tap fitting, to be held securely with clamps and cap screws. They can be conveniently removed and upon re-installation the die set will register accurately.

These bushings must not be pressed in and must not

be honed. They are equipped with figure-eight oil grooves. The Shoulder Bushing has a lubrication fitting, the Short Shoulder Bushing has an oil hole.

Clamps and screws are provided with bushings, from two to four sets per bushing, depending on diameter. Bushing sizes listed here will usually satisfy requirements, but other diameters and lengths are available on special order.

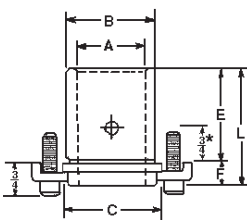
SHOULDER – Bronze Plated



Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.000	1.500	1 ³ / ₄	7 ⁷ / ₈	1 ¹ / ₄	2 ¹ / ₈	1.072	1.385	524-0809
1 ¹ / ₄	1.250	1.750	2 ¹ / ₁₆	1 ¹ / ₈	1 ¹ / ₂	2 ⁷ / ₈	1.281	1.703	524-1011
1 ¹ / ₂	1.500	2.000	2 ⁵ / ₁₆	1 ³ / ₈	1 ¹ / ₂	2 ⁷ / ₈	1.411	1.833	524-1212
1 ³ / ₄	1.750	2.250	2 ⁵ / ₈	1 ⁵ / ₈	1 ¹ / ₂	3 ¹ / ₈	1.567	1.989	524-1413
2	2.000	2.500	3 ¹ / ₃₂	1 ⁷ / ₈	1 ¹ / ₂	3 ³ / ₈	1.782	2.204	524-1614
2 ¹ / ₂	2.500	*3.000	3 ⁵ / ₈	1 ⁷ / ₈	2	3 ⁷ / ₈	2.086	2.508	524-2016
3	3.000	*3.625	4 ³ / ₈	1 ⁷ / ₈	2	3 ⁷ / ₈	2.468	2.889	524-2416



SHORT SHOULDER – Bronze Plated



*1¹/₄" on 2¹/₂ and 3" diameter bushings

Inside Dia. A		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.000	1.500	1 ³ / ₄	1 ³ / ₈	1 ¹ / ₂	1 ⁷ / ₈	1.082	1.395	523-0808
1 ¹ / ₄	1.250	1.750	2 ¹ / ₁₆	1 ⁷ / ₈	1 ¹ / ₂	2 ³ / ₈	1.286	1.708	523-1010
1 ¹ / ₂	1.500	2.000	2 ⁵ / ₁₆	1 ⁷ / ₈	1 ¹ / ₂	2 ³ / ₈	1.411	1.833	523-1210
1 ³ / ₄	1.750	2.250	2 ⁵ / ₈	2 ³ / ₈	1 ¹ / ₂	2 ⁷ / ₈	1.567	1.989	523-1412
2	2.000	2.500	2 ¹⁵ / ₁₆	2 ³ / ₈	1 ¹ / ₂	2 ⁷ / ₈	1.734	2.156	523-1612
2 ¹ / ₂	2.500	*3.000	3 ³ / ₈	2 ⁵ / ₈	3 ³ / ₈	3	1.959	2.381	523-2012
3	3.000	*3.500	3 ⁷ / ₈	3 ⁵ / ₈	3 ³ / ₈	4	2.214	2.636	523-2416



PLAIN BEARING COMPONENTS

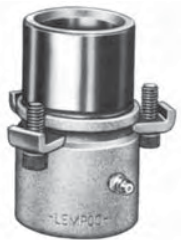


Precision Demountable Bushings

Lempco Precision Demountable Bushings, which are manufactured from electric furnace 52100 tool steel include the Steel Shoulder, Steel Short Shoulder, Steel Extra Long Shoulder types, and the Bronze Shoulder and Bronze Plated Shoulder and Short Shoulder types. The Bronze Plated bushings are described on the preceding page.

All Lempco Demountable Bushings are designed for tap fitting. They should not be pressed in. They will not require select fitting, honing or modification of any kind. They are assembled to the shoe with clamps and cap screws, seating flush to the surface with the bore perpendicular. These bushings can be conveniently removed, and on reinstallation the die set will register accurately.

The end radius of the bushing is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement. All Precision Demountable Bushings have oil grooves and lubrication fittings. For practical purposes the bushings listed here are adequate, but different diameters and lengths can be obtained on special order.



SHOULDER – Steel



SHORT SHOULDER – Steel



SHOULDER – Bronze



EXTRA LONG SHOULDER – Steel

SHOULDER – Bronze

Inside Dia.		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.000	1.500	1 ¹¹ / ₁₆	7/8	1 ³ / ₄	2 ⁵ / ₈	1 ¹ / ₁₆	1 ³ / ₈	548-0811
1 ¹ / ₄	1.250	1.750	1 ¹⁵ / ₁₆	1 ¹ / ₈	2	3 ¹ / ₈	1 ⁷ / ₃₂	1 ¹⁷ / ₃₂	548-1013
1 ¹ / ₂	1.500	2.000	2 ³ / ₁₆	1 ³ / ₈	2	3 ³ / ₈	1 ¹¹ / ₃₂	1 ²¹ / ₃₂	548-1214
1 ³ / ₄	1.750	2.250	2 ¹ / ₂	1 ³ / ₈	2	3 ³ / ₈	1 ¹ / ₂	1 ¹³ / ₁₆	548-1414
2	2.000	2.500	2 ⁷ / ₈	1 ¹³ / ₁₆	2	3 ¹³ / ₁₆	1 ⁴⁵ / ₆₄	2 ¹ / ₆₄	548-1616
2 ¹ / ₂	2.500	*3.250	3 ⁵ / ₈	1 ¹³ / ₁₆	2 ¹ / ₂	4 ⁵ / ₁₆	2 ⁵ / ₆₄	2 ²⁵ / ₆₄	548-2018
3	3.000	*3.750	4 ¹ / ₈	1 ¹³ / ₁₆	2 ¹ / ₂	4 ⁵ / ₁₆	2 ¹¹ / ₃₂	2 ²¹ / ₃₂	548-2418

SHOULDER – Steel

Inside Dia.		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.000	1.500	1 ¹¹ / ₁₆	7/8	1 ³ / ₄	2 ⁵ / ₈	1 ¹ / ₁₆	1 ³ / ₈	564-0811
1 ¹ / ₄	1.250	1.750	1 ¹⁵ / ₁₆	1 ¹ / ₈	2	3 ¹ / ₈	1 ⁷ / ₃₂	1 ¹⁷ / ₃₂	564-1013
1 ¹ / ₂	1.500	2.000	2 ³ / ₁₆	1 ³ / ₈	2	3 ³ / ₈	1 ¹¹ / ₃₂	1 ²¹ / ₃₂	564-1214
1 ³ / ₄	1.750	2.250	2 ¹ / ₂	1 ³ / ₈	2	3 ³ / ₈	1 ¹ / ₂	1 ¹³ / ₁₆	564-1414
2	2.000	2.500	2 ⁷ / ₈	1 ¹³ / ₁₆	2	3 ¹³ / ₁₆	1 ⁴⁵ / ₆₄	2 ¹ / ₆₄	564-1616
2 ¹ / ₂	2.500	*3.250	3 ⁵ / ₈	1 ¹³ / ₁₆	2 ¹ / ₂	4 ⁵ / ₁₆	2 ⁵ / ₆₄	2 ²⁵ / ₆₄	564-2018
3	3.000	*3.750	4 ¹ / ₈	1 ¹³ / ₁₆	2 ¹ / ₂	4 ⁵ / ₁₆	2 ¹¹ / ₃₂	2 ²¹ / ₃₂	564-2418

SHORT SHOULDER – Steel

Inside Dia.		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.000	1.500	1 ¹¹ / ₁₆	7/8	1 ³ / ₁₆	1 ¹¹ / ₁₆	1 ¹ / ₁₆	1 ³ / ₈	563-0807
1 ¹ / ₄	1.250	1.750	1 ¹⁵ / ₁₆	1 ¹ / ₈	1 ³ / ₁₆	1 ¹⁵ / ₁₆	1 ⁷ / ₃₂	1 ¹⁷ / ₃₂	563-1008
1 ¹ / ₂	1.500	2.000	2 ³ / ₁₆	1 ³ / ₈	1 ³ / ₁₆	2 ³ / ₁₆	1 ¹¹ / ₃₂	1 ²¹ / ₃₂	563-1209
1 ³ / ₄	1.750	2.250	2 ¹ / ₂	1 ³ / ₈	1	2 ³ / ₈	1 ¹ / ₂	1 ¹³ / ₁₆	563-1410
2	2.000	2.500	2 ⁷ / ₈	1 ¹³ / ₁₆	1	2 ¹³ / ₁₆	1 ⁴⁵ / ₆₄	2 ¹ / ₆₄	563-1612
2 ¹ / ₂	2.500	*3.250	3 ⁵ / ₈	1 ¹³ / ₁₆	1	2 ¹³ / ₁₆	2 ⁵ / ₆₄	2 ²⁵ / ₆₄	563-2012
3	3.000	*3.750	4 ¹ / ₈	1 ¹³ / ₁₆	1	2 ¹³ / ₁₆	2 ¹¹ / ₃₂	2 ²¹ / ₃₂	563-2412

EXTRA LONG SHOULDER – Steel

Inside Dia.		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.000	1.500	1 ¹¹ / ₁₆	7/8	3	3 ⁷ / ₈	1 ¹ / ₁₆	1 ³ / ₈	555-0816
1 ¹ / ₄	1.250	1.750	1 ¹⁵ / ₁₆	1 ¹ / ₈	3	4 ¹ / ₈	1 ⁷ / ₃₂	1 ¹⁷ / ₃₂	555-1017
1 ¹ / ₂	1.500	2.000	2 ³ / ₁₆	1 ³ / ₈	3	4 ³ / ₈	1 ¹¹ / ₃₂	1 ²¹ / ₃₂	555-1218
1 ³ / ₄	1.750	2.250	2 ¹ / ₂	1 ³ / ₈	3	4 ³ / ₈	1 ¹ / ₂	1 ¹³ / ₁₆	555-1418
2	2.000	2.500	2 ⁷ / ₈	1 ¹³ / ₁₆	3 ¹ / ₂	5 ⁵ / ₁₆	1 ⁴⁵ / ₆₄	2 ¹ / ₆₄	555-1622
2 ¹ / ₂	2.500	*3.250	3 ⁵ / ₈	1 ¹³ / ₁₆	3 ¹ / ₂	5 ⁵ / ₁₆	2 ⁵ / ₆₄	2 ²⁵ / ₆₄	555-2022
3	3.000	*3.750	4 ¹ / ₈	1 ¹⁵ / ₁₆	3 ¹ / ₂	5 ⁷ / ₁₆	2 ¹¹ / ₃₂	2 ²¹ / ₃₂	555-2422

EXTRA LONG SHOULDER – Bronze

NEW

Inside Dia.		B	C	E	F	L	Radius		Catalog Number
Nom.	Dec.						M	N	
1	1.000	1.500	1 ¹¹ / ₁₆	7/8	3	3 ⁷ / ₈	1 ¹ / ₁₆	1 ³ / ₈	548-0816
1 ¹ / ₄	1.250	1.750	1 ¹⁵ / ₁₆	1 ¹ / ₈	3	4 ¹ / ₈	1 ⁷ / ₃₂	1 ¹⁷ / ₃₂	548-1017
1 ¹ / ₂	1.500	2.000	2 ³ / ₁₆	1 ³ / ₈	3	4 ³ / ₈	1 ¹¹ / ₃₂	1 ²¹ / ₃₂	548-1218
1 ³ / ₄	1.750	2.250	2 ¹ / ₂	1 ³ / ₈	3	4 ³ / ₈	1 ¹ / ₂	1 ¹³ / ₁₆	548-1418
2	2.000	2.500	2 ⁷ / ₈	1 ¹³ / ₁₆	3 ¹ / ₂	5 ⁵ / ₁₆	1 ⁴⁵ / ₆₄	2 ¹ / ₆₄	548-1622
2 ¹ / ₂	2.500	3.250	3 ⁵ / ₈	1 ¹³ / ₁₆	3 ¹ / ₂	5 ⁵ / ₁₆	2 ⁵ / ₆₄	2 ²⁵ / ₆₄	548-2022
3	3.000	3.750	4 ¹ / ₈	1 ¹⁵ / ₁₆	3 ¹ / ₂	5 ⁷ / ₁₆	2 ¹¹ / ₃₂	2 ²¹ / ₃₂	548-2422



PLAIN BEARING COMPONENTS

Precision Press Fit Bushings

Precision Press Fit Bushings for Lempco plain bearing assemblies are offered in five designs. The Steel Shoulder, Short Shoulder, Short Sleeve and Extra Long Sleeve types are manufactured from high grade electric furnace 52100 tool steel. Bronze Shoulder Bushings are made from hard bronze alloy.

Since all of these bushings are designed for press fitting a nominal allowance is provided on the inside diameter for honing after assembly. Bushings $1\frac{3}{4}$ " diameter and smaller are finish ground and stocked .0006" under listed diameters.

Bushings having inside diameters of 2" or larger are finished ground to listed decimal diameters.

All Precision Press Fit Bushings have figure-eight oil grooves. Steel and Bronze Shoulder types have lubrication fittings. The end radius of the bushing is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.

Bushing sizes listed here are in common use, but others can be obtained on special order.



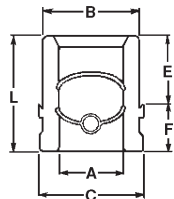
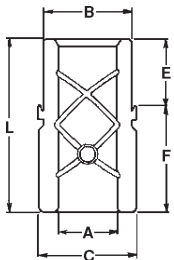
SHOULDER – Bronze

SHOULDER – Steel or Bronze

Inside Dia. A		B	C	E	F	L	Catalog Numbers Steel	Catalog Numbers Bronze
Nom.	Dec.							
$\frac{3}{4}$	.750	1.127	$1\frac{3}{16}$	$\frac{7}{8}$	$1\frac{3}{4}$	$2\frac{5}{8}$	562-0611	544-0611
1	1.000	1.502	$1\frac{11}{16}$	$\frac{7}{8}$	$1\frac{3}{4}$	$2\frac{5}{8}$	562-0811	544-0811
$1\frac{1}{4}$	1.250	1.752	$1\frac{15}{16}$	$1\frac{1}{8}$	2	$3\frac{1}{8}$	562-1013	544-1013
$1\frac{1}{2}$	1.500	2.002	$2\frac{3}{16}$	$1\frac{3}{8}$	2	$3\frac{3}{8}$	562-1214	544-1214
$1\frac{3}{4}$	1.750	2.252	$2\frac{1}{2}$	$1\frac{3}{8}$	2	$3\frac{3}{8}$	562-1414	544-1414
2	2.000	2.502	$2\frac{7}{8}$	$1\frac{13}{16}$	2	$3\frac{13}{16}$	562-1616	544-1616
$2\frac{1}{2}$	2.500	*3.252	$3\frac{5}{8}$	$1\frac{13}{16}$	$2\frac{1}{2}$	$4\frac{5}{16}$	562-2018	544-2018
3	3.000	*3.752	$4\frac{1}{8}$	$1\frac{13}{16}$	$2\frac{1}{2}$	$4\frac{5}{16}$	562-2418	544-2418



SHOULDER – Steel



SHORT SHOULDER – Steel

Inside Dia. A		B	C	E	F	L	Catalog Numbers
Nom.	Dec.						
$\frac{3}{4}$	.750	1.127	$1\frac{5}{16}$	$\frac{7}{8}$	$\frac{13}{16}$	$1\frac{11}{16}$	561-0607
1	1.000	1.502	$1\frac{11}{16}$	$\frac{7}{8}$	$\frac{13}{16}$	$1\frac{11}{16}$	561-0807
$1\frac{1}{4}$	1.250	1.752	$1\frac{15}{16}$	$1\frac{1}{8}$	$\frac{13}{16}$	$1\frac{15}{16}$	561-1008
$1\frac{1}{2}$	1.500	2.002	$2\frac{3}{16}$	$1\frac{3}{8}$	$\frac{13}{16}$	$2\frac{3}{16}$	561-1209
$1\frac{3}{4}$	1.750	2.252	$2\frac{1}{2}$	$1\frac{3}{8}$	1	$2\frac{3}{8}$	561-1410
2	2.000	2.502	$2\frac{7}{8}$	$1\frac{13}{16}$	1	$2\frac{13}{16}$	561-1612
$2\frac{1}{2}$	2.500	*3.252	$3\frac{5}{8}$	$1\frac{13}{16}$	1	$2\frac{13}{16}$	561-2012
3	3.000	*3.752	$4\frac{1}{8}$	$1\frac{13}{16}$	1	$2\frac{13}{16}$	561-2412



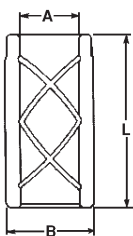
SHORT SHOULDER – Steel

SHORT SLEEVE or EXTRA LONG SLEEVE – Steel

Inside Dia. A		B	L		Catalog Numbers	
Nom.	Dec.		Short Sleeve	Ex. Lg. Sleeve	Short Sleeve	Ex. Lg. Sleeve
$\frac{3}{4}$	.750	1.127	$1\frac{3}{4}$	3	581-0607	583-0612
1	1.000	1.502	$1\frac{3}{4}$	3	581-0807	583-0812
$1\frac{1}{4}$	1.250	1.752	2	3	581-1008	583-1012
$1\frac{1}{2}$	1.500	2.002	2	3	581-1208	583-1212
$1\frac{3}{4}$	1.750	2.252	—	3	—	583-1412
2	2.000	*2.502	—	3	—	583-1612
$2\frac{1}{2}$	2.500	*3.252	—	3	—	583-2012



EXTRA LONG SLEEVE – Steel



SHORT SLEEVE – Steel

PLAIN BEARING COMPONENTS



Straight Guide Posts



Lempco's 505 series Plain Bearing Precision Guide Posts are manufactured from electric furnace 52100 tool steel, through-hardened and precision ground. These chromium alloy steel posts will give you better wear with accuracy than any other precision rated product on the market.

Although classified "Precision", these guide posts are for use with all of Lempco's nominal plain

bearing bushings.

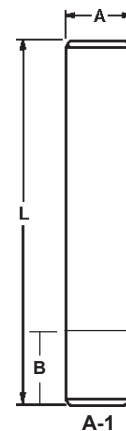
The end radius of the guide post is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement at high speeds. Sizes listed here are most commonly used, but Lempco will manufacture these highest quality guide posts in other diameters and lengths on special order.

Nom. Dia A	B	Length L	Catalog Numbers
3/4	1 1/8	4	505-0616
		4 1/4	505-0617
		4 1/2	505-0618
		4 3/4	505-0619
		5	505-0620
		6	505-0624
1	1 1/2	4	505-0816
		4 1/4	505-0817
		4 1/2	505-0818
		4 3/4	505-0819
		5	505-0820
		5 1/4	505-0821
		5 1/2	505-0822
		5 3/4	505-0823
		6	505-0824
		6 1/2	505-0826
		7	505-0828
		7 1/2	505-0830
		8	505-0832
		8 1/2	505-0834
		9	505-0836
		10	505-0840
		11	505-0844
		12	505-0848
1 1/4	1 3/4	4 1/2	505-1018
		4 3/4	505-1019
		5	505-1020
		5 1/4	505-1021
		5 1/2	505-1022
		5 3/4	505-1023
		6	505-1024
		6 1/2	505-1026
7	505-1028		

Nom. Dia A	B	Length L	Catalog Numbers
1 1/4	1 3/4	7 1/2	505-1030
		8	505-1032
		8 1/2	505-1034
		9	505-1036
		10	505-1040
		11	505-1044
1 1/2	1 3/4	12	505-1048
		4 1/2	505-1218
		4 3/4	505-1219
		5	505-1220
		5 1/4	505-1221
		5 1/2	505-1222
		5 3/4	505-1223
		6	505-1224
		6 1/2	505-1226
		7	505-1228
		7 1/2	505-1230
		8	505-1232
8 1/2	505-1234		
9	505-1236		
10	505-1240		
11	505-1244		
12	505-1248		
1 3/4	2 1/4	6	505-1424
		6 1/2	505-1426
		7	505-1428
		7 1/2	505-1430
		8	505-1432
		8 1/2	505-1434
1 3/4	2 1/4	9	505-1436
		10	505-1440
		11	505-1444
		12	505-1448

Nom. Dia A	B	Length L	Catalog Numbers
1 3/4	2 1/4	14	505-1456
2	2 1/2	6	505-1624
		6 1/2	505-1626
		7	505-1628
		7 1/2	505-1630
		8	505-1632
		8 1/2	505-1634
		9	505-1636
		10	505-1640
		11	505-1644
		12	505-1648
2 1/2	3 1/2	13	505-1652
		14	505-1656
		17	505-1668
		20	505-1680
		8	505-2032
		8 1/2	505-2034
		9	505-2036
		10	505-2040
		11	505-2044
		12	505-2048
3	3 1/2	13	505-2052
		14	505-2056
		17	505-2068
		20	505-2080
		8	505-2432
		8 1/2	505-2434
		9	505-2436
		10	505-2440
11	505-2444		
12	505-2448		
13	505-2452		
14	505-2456		

Nom. Dia A	B	Length L	Catalog Numbers
3	3 1/2	17	505-2468
		20	505-2480



A-1 3/4" TO 1" = +.002
 A-1 1 1/4" TO 2" = +.0025
 A-1 2 1/2" TO 3" = +.003



PLAIN BEARING COMPONENTS

Flanged Demountable Guide Posts

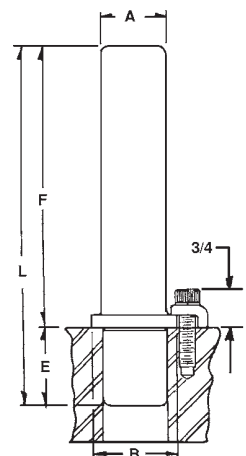


Diameter		Nominal Length				Catalog Numbers
Nom Post A	Flange B	E	Radius		L	
			M	N		
1	1 ⁵ / ₁₆	1 ³ / ₁₆	2 ³ / ₄	1 ³ / ₁₆	1 ¹ / ₈	4 556-0816
			3 556-0817			
			3 ¹ / ₄ 556-0818			
			3 ¹ / ₂ 556-0819			
			3 ³ / ₄ 556-0820			
			4 556-0821			
			4 ¹ / ₄ 556-0822			
			4 ¹ / ₂ 556-0823			
			4 ³ / ₄ 556-0824			
			5 ¹ / ₄ 556-0826			
			5 ¹ / ₂ 556-0828			
			6 ¹ / ₄ 556-0830			
			6 ³ / ₄ 556-0832			
			7 ¹ / ₄ 556-0834			
7 ³ / ₄ 556-0836						
1 ¹ / ₄	1 ⁹ / ₁₆	1 ³ / ₁₆	3 ¹ / ₄	6 ³ / ₆₄	1 ²⁵ / ₆₄	4 ¹ / ₂ 556-1018
			3 ¹ / ₂ 556-1019			
			3 ³ / ₄ 556-1020			
			4 556-1021			
			4 ¹ / ₄ 556-1022			
			4 ¹ / ₂ 556-1023			
			4 ³ / ₄ 556-1024			
			5 ¹ / ₄ 556-1026			
			5 ³ / ₄ 556-1028			
			6 ¹ / ₄ 556-1030			
			6 ³ / ₄ 556-1032			
			7 ¹ / ₄ 556-1034			
			7 ³ / ₄ 556-1036			
			8 ¹ / ₄ 556-1040			
9 ¹ / ₄ 556-1044						
10 ¹ / ₄ 556-1048						
1 ¹ / ₂	1 ⁷ / ₈	1 ⁷ / ₁₆	3	1 ¹ / ₈	1 ¹⁷ / ₃₂	4 ¹ / ₂ 556-1218
			3 ¹ / ₄ 556-1219			
			3 ¹ / ₂ 556-1220			
			3 ³ / ₄ 556-1221			
			4 556-1222			
			4 ¹ / ₄ 556-1223			
			4 ¹ / ₂ 556-1224			
			5 556-1226			
			5 ¹ / ₂ 556-1228			
			6 556-1230			
			6 ¹ / ₂ 556-1232			
			7 556-1234			
			7 ¹ / ₂ 556-1236			
			8 ¹ / ₂ 556-1240			
9 ¹ / ₂ 556-1244						
10 ¹ / ₂ 556-1248						
1 ³ / ₄	2 ¹ / ₄	1 ¹¹ / ₁₆	4 ¹ / ₄	1 ¹⁹ / ₆₄	1 ⁴⁵ / ₆₄	6 556-1424
			4 ³ / ₄ 556-1426			
			5 ¹ / ₄ 556-1428			
			5 ³ / ₄ 556-1430			
			6 ¹ / ₄ 556-1432			
			6 ³ / ₄ 556-1434			
			7 ¹ / ₄ 556-1436			
			8 ¹ / ₄ 556-1440			
			9 ¹ / ₄ 556-1444			
			10 ¹ / ₄ 556-1448			
			12 ¹ / ₄ 556-1456			

Diameter		Nominal Length				Catalog Numbers					
Nom Post A	Flange B	E	Radius		L						
			M	N							
2	2 ¹ / ₂	1 ¹⁵ / ₁₆	4	1 ²⁷ / ₆₄	1 ⁵³ / ₆₄	6 556-1624					
			4 ¹ / ₂ 556-1626								
			5 556-1628								
			5 ¹ / ₂ 556-1630								
			6 556-1632								
			6 ¹ / ₂ 556-1634								
			7 556-1636								
			8 556-1640								
			9 556-1644								
			10 556-1648								
			11 556-1652								
			12 556-1656								
			15 556-1668								
			18 556-1680								
2 ¹ / ₂	3	1 ¹⁵ / ₁₆	6	1 ⁴³ / ₆₄	2 ⁵ / ₆₄	8 556-2032					
			6 ¹ / ₂ 556-2034								
			7 556-2036								
			8 556-2040								
			9 556-2044								
			10 556-2048								
			11 556-2052								
			12 556-2056								
			15 556-2068								
			18 556-2080								
			3			3 ¹ / ₂	2 ⁷ / ₁₆	5 ¹ / ₂	1 ⁵⁹ / ₆₄	2 ²¹ / ₆₄	8 556-2432
								6 556-2434			
								6 ¹ / ₂ 556-2436			
								7 ¹ / ₂ 556-2440			
8 ¹ / ₂ 556-2444											
9 ¹ / ₂ 556-2448											
10 ¹ / ₂ 556-2452											
11 556-2456											
14 556-2468											
17 556-2480											

The Lempco Flanged Demountable Guide Post for plain bearing assemblies is manufactured from electric furnace 52100 chromium tool steel, through-hardened and precision ground for longest wear with all Lempco plain bearing bushings, steel, bronze plated, precision grade.

This removable type post is tap fit into the dieholder bore with the flange flush to the ground surface of the shoe. It is secured with clamps and cap screws. It may be removed, and on re-installation the die set will register accurately. The end radius is ground with the tool marks running in the direction of vertical motion to minimize wear from engagement and disengagement.



NITROGEN GAS SPRINGS



High Force Long Life High Cycle Rate

Lempco offers 20 unique models with strokes ranging from 6mm/.24" to 300mm/11.8" and initial contact forces from 15.0 lbs. to 41,000 lbs.

If you are designing a new product, or making improvements to an existing one, a Raymond or Kaller nitrogen gas spring may be the answer. Call Lempco for technical assistance to discuss new application ideas. Current applications include valve actuators, shock absorbing bumpers, mountain bike suspension, etc.

If your application calls for a custom spring such as a special stroke length, shorter overall length, smaller diameter, high cycle rates or other differentiating specifications, call our technical assistance department and let us customize a spring or spring system for you.

Technical Features:

- High initial force
- Low force increase through stroke
- Pressure medium: Nitrogen gas
- Range of operating temperature: -25° F to 180° F
- Maximum piston rod speed:
35 meters/min 115 ft/min
- Component type mounting fixtures
- Manufacturer is ISO 9001 certified
- Strict testing and quality control

Call us at 1 (800) 321-8632 or fax at 1 (800) 221-6310 for our complete catalog of specifications. Ask for Heavy Duty Gas Spring Catalog, Form R100.

Visit our Web Site at www.lempco.com



Special Springs

Company: _____

Address: _____

City: _____

State: _____ Zip: _____

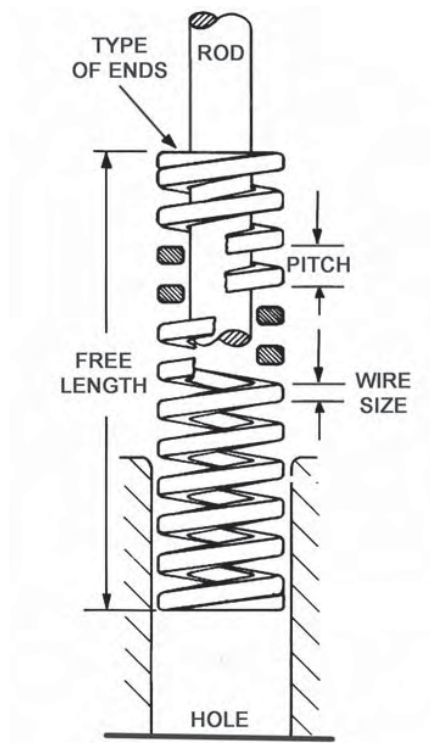
Attn: _____

Phone: _____

Fax: _____

COMPRESSION

Quantity Required
Wire Size
Type of Wire
Outside Diameter
Inside Diameter
Free Length
Hole Size
Rod Size
No. of Coils
Pitch
Rate
Solid Height
Direction of Coils
Type of Ends
Test Loads
Print Available?
Finish
Comments



In Office Use Only
Date Received:
Date Quoted:
Quoted By:



Alphabetical Index

Product	Page Numbers
Bolsters And Steel Plate	67 - 74
Bolsters - Small Press	68 - 69
Bolsters - Large Press	70 - 73
J.I.C. Pressroom Standards	69, 70 - 73
Machined Steel Plate	74
C.A.D. E-Mail Instructions	41
Components - Die Set - Inch	79 - 102
Ball Bearing - Rotainer/Retainers/Bushings/Guide Posts	80 - 88
Ball Bearing - Engineering Data	89 - 91
Plain Bearing - Bushings/Guide Posts/Demountable Bosses	92 - 100
Plain Bearing - Engineering Data	101 - 102
Components - Die Set - Interchangeable/Plain Bearing (Danyl/Lamina/Producto/Superior)	125 - 130
Bushings - Precision Demountable/Press Fit	126 - 128
Guide Posts - Straight/Flanged Demountable	129 - 130
Components - Die Set - Metric	103 - 112, 117 - 122
Ball Bearing - Rotainer/Retainers/Guide Posts/Bushings	104 - 110
Ball Bearing - Engineering Data	111 - 112
Conversion Table	123
Plain Bearing - Bushings/Guide Posts/Demountable Bosses	117 - 121
Plain Bearing - Engineering Data	122
Customized Guidance System	75 - 77



Alphabetical Index

Product	Page Numbers
Die Sets	
Aluminum	66
Flanged Two Post - Ball Bearing/Plain Bearing/ Precision	1 - 7
Forming Machine - Dovetail Sets for Multi-Slide/Verti-Slide/Fourslide Machines	59 - 65
Metric - Ball & Plain Bearing All-Steel	113 - 116
Rectangular Four Post - Ball Bearing/Plain Bearing/Precision	21 - 35
Rectangular Two Post - Ball Bearing/Plain Bearing/Precision	9 - 19
Special - Large All-Steel Ball & Plain Bearing	43 - 49
Demountable Boss All-Steel Ball & Plain Bearing	50 - 51
Round All-Steel Ball & Plain Bearing	52
Long Narrow All-Steel Ball & Plain Bearing	53
Heavy-Duty All-Steel Ball & Plain Bearing	54 - 57
 Factors In Die Set Design	 I - III
 Lempcoshank	 37 - 40
 Lubrication Instructions For Ball Assembly	 78
 Pressure Control Devices	
Nitrogen Gas Springs	131
Special Springs Worksheet	132

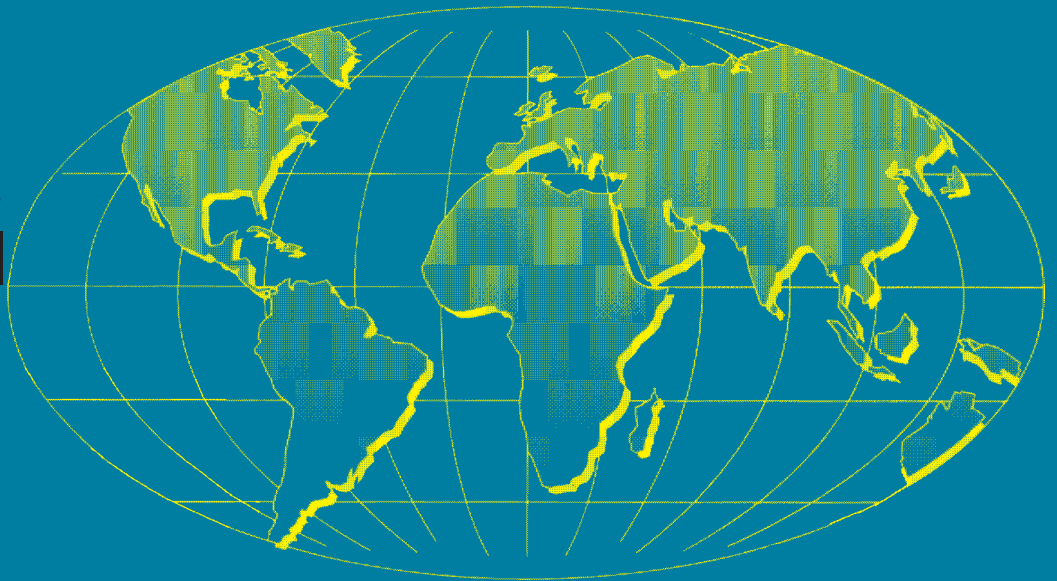


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