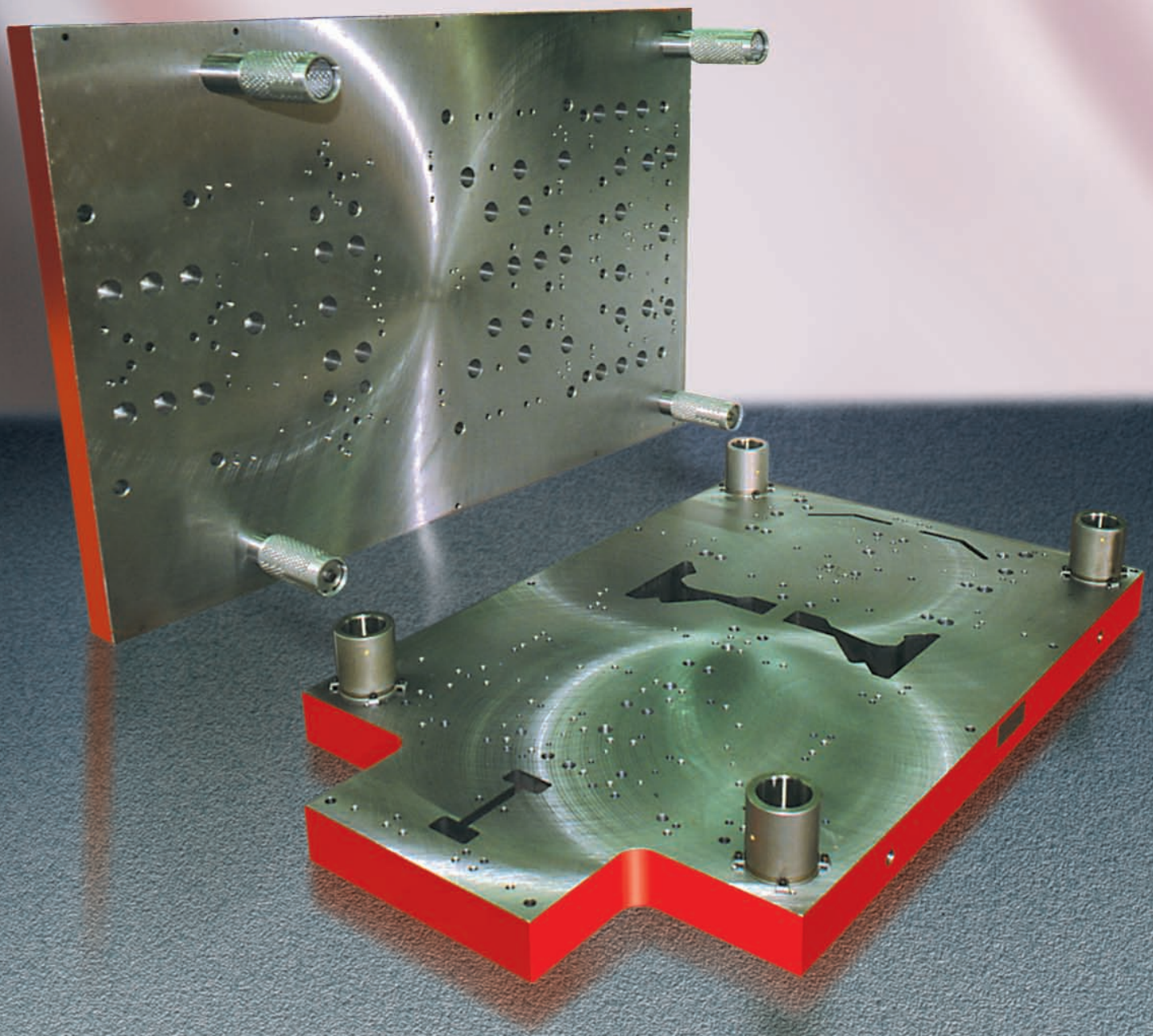
READY

THE INNOVATOR OF OUR INDUSTRY®

SELECTIVE FIT™
Die Sets and Guiding

Full Service and Full Range



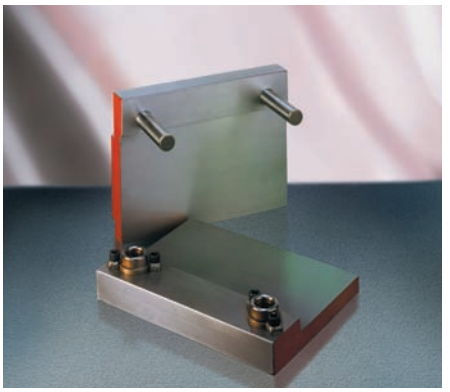
Protected by U.S. and International Patents

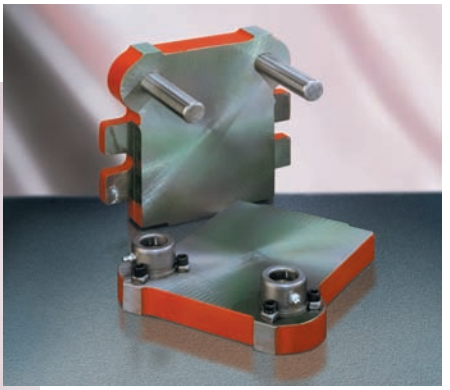
READY

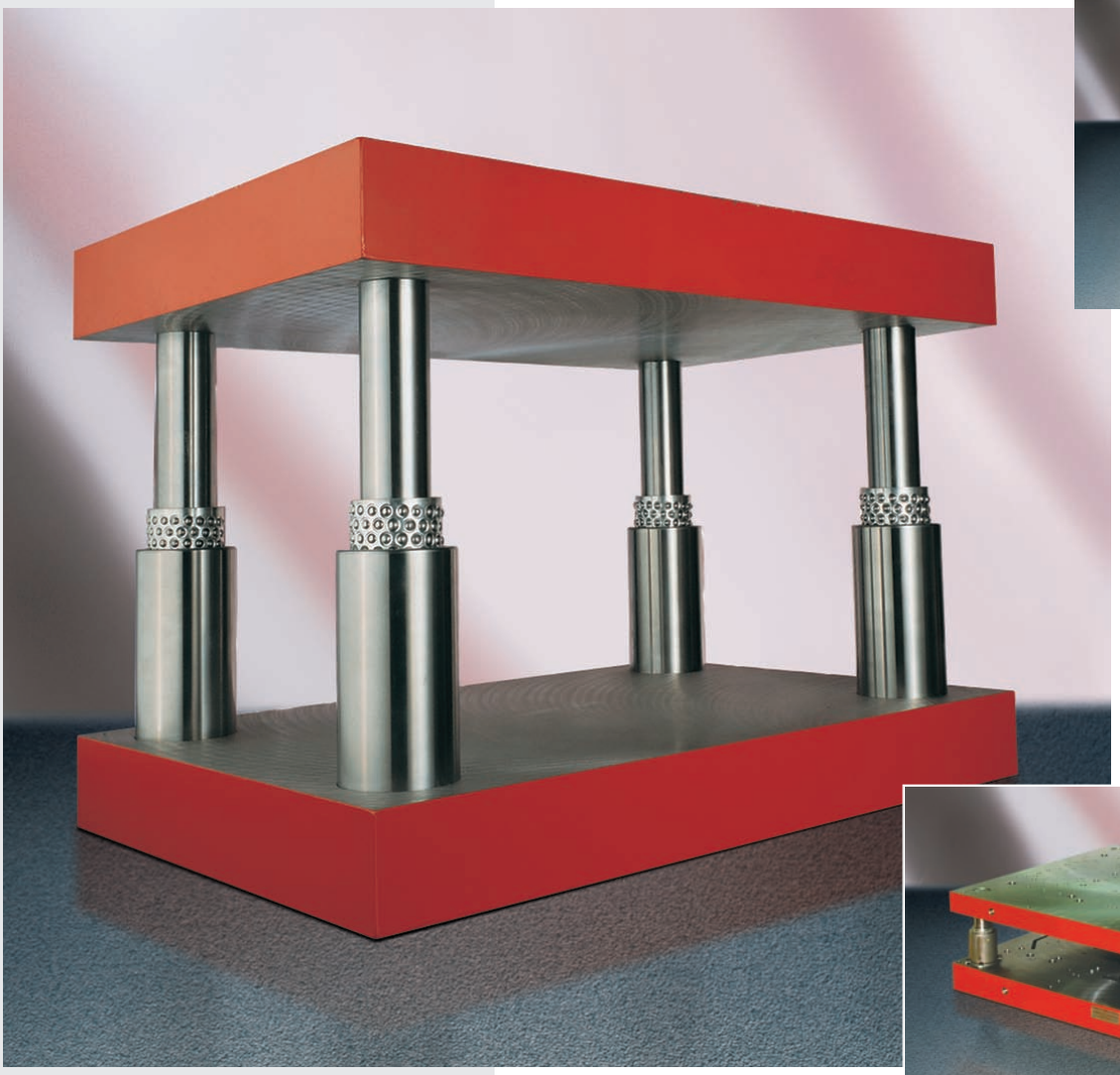
Die Sets –

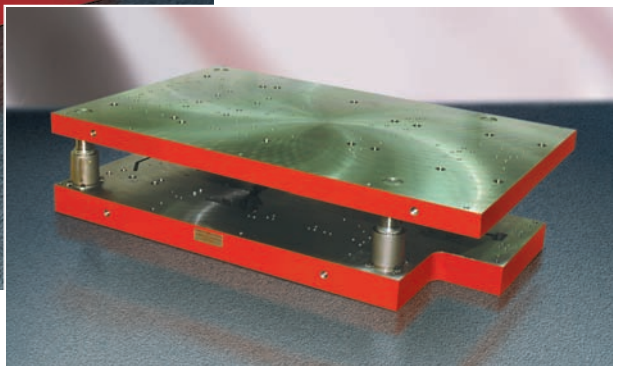
We offer a complete service

- "Next Day Die Set" - stock rectangular. "Order today, we'll ship tomorrow."
- Special Die Sets, both plain and ball bearing, and 3 Plate Die Sets.
- Aluminum Die Sets
- Blanchard Ground Plates, Special Machining, and Parallels.









Guide Pins and Bushings –
We offer the full range, inch & metric

- Our Plain Bearing line offers you three types of guide pins (straight, demountable and double diameter) and two kinds of bushings (demountable steel and our unique, patented Sintered Bronze Bushing.) All of these components are color-coded for Selective Fit™ and are fully interchangeable with one another.

- Our Ball Bearing line employs the same three guide pins plus two styles of ball bushings (straight sleeve and demountable). Unlike our competitors, our design is interchangeable with all major ball bearing brands on the market. Finally, you have at your disposal a "one size fits all" ball bearing line.

- We manufacture and stock the world's largest inventory of Danly style metric guiding. Why? Because in North America we are READY Technology, outside North America we are Danly International*, and we manufacture and sell Danly die sets and guiding through our ten plants and offices in Europe and in the Far East. Now we're making our extensive line of metric components available to our U.S. customers.

***Make no mistake:** *Neither Ready Technology or Danly International or any of the Danly companies outside North America is affiliated in any way with Danly Die Set or Connell Limited Partnership*

Index

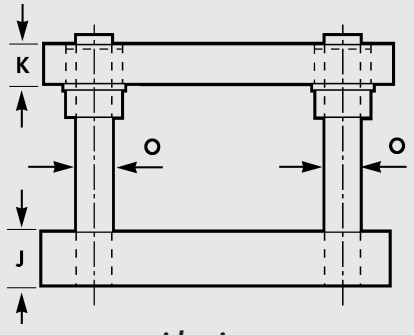
READY

Standard, Two Post Plain Bearing Die Sets

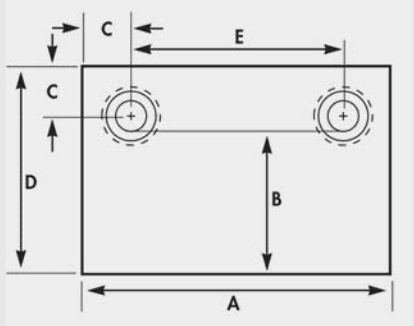
- Standard, in-stock die sets are manufactured with our precision guide pins and standard shoulder bushings.
- Bushing clamp position is for left-to-right feed.
- Please specify pin length (L), quantity needed and catalog number with your order. Unless otherwise specified, standard shoulder length bushings will be supplied.

Order Example

Qty	Catalog No.	Pin Length
1	2S1006-11	L = 6



side view



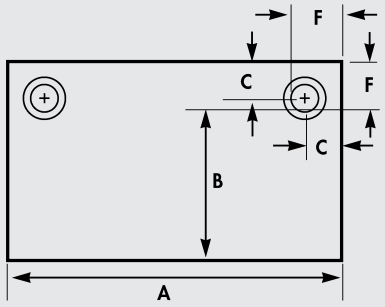
top view

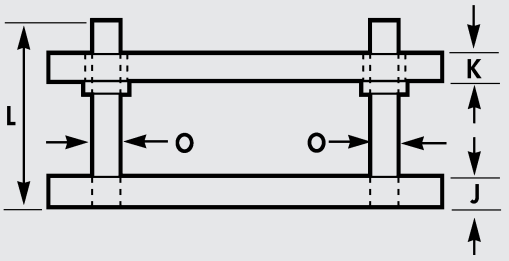
In-stock, 2 Post Plain Bearing Die Sets

Die Space L to R A	Die Space F to B B	Thickness Die Holder J	Thickness Punch Holder K	O	D	E	C	Catalog Number
6″	4″	1	1	1	6	3	1 1/2	2S64-11
6″	6″	1 1/4	1 1/4	1	8	3	1 1/2	2S66-11
8″	6″	1 1/4	1 1/4	1	8	5	1 1/2	2S86-11
8″	6″	1 1/4	1 1/2	1	8	5	1 1/2	2S86-12
8″	6″	1 1/2	1 1/4	1	8	5	1 1/2	2S86-21
8″	6″	1 1/2	1 1/2	1	8	5	1 1/2	2S86-22
10″	6″	1 1/4	1 1/4	1	8	7	1 1/2	2S1006-11
10″	6″	1 1/4	1 1/2	1	8	7	1 1/2	2S1006-12
10″	6″	1 1/2	1 1/4	1	8	7	1 1/2	2S1006-21
10″	6″	1 1/2	1 1/2	1	8	7	1 1/2	2S1006-22
10″	10″	1 1/2	1 1/2	1 1/4	12 1/4	6 3/4	1 5/8	2S1010-11
10″	10″	1 1/2	2	1 1/4	12 1/4	6 3/4	1 5/8	2S1010-12
10″	10″	2	1 1/2	1 1/4	12 1/4	6 3/4	1 5/8	2S1010-21
10″	10″	2	2	1 1/4	12 1/4	6 3/4	1 5/8	2S1010-22
12″	6″	1 1/2	1 1/2	1 1/4	8 1/4	8 3/4	1 5/8	2S1206-11
12″	6″	1 1/2	2	1 1/4	8 1/4	8 3/4	1 5/8	2S1206-12
12″	6″	2	1 1/2	1 1/4	8 1/4	8 3/4	1 5/8	2S1206-21
12″	6″	2	2	1 1/4	8 1/4	8 3/4	1 5/8	2S1206-22
14″	6″	1 1/2	1 1/2	1 1/2	8 1/2	10 1/2	1 3/4	2S1406-11
14″	6″	1 1/2	2	1 1/2	8 1/2	10 1/2	1 3/4	2S1406-12
14″	6″	2	1 1/2	1 1/2	8 1/2	10 1/2	1 3/4	2S1406-21
14″	6″	2	2	1 1/2	8 1/2	10 1/2	1 3/4	2S1406-22
14″	10″	1 1/2	1 1/2	1 1/2	12 1/2	10 1/2	1 3/4	2S1410-11
14″	10″	1 1/2	2	1 1/2	12 1/2	10 1/2	1 3/4	2S1410-12
14″	10″	2	1 1/2	1 1/2	12 1/2	10 1/2	1 3/4	2S1410-21
14″	10″	2	2	1 1/2	12 1/2	10 1/2	1 3/4	2S1410-22
16″	10″	1 1/2	1 1/2	1 1/2	12 1/2	12 1/2	1 3/4	2S1610-11
16″	10″	1 1/2	2	1 1/2	12 1/2	12 1/2	1 3/4	2S1610-12
16″	10″	2	1 1/2	1 1/2	12 1/2	12 1/2	1 3/4	2S1610-21
16″	10″	2	2	1 1/2	12 1/2	12 1/2	1 3/4	2S1610-22
18″	8″	1 1/2	1 1/2	1 1/2	10 1/2	14 1/2	1 3/4	2S1808-11
18″	8″	1 1/2	2	1 1/2	10 1/2	14 1/2	1 3/4	2S1808-12
18″	8″	2	1 1/2	1 1/2	10 1/2	14 1/2	1 3/4	2S1808-21
18″	8″	2	2	1 1/2	10 1/2	14 1/2	1 3/4	2S1808-22
20″	12″	1 1/2	1 1/2	1 1/2	14 1/2	16 1/2	1 3/4	2S2012-11
20″	12″	1 1/2	2	1 1/2	14 1/2	16 1/2	1 3/4	2S2012-12
20″	12″	2	1 1/2	1 1/2	14 1/2	16 1/2	1 3/4	2S2012-21
20″	12″	2	2	1 1/2	14 1/2	16 1/2	1 3/4	2S2012-22

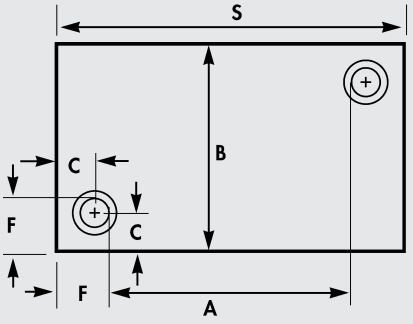
Custom, Two Post All Steel Die Sets

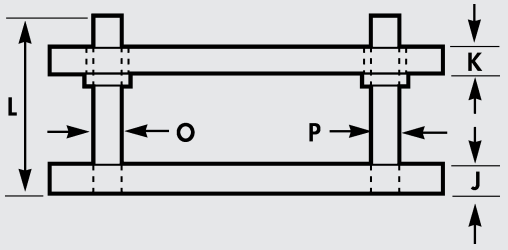
Back Post - Type 2B





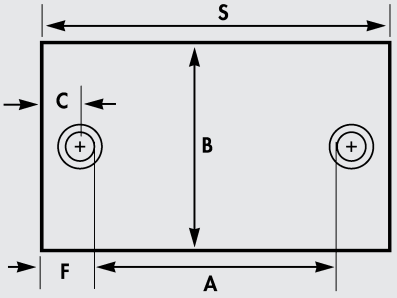
Diagonal Post - Type 2D

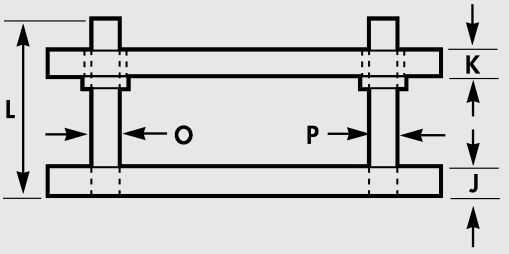




Can be made with posts on other diagonal, if specified.
Center of die space is in the center of the die plates.

Center Post - Type 2C





Center of die space is in the center of the die plates.

When ordering custom, all steel die sets, specify:

1. Type 2B, 2D, or 2C. *Note: O & P should be different diameters on Type 2D & 2C die sets.*
2. Dimensions A, B, J, K, and L.
3. Type bushings - sintered bronze bushings supplied unless otherwise specified.
4. Diameter of threaded shank, if wanted. See page 9 for Threaded Shank Selection Chart.
5. How shipment should be made.
6. Custom die sets may not be returned for credit.
7. Quantity needed.

Two Post Die Sets

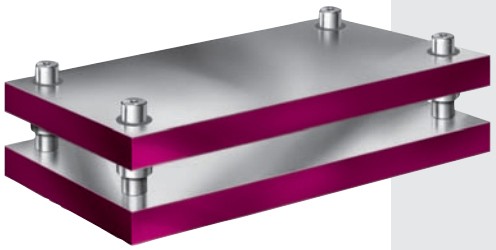
Dimensions furnished when customer specifies only A and B dimensions. B dimension does not affect table.

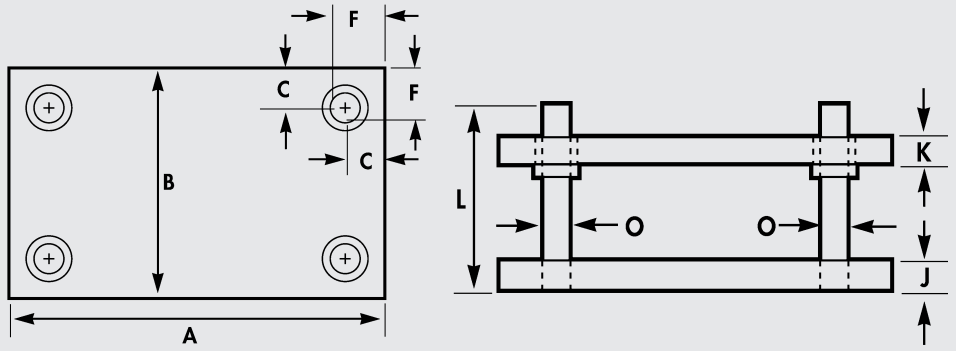
Die Space L to R A	Post Diameter O	Post Diameter P	D.H. Thickness J	P.H. Thickness K	F for O Post	C for O Post	C for P Post	S
6" to 8"	1	--	1 1/4	1 1/4	2	1 1/2	--	--
9" to 12"	1 1/4	1	1 1/2	1 1/2	2 1/4	1 5/8	1 3/4	A + 4 1/2
13" to 16"	1 1/2	1 1/4	1 1/2	1 1/2	2 1/2	1 3/4	1 7/8	A + 5
17" to 22"	1 3/4	1 1/2	1 3/4	1 3/4	2 3/4	1 7/8	2	A + 5 1/2
23" to 28"	2	1 3/4	2	2	3	2	2 1/8	A + 6
29" to 40"	2	1 3/4	2 1/2	2 1/2	3	2	2 1/8	A + 6
41" to 65"	2 1/2	2	3	3	3 3/4	2 1/2	2 3/4	A + 7 1/2

READY

Custom, Four Post All Steel Die Sets

Four Post - Type 4P





Right front pin offset 1/8".

When ordering custom, all steel die sets, specify:

1. This table shows accepted design dimensions. Any or all of these dimensions, however, can be changed to conform to customer's specifications of A, B, O, P, J, K, L, F or W, etc.
2. All die sets are always made so that the punch holder can not be reversed on die holder. Type 4Ps are made with same diameter posts, but the right front post is offset 1/8" toward outside edge of die set.
3. Any of these sets are available both with or without shank. Unless otherwise specified, shank is always located in middle of both A and B dimensions. For safety reasons, we supply only threaded shanks. See page 9 for Threaded Shank Selection Chart.
4. Die sets of design other than shown in catalog can be furnished in steel or aluminum.
5. Custom die sets may not be returned for credit.
6. Sintered Bronze Bushings supplied unless otherwise specified.

Four Post Die Sets

Dimensions furnished when customer specifies only A and B dimensions.

Die Space L to R A	Post Diameter O	D.H. Thickness J	P.H. Thickness K
6" to 10"	1	1 1/4	1 1/4
11" to 16"	1 1/4	1 1/2	1 1/2
17" to 22"	1 1/2	1 3/4	1 3/4
23" to 28"	1 3/4	2	2
29" to 40"	2	2 1/2	2 1/2
41" to 65"	2 1/2	3	3

These dimensions apply to both two post and four post sets.

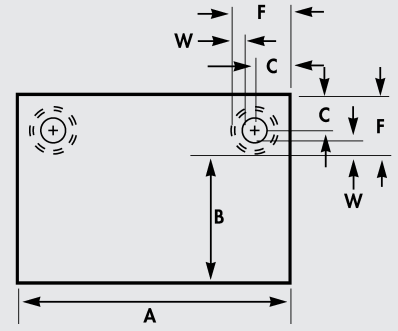
Nominal Guide Post Diameter	C	F
3/4"	1 1/4	1 5/8
1"	1 1/2	2
1 1/4"	1 5/8	2 1/4
1 1/2"	1 3/4	2 1/2
1 3/4"	1 7/8	2 3/4
2"	2	3
2 1/2"	2 1/2	3 3/4
3"	2 3/4	4 1/4

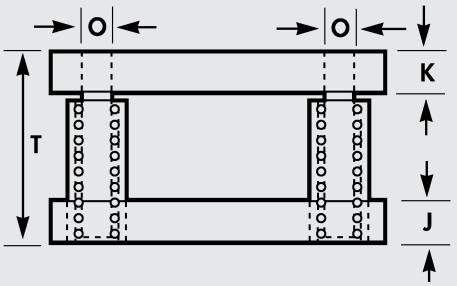
Let Us Quote Your Special Applications

- Aluminum die sets.
- Three and four platen die sets.
- Plate work, ground or unground.
- Stress relieved plates.
- Die sets can be made with heel blocks.
- Per print CNC machining, holes, keyways, cutouts and burnouts.

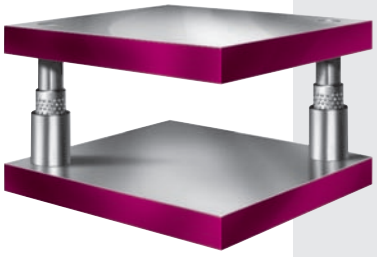
Custom, Two Post Ball Bearing Die Sets

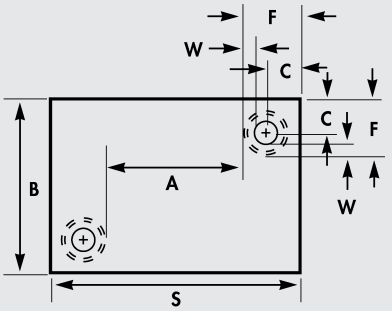
Back Post - Type 2BB

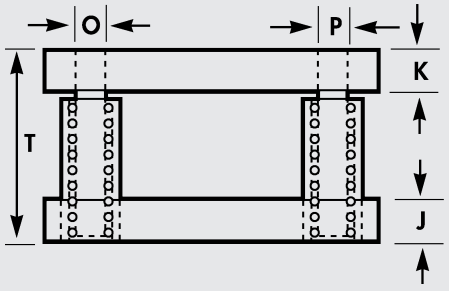




Diagonal Post - Type 2BD

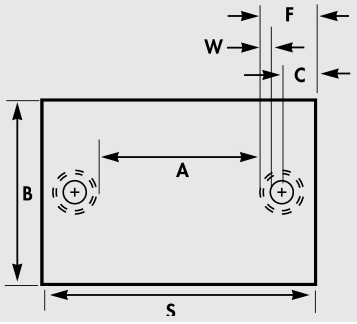


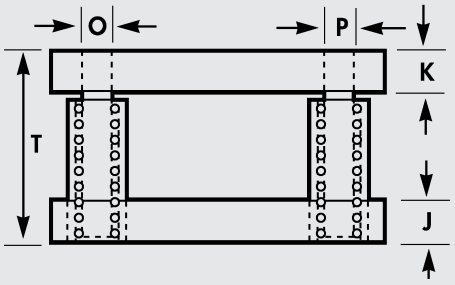




Center of die space is in the center of the die plates.

Center Post - Type 2BC





Center of die space is in the center of the die plates.

When ordering custom ball bearing die sets, specify:

1. Type 2BB, 2BD, or 2BC.
2. Dimensions A, B, J, and K.
3. Ball bearing die sets will be furnished with straight steel sleeve bushings or demountable ball bearing bushings.
4. Dimension "T" is minimum shut height.
5. Post diameter "O" & "P". (O and P should be different for 2BD and 2BC.)
6. Custom die sets may not be returned for credit.
7. Quantity needed.

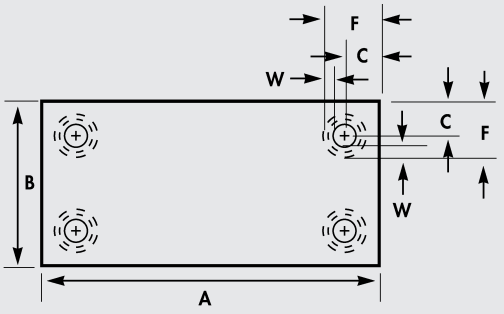
Two Post Die Sets *Dimensions furnished when customer specifies only A and B dimensions.*

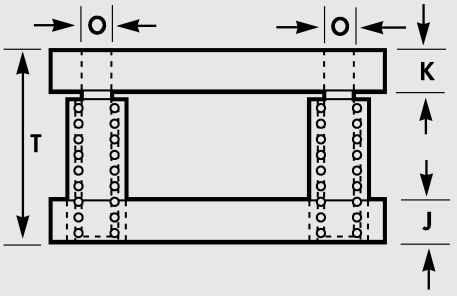
Die Space L to R A	Post Diameter O	Post Diameter P	D.H. Thickness J	P.H. Thickness K	F for Sleeve Bushing	F for Demountable Bushing	C For O Post	C for P Post *(Sleeve Bushing)*	C for P Post *(Demountable Bushing)*	S
6" to 8"	1	--	1 1/4	1 1/4	2 11/16	2 7/8	1 3/4	--	--	--
9" to 12"	1 1/4	1	1 1/2	1 1/2	2 15/16	3 1/16	1 7/8	2	2	A + 2F
13" to 16"	1 1/2	1 1/4	1 1/2	1 1/2	3 3/8	3 9/16	2 1/8	2 1/4	2 3/8	A + 2F
17" to 22"	1 3/4	1 1/2	1 3/4	1 3/4	3 5/8	3 13/16	2 1/4	2 3/8	2 3/8	A + 2F
23" to 28"	2	1 3/4	2	2	4 1/8	4 5/16	2 1/2	2 3/4	2 3/4	A + 2F
29" to 40"	2	1 3/4	2 1/2	2 1/2	4 1/8	4 5/16	2 1/2	2 3/4	2 3/4	A + 2F
41" to 65"	2 1/2	2	3	3	4 3/4	5	2 7/8	3 1/8	3 1/8	A + 2F

READY

Custom, Four Post Ball Bearing Die Sets

Four Post - Type 4BB





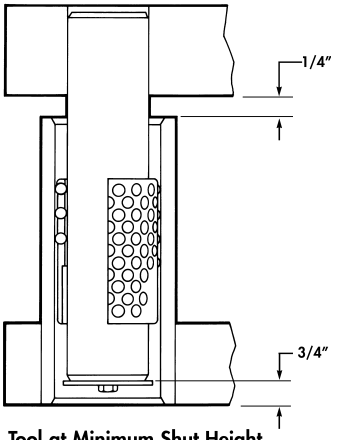
Right front pin offset 1/4" to outside.

Ball Bearing Component Selection

Refer to pages 26 and 27 for the correct selection of operating condition and components. Please note that on long stroke applications, the pin and cage can be disengaged **only** if the press is operated at less than 150 spm and in a vertical position with accurate ram gib alignment.

Maximum Pin Length
= Minimum Shut Height - 3/4"

Maximum Straight Sleeve Length
= Minimum Shut Height - Punch Holder Thickness - 1/4"



Tool at Minimum Shut Height
(die life depleted)

Four Post Die Sets
Dimensions furnished when customer specifies only A and B dimensions.

Die Space L to R A	Post Diameter O	D.H. Thickness J	P.H. Thickness K
8" to 10"	1	1 1/4	1 1/4
11" to 16"	1 1/4	1 1/2	1 1/2
17" to 22"	1 1/2	1 3/4	1 3/4
23" to 28"	1 3/4	2	2
29" to 40"	2	2 1/2	2 1/2
41" to 65"	2 1/2	3	3

These dimensions apply to both two post and four post sets.

Nominal Guide Post Diameter	C	Sleeve Bushing F	Sleeve Bushing W	Demountable Bushing F	Demountable Bushing W
1"	1 3/4	2 11/16	7/16	2 7/8	9/16
1 1/4"	1 7/8	2 15/16	7/16	3 1/16	9/16
1 1/2"	2 1/8	3 3/8	1/2	3 9/16	11/16
1 3/4"	2 1/4	3 5/8	1/2	3 13/16	11/16
2"	2 1/2	4 1/8	5/8	4 5/16	13/16
2 1/2"	2 7/8	4 3/4	5/8	5	13/16
3"	3 1/4	--	--	5 5/8	7/8

Ground Plate Specifications

- **AISI 1020 Mild Steel Plate** - 21 sizes in stock, from 1/2" to 4".
- **Blanchard Grinding Available** - call for details.
- **Also available in aluminum** - not stocked, specify grade.
- **Send us your prints** - Our email is: STDDIE@readytechnology.com

Pertinent Die Set Standards

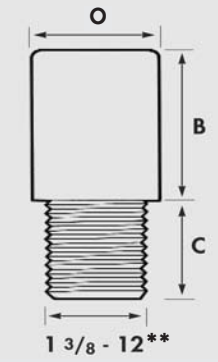
Flatness Plates	.0005 per lineal foot
Parallelism Plates	.001 per lineal foot
Thickness Plates	±1/16 stock sets
Thickness Plates	+ 1/16 -1/8 special sets
Shank Diameter	+ .000 -.002
Guide Pins Squareness	.001 in 6 inches
Guide Pins Parallelism	.001 in 6 inches
Guide Bushings Squareness	.001 in 6 inches
Guide Bushings Parallelism	.001 in 6 inches
Parallelism Assembled Die Set	.0015 per lineal foot

Blanchard Ground Stripper Plates

- Burned edges
- Thickness +1/16 / - 0
- AISI 1020 steel available from stock

Overall Size	Thickness
SP - 6" x 18"	1/2, 3/4, 1, 1 1/4, 1 1/2
SP - 10" x 18"	1/2, 3/4, 1, 1 1/4, 1 1/2
SP - 14" x 18"	1/2, 3/4, 1, 1 1/4, 1 1/2

Overall Size	Thickness
SP - 18" x 18"	1/2, 3/4, 1, 1 1/4, 1 1/2
SP - 12" x 24"	1/2, 3/4, 1
SP - 24" x 25"	1/2, 3/4, 1



**PS-O 5/8-11 only

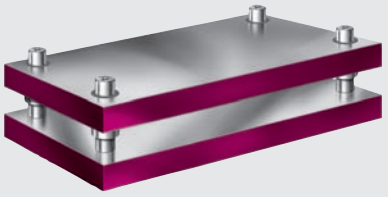
Threaded Shank Selection

Diameter O	Length B	Length Thread C	Catalog Number
1"	1 3/4"	1 3/4	PS-0
1 1/2"	2"	1	PS-1
		1 1/4	PS-2
		1 3/8	PS-3
		1 1/2	PS-4
		1 5/8*	PS-5
		1 3/4	PS-6
		2*	PS-7
		2 1/4	PS-8
		2 1/2*	PS-9
1 9/16"	2"	1	PS-11
		1 1/4	PS-12
		1 3/8	PS-13
		1 1/2	PS-14
		1 5/8*	PS-15
		1 3/4	PS-16
		2*	PS-17
		2 1/4	PS-18
		2 1/2*	PS-19
2"	2 3/4"	1 1/4	PS-21
		1 3/8	PS-22
		1 1/2	PS-23
		1 5/8*	PS-24
		1 3/4	PS-25
		2*	PS-26
		2 1/4	PS-27
		2 1/2*	PS-28
2 1/2"	2 3/4"	1 1/4	PS-31
		1 3/8	PS-32
		1 1/2	PS-33
		1 5/8*	PS-34
		1 3/4	PS-35
		2*	PS-36
		2 1/4	PS-37
		2 1/2*	PS-38
3"	2 3/4"	1 1/4	PS-41
		1 3/8	PS-42
		1 1/2	PS-43
		1 5/8*	PS-44
		1 3/4	PS-45
		2*	PS-46
		2 1/4	PS-47
		2 1/2*	PS-48

* stock lengths

READY

Aluminum Die Sets, Plates, Ram and Mold Plates



Four Post - Type 4P

Back Post - Type 2B

Center Post - Type 2C

Advantages of Aluminum:

- One-third the weight of steel
- Faster and easier setup
- Less wear and tear on the machine (clutch, brake, ram, ...)
- Easy machinability means 20-35% increased feed rates
- Uses existing conventional cuttings tools
- Draws heat away from tooling, then dissipates heat quickly
- Rust free, least susceptible to elements
- Impervious to typical (water soluble) die lubes
- Non-magnetic - good environment for in-die sensing
- Stress relieved in the process - a stable material before/after machining
- Easily recyclable

Note: It is recommended to finish heavy (point pressures) machining before grinding for best results. We do not recommend using steel and aluminum plates in a die set combination.

Comparative Technical Data	Physical & Mechanical Properties	Tensile Strength *(psi)*	Yield Strength *(psi)*	Density *(lb/inch^3)*	Thermal Conductivity*	Thermal Expansion**	Modulus of Elasticity***	Typical Hardness *(Rc equivalent)*
Hot Rolled Steel	1020	64,000	50,000	.283	20.0	6.3	30	135B *(12Rc)*
Aircraft Aluminum	6013	58,000	54,000	.098	95	13.0	10.1	120B *(11Rc)*
Aircraft Aluminum	6061	46,000	42,000	.098	96	13.1	10.0	95B *(8Rc)*
Aircraft Aluminum	7075	75,000	73,000	.101	75	13.1	10.4	150B *(14Rc)*
Aircraft Aluminum	QC7	79,000	64,000	.102	91	12.8	10.3	167B *(17Rc)*
Alloy Steel	4140	102,000	90,000	.282	24.7	6.2	30	220B *(21Rc)*

** (btu/ft/hr/ft^2/°F)*
*** average coefficient (x 10^{-6}/in./°F)*
**** (x 10^6 lbs./in.^{2})*

READY Plain and Ball Bearing Components

In the following 17 pages, you will see a number of innovative ideas designed to increase the performance of your stamping tools, reduce your inventory costs, simplify die assembly and maintenance, and maximize available die space.

Here are some of the highlights:

- Each Ready pin serves a dual function - it can operate as a plain bearing pin or a ball bearing guide pillar. This saves you the cost of a dual inventory.
- Ready's Selective Fit™ system matches each pin to the correct bushing to achieve the proper fit. Each part is color-coded (white, blue, or yellow), so as long as the color spot on the pin matches that of the bushing, the running clearance in each pin/bushing pair in your tool will be identical.

  Since the clearance grows in proportion with the pin diameter, Selective Fit™ automatically gives you the proper running fit for your application.
- You now have a choice of clamping methods with our demountable pins. You can secure the flange with traditional toe clamps and screws, or you can hold the pin in place with a stop washer mounted in the underside of the die shoe. By eliminating the toe clamps you gain extra die space.
- Another innovation which saves space is Ready's patented Ring System. In effect you can now use our ball bearing sleeve bushing like a demountable bushing. Since the sleeve bushing and Ring System clamps have a smaller footprint than a traditional demountable bushing you save on die space. Please refer to page 19 for details.

READY Plain Bearing Components

3 types of pins, 3 types of bushings

Precision Guide Pins (-825)

Our Precision Guide Pins are designed to be used with either plain bearing or ball bearing bushings.

Vacuum degassed, ball bearing quality steel is induction hardened to 60 - 64 Rc, then core tempered for toughness. This produces an optimum combination of wear resistance for long operating life and shock resistance for safety.

Demountable Pins (-835)

Our Demountable Pins are designed for use in either plain bearing or ball bearing applications. Like our precision press fit pins, they are case hardened to 60 - 64 Rc, then core tempered for toughness.

They can be assembled to the same die set plate hundreds of times without distorting the hole center distances or damaging the holes themselves. So they not only simplify die building and maintenance, but they ensure maximum accuracy as well.

Ready demountable pins can be held in place either with toe clamps and screws, or with a retainer plug. This second option increases the die space available.

Double Diameter Pins (-55)

Our double diameter pins are also designed for use with ball bearing as well as plain bearing bushings. They are case hardened to 60-64 Rc for wear resistance, then core tempered for toughness. A tapped hole is provided at the end of the pin for the ball cage assembly.

The press fit diameter is interchangeable with familiar brands of plain bearing and ball bearing pins, so Ready double diameter pins may be used for die maintenance as well as for new tooling.

Bore Sizes for Plain Bearing Pins and Bushings

Pin Diameter	-825, -835 Bore Diameter	-55 Bore Diameter	-2x5, -6x5 Bore Diameter
3/4″	--	0.7506 0.7500	1.2506 1.2500
1″	0.9991 0.9985	1.0006 1.0000	1.5006 1.5000
1 1/4″	1.2489 1.2482	1.2506 1.2500	1.7506 1.7500
1 1/2″	1.4989 1.4982	1.5006 1.5000	2.0007 2.0000
1 3/4″	1.7489 1.7482	1.7506 1.7500	2.2507 2.2500
2″	1.9989 1.9982	2.0007 2.0000	2.5007 2.5000
2 1/2″	2.4986 2.4979	2.5007 2.5000	3.2509 3.2500
3″	2.9986 2.9974	3.0007 3.0000	3.7509 3.7500

Demountable Sintered Bronze Bushings (-235, -245, -285)

Our Sintered Bronze Bushings set a new standard of performance for stamping die guide bushings. A layer of bronze is sintered to the inside diameter of a steel bushing, creating a mechanical bond at the bronze/steel interface stronger than that of traditional plated bushings. Please refer to the following page for details.

Demountable Steel Bushings (-645)

Our Steel Bushings are manufactured to the same high level of precision as our Sintered Bronze Bushings. If operated at moderate speeds and side loads with good lubrication, they are an economic substitute for sintered bronze bushings. These two types of bushings are fully interchangeable.

Our patented Sintered Bronze Bushings offer many advantages over plated bronze bushings.

- ***Thicker Bronze:*** The sintered bronze in our bushings is substantially thicker than the plating technology it replaces.
- ***Porous Surface:*** Holds the lubrication oil where you need it most, to resist wear. Sintered bronze is porous bronze, up to 40% porosity.
- ***Stronger Bond:*** Our patented process forms a unique fusion bond so the bronze and substrate become one. See the 1000x magnification in the adjacent panel.
- ***Wear Resistance:*** The combination of increased thickness, porosity and stronger bonding means our bushing is your best choice for high speed and eccentric loading. The longest life possible under extreme conditions.

Bronze plating is not a simple process. If the bushing is dirty or there are contaminants in the plating solution, the bronze will not adhere properly and will peel away from the surface. The fourth batch of bushings, for example, will be less likely to be defect-free than the first batch placed in a tank with fresh plating solution.

The second problem with plating is that the thickness of the bronze layer depends on the plating time. A thick bronze layer is simply too costly to produce, and on large diameter bushings in particular, problems arise when the thin plating wears away and the underlying steel comes in contact with the guide pin.

READY's Sintered Bronze Bushings solve both problems. Using a patented manufacturing process, a layer of bronze is sintered to the inside diameter of the steel bushing, creating a strong, reliable mechanical bond. The thickness of the bronze layer is not limited by time or cost constraints, so it is thicker than plated bronze, and it increases proportionally with the bushing diameter.

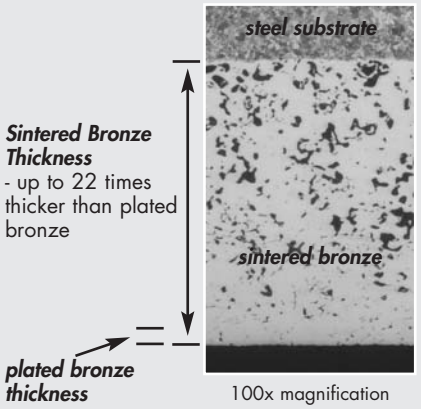
You can test the bond strengths yourself. Cut through the diameter of a plated bushing and you stand a good chance to see peeling. Do the same with our sintered bushing and you will see that the bronze-steel bond is unaffected. If you need to shorten the inserted diameter to fit our bushing into a thin stripper plate, you can do so without harming it.

There is a third advantage to our sintered bushings. Because sintered bronze is porous, it holds the lubrication oil in place and helps to maintain an unbroken lubrication layer, which improves wear resistance. The bronze pores act as small oil reservoirs, so our Sintered Bronze Bushings are more forgiving if maintenance has been overlooked. However, for best results, we recommend regular, periodic lubrication with a high viscosity oil.

Compare the Bronze Thickness

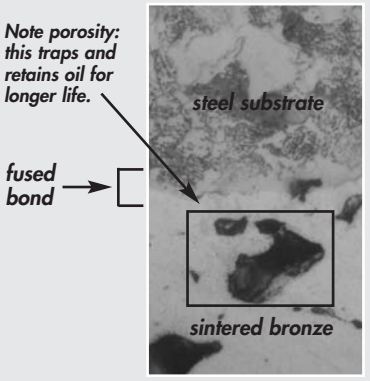
Take A Closer Look ...

Actual magnified views of bushing cross sections.



100x magnification

This view reveals the greater bronze thickness and the porosity of our Sintered Bronze Bushing.



1000x magnification

This view reveals the fusion bonding of the thick sintered bronze layer to the steel substrate.

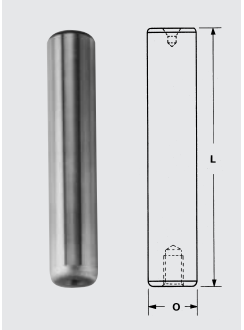
Compare The Thickness ...

Nominal Diameter O Nom.	*Plated Bronze Layer Thickness*	*READY Sintered Bronze Layer Thickness*
1″	*0.002″*	*0.027″*
1 1/4″	*0.002″*	*0.030″*
1 1/2″	*0.002″*	*0.033″*
1 3/4″	*0.002″*	*0.034″*
2″	*0.002″*	*0.037″*
2 1/2″	*0.002″*	*0.041″*
3″	*0.002″*	*0.044″*

Precision Pin Selection Guide (-825)

Nominal Pin Diameter O	Length L	Catalog Number
1″	3 1/4	5-0813-825
	3 3/4	5-0815-825
	4 1/4	5-0817-825
	4 1/2	5-0818-825
	4 3/4	5-0819-825
	5	5-0820-825
	5 1/4	5-0821-825
	5 1/2	5-0822-825
	5 3/4	5-0823-825
	6	5-0824-825
	6 1/2	5-0826-825
	7	5-0828-825
	7 1/2	5-0830-825
	8	5-0832-825
	8 1/2	5-0834-825
	9	5-0836-825
1 1/4″	4 1/4	5-1017-825
	4 3/4	5-1019-825
	5 1/4	5-1021-825
	5 1/2	5-1022-825
	5 3/4	5-1023-825
	6	5-1024-825
	6 1/2	5-1026-825
	7	5-1028-825
	7 1/2	5-1030-825
	8	5-1032-825
	8 1/2	5-1034-825
	9	5-1036-825
	10	5-1040-825
	11	5-1044-825
	12	5-1048-825
1 1/2″	4 1/4	5-1217-825
	5	5-1220-825
	5 3/4	5-1223-825
	6	5-1224-825
	6 1/2	5-1226-825
	7	5-1228-825
	7 1/2	5-1230-825
	8	5-1232-825
	8 1/2	5-1234-825
	9	5-1236-825
	9 1/2	5-1238-825
	10	5-1240-825
	10 1/2	5-1242-825
	11	5-1244-825
	11 1/2	5-1246-825
	12	5-1248-825
	12 1/2	5-1250-825
	13	5-1252-825
	14	5-1256-825

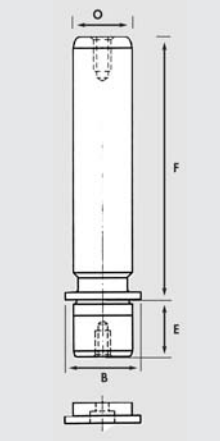
Nominal Pin Diameter O	Length L	Catalog Number
1 3/4″	5	5-1420-825
	5 3/4	5-1423-825
	6 1/2	5-1426-825
	7	5-1428-825
	7 1/2	5-1430-825
	8	5-1432-825
	8 1/2	5-1434-825
	9	5-1436-825
	9 1/2	5-1438-825
	10	5-1440-825
	10 1/2	5-1442-825
	11	5-1444-825
	11 1/2	5-1446-825
	12	5-1448-825
	12 1/2	5-1450-825
	13	5-1452-825
	14	5-1456-825
	15	5-1460-825
	17	5-1468-825
2″	5 3/4	5-1623-825
	6 1/2	5-1626-825
	7 1/4	5-1629-825
	7 1/2	5-1630-825
	7 3/4	5-1631-825
	8	5-1632-825
	8 1/2	5-1634-825
	9	5-1636-825
	9 1/2	5-1638-825
	10	5-1640-825
	10 1/2	5-1642-825
	11	5-1644-825
	11 1/2	5-1646-825
	12	5-1648-825
	12 1/2	5-1650-825
	13	5-1652-825
	14	5-1656-825
	15	5-1660-825
	16	5-1664-825
	17	5-1668-825
	18	5-1672-825
2 1/2″	8	5-2032-825
	8 3/4	5-2035-825
	9 1/2	5-2038-825
	10	5-2040-825
	11	5-2044-825
	12	5-2048-825
	13	5-2052-825
	14	5-2056-825
	17	5-2068-825
	18	5-2072-825
	20	5-2080-825
3″	8	5-2432-825
	9	5-2436-825
	10	5-2440-825
	11	5-2444-825
	12	5-2448-825
	13	5-2452-825
	14	5-2456-825
	17	5-2468-825
	20	5-2480-825



Demountable Pin Selection Guide (-835)

Nominal Pin Diameter O	Flange B	Length E	Length F	Catalog Number
1″	1.31	7/8″	4	5-0816-835
			4 1/2	5-0818-835
			5	5-0820-835
			5 1/2	5-0822-835
			6	5-0824-835
			6 1/2	5-0826-835
			7	5-0828-835
			7 1/2	5-0830-835
1 1/4″	1.56	1 3/16″	4	5-1016-835
			4 1/2	5-1018-835
			5	5-1020-835
			5 1/2	5-1022-835
			6	5-1024-835
			6 1/2	5-1026-835
			7	5-1028-835
			7 1/2	5-1030-835
			8	5-1032-835
			8 1/2	5-1034-835
			9	5-1036-835
			9 1/2	5-1038-835
			10	5-1040-835
1 1/2″	1.87	1 7/16″	5	5-1220-835
			5 1/2	5-1222-835
			6	5-1224-835
			6 1/2	5-1226-835
			7	5-1228-835
			7 1/2	5-1230-835
			8	5-1232-835
			8 1/2	5-1234-835
			9	5-1236-835
			9 1/2	5-1238-835
			10	5-1240-835
			11	5-1244-835
1 3/4″	2.25	1 11/16″	5	5-1420-835
			5 1/2	5-1422-835
			6	5-1424-835
			6 1/2	5-1426-835
			7	5-1428-835
			7 1/2	5-1430-835
			8	5-1432-835
			8 1/2	5-1434-835
			9	5-1436-835
			9 1/2	5-1438-835
			10	5-1440-835
			11	5-1444-835
			12	5-1448-835

Nominal Pin Diameter O	Flange B	Length E	Length F	Catalog Number
2″	2.50	1 15/16″	5	5-1620-835
			5 1/2	5-1622-835
			6	5-1624-835
			6 1/2	5-1626-835
			7	5-1628-835
			7 1/2	5-1630-835
			8	5-1632-835
			8 1/2	5-1634-835
			9	5-1636-835
			9 1/2	5-1638-835
			10	5-1640-835
			11	5-1644-835
			12	5-1648-835
2 1/2″	3.00	1 15/16″	5	5-2020-835
			5 1/2	5-2022-835
			6	5-2024-835
			6 1/2	5-2026-835
			7	5-2028-835
			7 1/2	5-2030-835
			8	5-2032-835
			8 1/2	5-2034-835
			9	5-2036-835
			9 1/2	5-2038-835
			10	5-2040-835
			11	5-2044-835
			12	5-2048-835
			13	5-2052-835
			14	5-2056-835
3″	3.50	2 3/16″	6	5-2424-835
			7	5-2428-835
			8	5-2432-835
			9	5-2436-835
			10	5-2440-835
			11	5-2444-835
			12	5-2448-835
			14	5-2456-835
			16	5-2464-835



Guide Pin Tap Sizes / *Recommended Seating Torque*

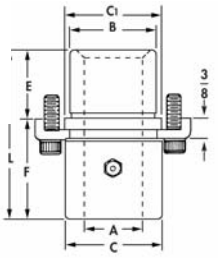
Nominal Pin Diameter O	Tap Size	Lbs. - Feet
1 - 1 1/4″	5/16 - 18 N.C.	26
1 1/2 - 1 3/4 - 2″	3/8 - 16 N.C.	47
2 1/2″ - 3″	1/2 - 13 N.C.	112

For Demountable Pin Tap Sizes, see page 17.

Demountable Sintered Bronze Bushings (-235, -245, -285)

Short Shoulder Bushings

Inside Diameter A Nom.	Dec.	B	C	C1	E	F	L	Sintered Bronze Catalog Number
3/4"	0.750	1 1/8	1.17	1.27	11/16	3/4	1.43	6-06-235
1"	1.000	1 1/2	1.72	1.84	15/16	13/16	1 3/4	6-08-235
1 1/4"	1.250	1 3/4	1.95	2.09	1 1/8	13/16	1 15/16	6-10-235
1 1/2"	1.500	2	2.19	2.35	1 3/16	13/16	2	6-12-235
1 3/4"	1.750	2 1/4	2.50	2.66	1 3/8	1	2 3/8	6-14-235
2"	2.000	2 1/2	2.91	2.95	1 5/8	1	2 5/8	6-16-235
2 1/2"	2.500	3 1/4	3.66	3.66	1 7/8	1	2 7/8	6-20-235
3"	3.000	3 3/4	4.19	4.28	1 7/8	1	2 7/8	6-24-235



Standard Shoulder Bushings

Inside Diameter A Nom.	Dec.	B	C	C1	E	F	L	Sintered Bronze Catalog Number
3/4"	0.750	1 1/8	1.17	1.26	11/16	1 3/4	2.44	6-06-245
1"	1.000	1 1/2	1.72	1.84	15/16	1 3/4	2 11/16	6-08-245
1 1/4"	1.250	1 3/4	1.95	2.09	1 1/8	2	3 1/8	6-10-245
1 1/2"	1.500	2	2.19	2.35	1 3/16	2	3 3/16	6-12-245
1 3/4"	1.750	2 1/4	2.50	2.66	1 3/8	2	3 3/8	6-14-245
2"	2.000	2 1/2	2.91	2.95	1 5/8	2	3 5/8	6-16-245
2 1/2"	2.500	3 1/4	3.66	3.66	1 7/8	2 1/2	4 3/8	6-20-245
3"	3.000	3 3/4	4.19	4.28	1 7/8	2 1/2	4 3/8	6-24-245

Extra Long Shoulder Bushings

Inside Diameter A Nom.	Dec.	B	C	C1	E	F	L	Sintered Bronze Catalog Number
1"	1.000	1 1/2	1.72	1.84	15/16	3	3 15/16	6-08-285
1 1/4"	1.250	1 3/4	1.95	2.09	1 1/8	3	4 1/8	6-10-285
1 1/2"	1.500	2	2.19	2.35	1 3/16	3	4 3/16	6-12-285
1 3/4"	1.750	2 1/4	2.50	2.66	1 3/8	3	4 3/8	6-14-285
2"	2.000	2 1/2	2.91	2.95	1 5/8	3	4 5/8	6-16-285
2 1/2"	2.500	3 1/4	3.66	3.66	1 7/8	3	4 7/8	6-20-285
3"	3.000	3 3/4	4.19	4.28	1 7/8	3	4 7/8	6-24-285

Demountable Steel Bushings (-645)

Standard Shoulder Bushings

Inside Diameter A Nom.	Dec.	B	C	C1	E	F	L	Steel Catalog Number
3/4"	.750	1 1/8	1.17	1.30	11/16	13/4	2 7/16	6-06-645
1"	1.000	1 1/2	1.72	1.85	15/16	13/4	2 11/16	6-08-645
1 1/4"	1.250	1 3/4	1.99	2.09	1 1/8	2	3 1/8	6-10-645
1 1/2"	1.500	2	2.19	2.35	1 3/16	2	3 3/16	6-12-645
1 3/4"	1.750	2 1/4	2.50	2.66	1 3/8	2	3 3/8	6-14-645
2"	2.000	2 1/2	2.91	3.06	1 5/8	2	3 5/8	6-16-645

Note: The Demountable Clamp Data is located on page 17.

READY

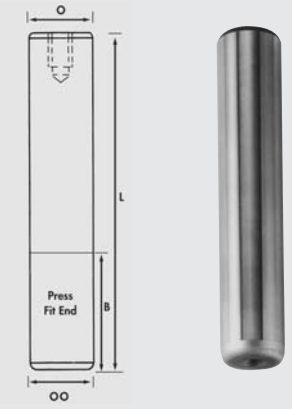
Double Diameter Pins

Double Diameter Pin Selection Guide (-55)

Nominal Pin Diameter O	Length B	Length L	Catalog Number
3/4″	1 1/8″	4	5-0616-55
		4 1/2	5-0618-55
		5	5-0620-55
		5 1/2	5-0622-55
		6	5-0624-55
		6 1/2	5-0626-55
		7	5-0628-55
		7 1/2	5-0630-55
		8	5-0632-55
1″	1 1/2″	4	5-0816-55
		4 1/2	5-0818-55
		5	5-0820-55
		5 1/2	5-0822-55
		6	5-0824-55
		6 1/2	5-0826-55
		7	5-0828-55
		7 1/2	5-0830-55
		8	5-0832-55
		8 1/2	5-0834-55
		9	5-0836-55
		9 1/2	5-0838-55
		10	5-0840-55
1 1/4″	1 3/4″	4	5-1016-55
		4 1/2	5-1018-55
		5	5-1020-55
		5 1/2	5-1022-55
		6	5-1024-55
		6 1/2	5-1026-55
		7	5-1028-55
		7 1/2	5-1030-55
		8	5-1032-55
		8 1/2	5-1034-55
		9	5-1036-55
		9 1/2	5-1038-55
		10	5-1040-55
		11	5-1044-55
		12	5-1048-55
		14	5-1056-55
1 1/2″	2″	4 1/2	5-1218-55
		5	5-1220-55
		5 1/2	5-1222-55
		6	5-1224-55
		6 1/2	5-1226-55
		7	5-1228-55
		7 1/2	5-1230-55
		8	5-1232-55
		8 1/2	5-1234-55
		9	5-1236-55
		9 1/2	5-1238-55
		10	5-1240-55
		11	5-1244-55
		12	5-1248-55
		14	5-1256-55

Nominal Pin Diameter O	Length B	Length L	Catalog Number
1 3/4″	2 1/4″	6	5-1424-55
		6 1/2	5-1426-55
		7	5-1428-55
		7 1/2	5-1430-55
		8	5-1432-55
		8 1/2	5-1434-55
		9	5-1436-55
		9 1/2	5-1438-55
		10	5-1440-55
		11	5-1444-55
		12	5-1448-55
		13	5-1452-55
		14	5-1456-55
		15	5-1460-55
		17	5-1468-55
2″	2 1/2″	6	5-1624-55
		6 1/2	5-1626-55
		7	5-1628-55
		7 1/2	5-1630-55
		8	5-1632-55
		8 1/2	5-1634-55
		9	5-1636-55
		9 1/2	5-1638-55
		10	5-1640-55
		11	5-1644-55
		12	5-1648-55
		13	5-1652-55
		14	5-1656-55
		15	5-1660-55
		17	5-1668-55
2 1/2″	3 1/2″	8	5-2032-55
		8 1/2	5-2034-55
		9	5-2036-55
		10	5-2040-55
		11	5-2044-55
		12	5-2048-55
		13	5-2052-55
		14	5-2056-55
		15	5-2060-55
		17	5-2068-55
		19	5-2076-55
3″	4″	9	5-2436-55
		10	5-2440-55
		11	5-2444-55
		12	5-2448-55
		13	5-2452-55
		14	5-2456-55
		15	5-2460-55
		17	5-2468-55
		19	5-2476-55

- Ideal for retro-fits to improve productivity and decrease costly maintenance.
- Proven quality and dependability in dies for years.
- Readily available.
- Oversize press fit end for die shoe and nominal size end for bushing.
- Interchangeable with familiar brands.



Double Diameter Dimensions

Double Diameter Pin Dimensions

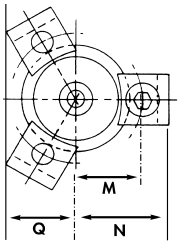
Pin Diameter	00 +0 -.0005	Length of Press Fit B
3/4″	0.752	1 1/8″
1″	1.002	1 1/2″
1 1/4″	1.2525	1 3/4″
1 1/2″	1.5025	2″
1 3/4″	1.7525	2 1/4″
2″	2.0025	2 1/2″
2 1/2″	2.503	3 1/2″
3″	3.003	4″

Guide Pin Tap Sizes ***Recommended Seating Torque***

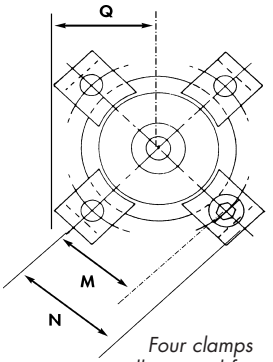
Nominal Pin Diameter O	Tap Size	Lbs. - Feet
1 - 1 1/4″	5/16 - 18 N.C.	26
1 1/2 - 1 3/4 - 2″	3/8 - 16 N.C.	47
2 1/2″ - 3″	1/2 - 13 N.C.	112

Demountable Pin Clamp Data

Diameter O	Pillar Clamp Data: Radius M	Radius N	Q	Qty per Pillar	Catalog Number	Socket Head Cap Screws S	Socket Head Cap Screws T
1″	13/16	1 1/8	7/8	3	6-90-1	1/4 - 20 x 3/4	5/8
1 1/4″	63/64	1 7/16	1	3	6-93-1	5/16 - 18 x 7/8	3/4
1 1/2″	1 1/8	1 9/16	1 1/16				
1 3/4″	1 19/64	1 3/4	1 3/8	4	6-93-1	5/16 - 18 x 7/8	3/4
2″	1 27/64	1 7/8	1 9/16				
2 1/2″	1 43/64	2 1/8	1 3/4				
3″	1 59/64	2 3/8	1 15/16				

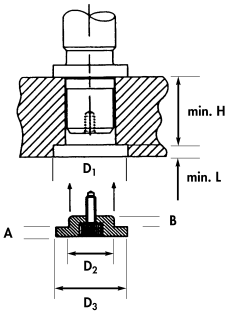


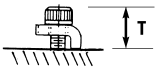
Three clamps equally spaced for 1″ - 1 1/2″ diameter pins.



Four clamps equally spaced for 1 3/4″ - 3″ diameter pins.

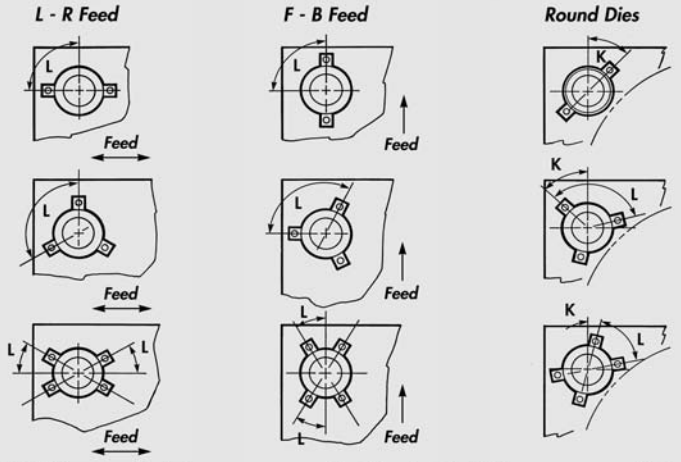
Pin Diameter O	Pillar Retaining Plug Data: D1	min. L	min. H	A	B	D2	D3	Catalog Number	Screw
1″	1.50	.25	1.25	.20	.36	.99	1.49	6-08-35	3/8 - 16
1 1/4″	1.75	.25	1.75	.20	.55	1.24	1.74	6-10-35	1/2 - 13
1 1/2″	2.00	.25	2.00	.20	.55	1.49	1.99	6-12-35	1/2 - 13
1 3/4″	2.25	.25	2.45	.20	.73	1.74	2.24	6-14-35	5/8 - 11
2″	2.50	.25	2.70	.20	.73	1.99	2.49	6-16-35	5/8 - 11
2 1/2″	3.00	.25	2.70	.20	.73	2.49	2.99	6-20-35	5/8 - 11
3″	3.50	.25	3.15	.20	.93	2.99	3.49	6-24-35	3/4 - 10





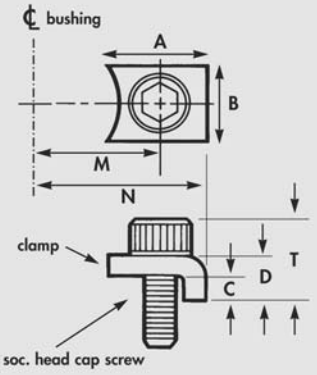
Demountable Bushing Clamp Data

Clamp Arrangement Selection Data



NOTE: If not specified, clamp arrangement L-R will be furnished. Clamp arrangement F-B is furnished on center pin sets.

Clamp Numbers: 6-90-1, 6-93-1, 6-95-1



We ship the appropriate number of clamps and SHCS with each demountable bushing ordered.

APPLICATION	Nominal Diameter / Bush. ID Pin OD	Clamp Data: Location M	Location N	Location L	Location K	Size A	Size B	Size C	Size D	Clamp No.	Per Unit	Screw Size	T
Bushings, Demountable Shoulder and Short Shoulder	3/4″	25/32	1 1/64	90°	45°	15/32	1/2	.125	7/32	6-95-1	2	1/4 - 20 x 5/8	15/32
	1″	1 1/16	1 3/8	90°	45°	5/8	5/8	.193	11/32	6-90-1	2	1/4 - 20 x 3/4	39/64
	1 1/4″	1 7/32	1 17/32	120°	45°	25/32	5/8	.250	7/16	6-93-1	3	5/16 - 18 x 3/4	3/4
	1 1/2″	1 3/8	1 11/16										
	1 3/4″	1 1/2	1 13/16	35°	10°	25/32	5/8	.250	7/16	6-93-1	4	5/16 - 18 x 3/4	3/4
	2″	1 45/64	2 1/64										
	2 1/2″	2 5/64	2 25/64	40°	5°								
	3″	2 5/16	2 5/8	45°	0°								

Ready's Ball Bearing Guide Pins Are Truly Interchangeable

Ball Bearing Cages

Operating Conditions

For optimum performance guide pins should be mounted in the punch holder. This allows the ball cage to reposition itself, if preload is relieved on each press stroke. Complete assemblies (guide pin, ball cage and bushing) should be ordered to insure proper fit.

Recommended Lubrication

We recommend lubricating the ball bushing assembly once each 8 hour shift. Use a refined mineral oil with a viscosity of 290/340 SSU at 100° F, combining "EP" additives and rust inhibitors, such as Mobil Compound AA or Mobil Gear 626.

Installation Instructions for Sleeve Bushings Using Bushing Mount

1. Degrease bushing OD and die shoe bore with alcohol, acetone or other volatile solvent and wipe dry.
2. Apply Bushing Mount sparingly to both surfaces.
3. Wring bushing into die shoe.
4. Allow 4-hour cure at 72°F. To accelerate cure, heat with heat-lamp. Do not disturb bushing until cure is complete.
5. Honing is not required after installation.

Precision Guide Pins (-825) Demountable Pins (-835), and Double Diameter Pins (-55)

You can use any of our guide pins in ball bearing applications because each of the 3 styles is designed for dual purpose in both friction solid guiding and ball bearing guiding.

Vacuum degassed, ball bearing quality steel is induction hardened to 60-64 Rc, then core tempered for toughness. This produces an optimum combination of wear resistance for long operating life and shock resistance for safety.

The guide pin retains the ball cage by means of a washer assembly. The cage is free to rotate 360°, so scoring and tracking on the guide pin surface are eliminated or reduced.

Our guide pins are interchangeable with all the major brands.

Ball Bearing Cages (-8225)

Our Ball Cages use AFBMA Grade 10 precision ball bearings, accurate to within .0001". These ball bearing have been chosen for their high hardness and excellent resistance to wear and deformation. They are retained securely in place by a hardened aluminum alloy cage, heat treated for toughness and wear resistance.

Each ball bearing is held in place with 360° staking. This is a safer design than two or four point staking. Failure tests show that a 360° staked ball requires a substantially higher force to become dislodged.

Ready Ball Cages are free to rotate within the ball bushing assembly, so wear on the guide pin and bushing is reduced. The ball bearings are arranged in a double spiral pattern, so that each ball bearing travels along its own unique path. Tracking is reduced and operating life is enhanced.

Demountable Ball Bearing Bushings (-855) and Straight Sleeve Bushings (-865)

We offer two types of ball bearing bushings. Our Demountable Ball Bearing Bushings are flange mounted and held in place with toe clamps and screws. They are interchangeable with familiar brands of demountable ball bushings.

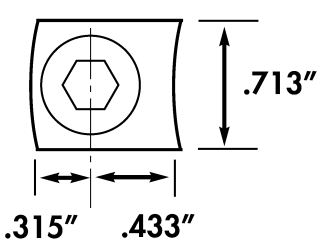
Our Straight Sleeve bushings offer something quite new. All sleeve bushings 1 1/2" in diameter and larger incorporate our patented Ring System clamping groove, which provides several benefits. Please refer to the following page for details.

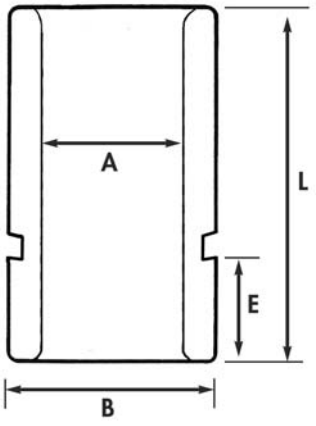
If you prefer, however, you can secure our sleeve bushings in the traditional manner with Bushing Mount. Up to eleven tons of force are required to dislodge the bushing once the Bushing Mount has properly cured. Please follow the assembly procedure outlined in the side panel on this page. Bushing Mount compound is available upon request.

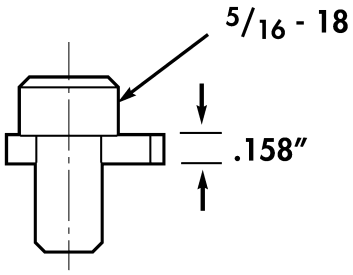
Our ball bearing bushings are interchangeable with most major brands; for brands with a smaller register fit than ours, we have left the OD of our straight sleeve bushing soft, enabling you to turn down the OD to match. See your READY representative for details.

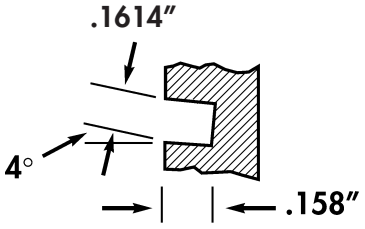
The Ring System –

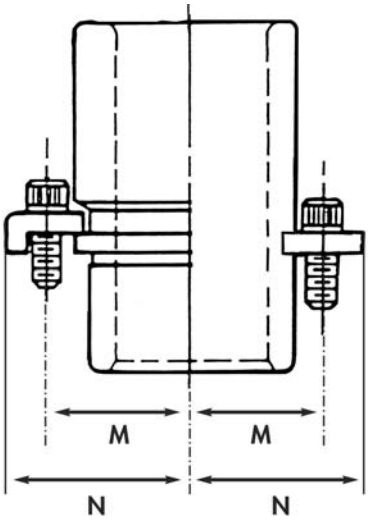
Our Straight Sleeve Bushing Has Just Become Demountable

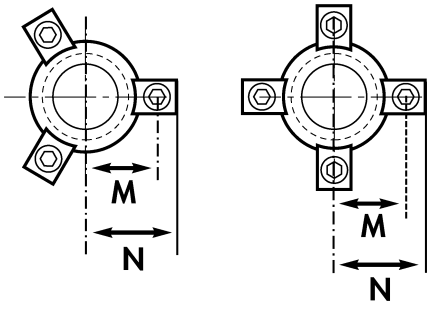












Our patented Ring System consists of a slightly curved clamp which fits into a 4° angled groove. As the clamping screw is tightened the clamp wedges against the slot, holding the bushing securely in place.

This design produces real benefits. Since the Ring System makes the sleeve bushing easy to assemble and disassemble, die building and maintenance are simplified. Ring System bushings are less costly to produce than demountable bushings, so you save on purchase cost.

In addition, Ring System bushings give you more die space. You can see in the table below that the Ring System sleeve bushing takes up less space than a demountable ball bearing bushing of traditional design.

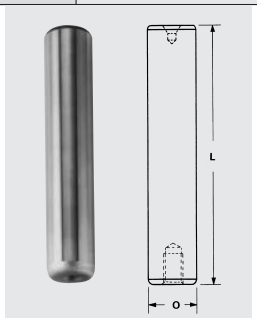
Clamp Data

Pin Diameter	Demountable Bushing					Ring System Sleeve Bushing				
	M	N	Clamps per Bushing	Clamp	Screw	M	N	Clamps per Bushing	Clamp	Screw
1″	1.313	1.688	3	6-93-1	5/16 - 18 X 3/4 lg	-	-	-	6-B2-1	5/16 - 18 X 3/4 lg
1 1/4″	1.438	1.813	3			-	-	-		
1 1/2″	1.688	2.063	4			1.513	1.846	4		
1 3/4″	1.813	2.188	4			1.657	1.972	4		
2″	2.063	2.438	4			1.909	2.224	4		
2 1/2″	2.313	2.688	4			2.161	2.476	4		
3″	2.625	3.000	4			-	-	-		

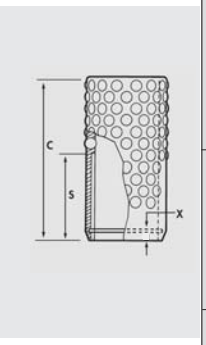
Precision Pin Selection Guide (-825)

Nominal Pin Diameter O	Length L	Catalog Number
1″	3 1/4	5-0813-825
	3 3/4	5-0815-825
	4 1/4	5-0817-825
	4 1/2	5-0818-825
	4 3/4	5-0819-825
	5	5-0820-825
	5 1/4	5-0821-825
	5 1/2	5-0822-825
	5 3/4	5-0823-825
	6	5-0824-825
	6 1/2	5-0826-825
	7	5-0828-825
	7 1/2	5-0830-825
	8	5-0832-825
	8 1/2	5-0834-825
	9	5-0836-825
1 1/4″	4 1/4	5-1017-825
	4 3/4	5-1019-825
	5 1/4	5-1021-825
	5 1/2	5-1022-825
	5 3/4	5-1023-825
	6	5-1024-825
	6 1/2	5-1026-825
	7	5-1028-825
	7 1/2	5-1030-825
	8	5-1032-825
	8 1/2	5-1034-825
	9	5-1036-825
	10	5-1040-825
	11	5-1044-825
	12	5-1048-825
1 1/2″	4 1/4	5-1217-825
	5	5-1220-825
	5 3/4	5-1223-825
	6	5-1224-825
	6 1/2	5-1226-825
	7	5-1228-825
	7 1/2	5-1230-825
	8	5-1232-825
	8 1/2	5-1234-825
	9	5-1236-825
	9 1/2	5-1238-825
	10	5-1240-825
	10 1/2	5-1242-825
	11	5-1244-825
	11 1/2	5-1246-825
	12	5-1248-825
	12 1/2	5-1250-825
	13	5-1252-825
	14	5-1256-825

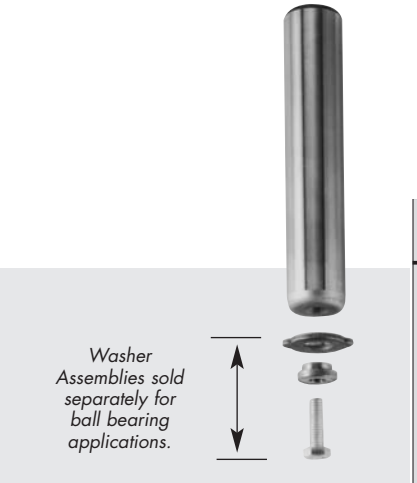
Nominal Pin Diameter O	Length L	Catalog Number
1 3/4″	5	5-1420-825
	5 3/4	5-1423-825
	6 1/2	5-1426-825
	7	5-1428-825
	7 1/2	5-1430-825
	8	5-1432-825
	8 1/2	5-1434-825
	9	5-1436-825
	9 1/2	5-1438-825
	10	5-1440-825
	10 1/2	5-1442-825
	11	5-1444-825
	11 1/2	5-1446-825
	12	5-1448-825
	12 1/2	5-1450-825
	13	5-1452-825
	14	5-1456-825
	15	5-1460-825
	17	5-1468-825
2″	5 3/4	5-1623-825
	6 1/2	5-1626-825
	7 1/4	5-1629-825
	7 1/2	5-1630-825
	7 3/4	5-1631-825
	8	5-1632-825
	8 1/2	5-1634-825
	9	5-1636-825
	9 1/2	5-1638-825
	10	5-1640-825
	10 1/2	5-1642-825
	11	5-1644-825
	11 1/2	5-1646-825
	12	5-1648-825
	12 1/2	5-1650-825
	13	5-1652-825
	14	5-1656-825
	15	5-1660-825
	16	5-1664-825
	17	5-1668-825
	18	5-1672-825
2 1/2″	8	5-2032-825
	8 3/4	5-2035-825
	9 1/2	5-2038-825
	10	5-2040-825
	11	5-2044-825
	12	5-2048-825
	13	5-2052-825
	14	5-2056-825
	17	5-2068-825
	18	5-2072-825
	20	5-2080-825
3″	8	5-2432-825
	9	5-2436-825
	10	5-2440-825
	11	5-2444-825
	12	5-2448-825
	13	5-2452-825
	14	5-2456-825
	17	5-2468-825
	20	5-2480-825



Ball Bearing Cage Selection Guide (-8225)



Diameter O	C	S	X	Catalog Number
1″	2	1 1/16	3/16	6-0808-8225
	2 1/2	1 5/16		6-0810-8225
	3	1 9/16		6-0812-8225
	3 1/4	1 13/16		6-0813-8225
	3 1/2	2 1/16		6-0814-8225
	3 3/4	2 5/16		6-0815-8225
1 1/4″	2 3/4	1 7/16	3/16	6-1011-8225
	3 1/4	1 11/16		6-1013-8225
	3 3/4	1 15/16		6-1015-8225
	4	2 3/16		6-1016-8225
	4 1/4	2 7/16		6-1017-8225
	4 3/4	2 15/16		6-1019-8225
1 1/2″	2 3/4	1 7/16	1/4	6-1211-8225
	3 1/2	1 13/16		6-1214-8225
	4 1/4	2 3/16		6-1217-8225
	4 1/2	2 7/16		6-1218-8225
	5	2 15/16		6-1220-8225
	5 1/2	3 7/16		6-1222-8225
	6	3 15/16		6-1224-8225
1 3/4″	3 1/4	1 11/16	1/4	6-1413-8225
	4	2 1/16		6-1416-8225
	4 3/4	2 7/16		6-1419-8225
	5 1/4	2 15/16		6-1421-8225
	5 3/4	3 7/16		6-1423-8225
	6 1/4	3 15/16		6-1425-8225
	6 3/4	4 7/16		6-1427-8225
2″	3 3/4	1 15/16	1/4	6-1615-8225
	4 1/2	2 5/16		6-1618-8225
	5 1/4	2 11/16		6-1621-8225
	5 5/8	3 1/16		6-1623-8225
	6	3 7/16		6-1624-8225
	6 1/2	3 15/16		6-1626-8225
	7	4 7/16		6-1628-8225
	7 1/2	4 15/16		6-1630-8225
2 1/2″	5 3/4	3	3/8	6-2023-8225
	6 1/2	3 3/8		6-2026-8225
	7 1/4	3 3/4		6-2029-8225
	7 3/4	4 1/4		6-2031-8225
	8 1/4	4 3/4		6-2033-8225
	8 3/4	5 1/4		6-2035-8225
3″	5 3/4	3	3/8	6-2423-8225
	6 1/2	3 3/8		6-2426-8225
	7 1/4	3 3/4		6-2429-8225



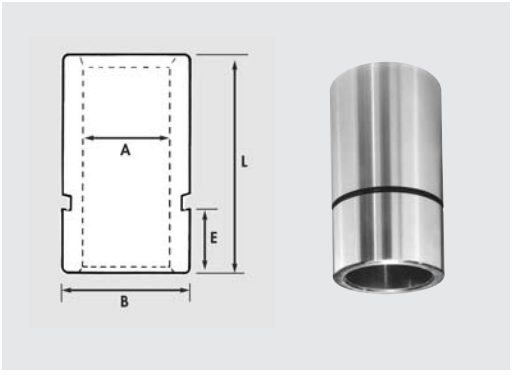
Washer Assemblies sold separately for ball bearing applications.

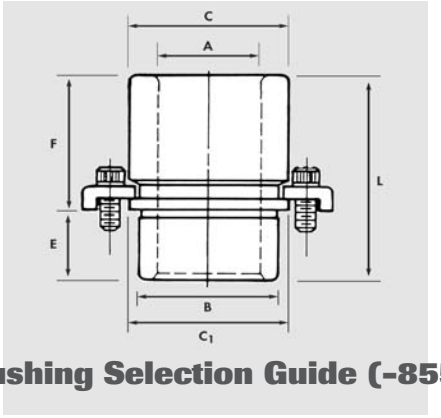
Washer Assemblies

Nominal Pin Diameter O	Catalog Number
1″	6-0008-822
1 1/4″	6-0010-822
1 1/2″	6-0012-822
1 3/4″	6-0014-822
2″	6-0016-822
2 1/2″	6-0020-822
3″	6-0024-822

Straight Sleeve Bushing Selection Guide (-865)

Nominal Post Diameter O	A	B	E	Length L	Catalog Number
1″	1 3/8	1 7/8	n/a	2 1/2	6-0810-865
				3	6-0812-865
				3 1/2	6-0814-865
				4	6-0816-865
				4 1/2	6-0818-865
				5	6-0820-865
1 1/4″	1 5/8	2 1/8	n/a	3	6-1012-865
				3 1/2	6-1014-865
				4	6-1016-865
				4 1/2	6-1018-865
				5	6-1020-865
				6	6-1024-865
1 1/2″	1 7/8	2 1/2	1 3/8	3	6-1212-865
				3 3/4	6-1215-865
				4 1/2	6-1218-865
				5	6-1220-865
				5 1/2	6-1222-865
				6	6-1224-865
				7	6-1228-865
				8	6-1232-865
1 3/4″	2 1/8	2 3/4	1 5/8	3 1/2	6-1414-865
				4 1/4	6-1417-865
				5	6-1420-865
				5 1/2	6-1422-865
				6	6-1424-865
				7	6-1428-865
				8	6-1432-865
				9	6-1436-865
2″	2 1/2	3 1/4	1 7/8	4	6-1616-865
				4 3/4	6-1619-865
				5 1/2	6-1622-865
				6 1/4	6-1625-865
				7	6-1628-865
				8	6-1632-865
				9	6-1636-865
				10	6-1640-865
2 1/2″	3	3 3/4	1 7/8	6	6-2024-865
				6 3/4	6-2027-865
				7 1/2	6-2030-865
				8 1/2	6-2034-865
				9 1/2	6-2038-865
				10 1/2	6-2042-865





Demountable Bushing Selection Guide (-855)

Nominal Post Diameter O	A	B	C	C1	E	F	L	Catalog Number
1″	1 3/8	1 7/8	2 1/8	2.28	1 3/16	1 1/4	2 7/16	6-0805-855
						1 3/4	2 15/16	6-0807-855
						2 1/4	3 7/16	6-0809-855
1 1/4″	1 5/8	2 1/8	2 3/8	2.48	1 3/16	1 3/4	2 15/16	6-1007-855
						2 1/4	3 7/16	6-1009-855
						2 3/4	3 15/16	6-1011-855
1 1/2″	1 7/8	2 1/2	2 7/8	2.98	1 7/16	1 1/2	2 15/16	6-1206-855
						2 1/4	3 11/16	6-1209-855
						3	4 7/16	6-1212-855
						3 1/2	4 15/16	6-1214-855
1 3/4″	2 1/8	2 3/4	3 1/8	3.28	1 11/16	1 3/4	3 7/16	6-1407-855
						2 1/2	4 3/16	6-1410-855
						3 1/4	4 15/16	6-1413-855
2″	2 1/2	3 1/4	3 5/8	3.74	1 15/16	2	3 15/16	6-1608-855
						2 3/4	4 11/16	6-1611-855
						3 1/2	5 7/16	6-1614-855
						4 1/4	6 3/16	6-1617-855
2 1/2″	3	3 3/4	4 1/8	4.25	1 15/16	4	5 15/16	6-2016-855
						4 3/4	6 11/16	6-2019-855
						5 1/2	7 7/16	6-2022-855
3″	3 1/2	4 1/4	4 3/4	4.88	1 15/16	4	5 15/16	6-2416-855
						4 3/4	6 11/16	6-2419-855
						5 1/2	7 7/16	6-2422-855

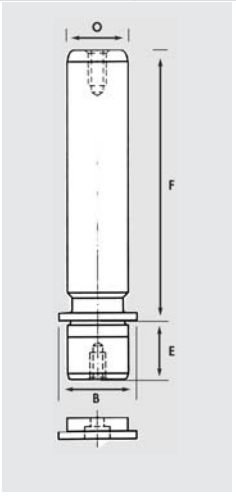
Bore Sizes for Ball Bearing Bushing and Pin Assembly

Pin Diameter	-825, -835 Bore Diameter	-55 Bore Diameter	Ball Bushing Bore Diameter	Ring System Bore Diameter
1″	0.9991 / 0.9985	1.0006 / 1.0000	1.8756 / 1.8750	-
1 1/4″	1.2489 / 1.2482	1.2506 / 1.2500	2.1257 / 2.1250	-
1 1/2″	1.4989 / 1.4982	1.5006 / 1.5000	2.5007 / 2.5000	2.4997 / 2.4990
1 3/4″	1.7489 / 1.7482	1.7506 / 1.7500	2.7507 / 2.7500	2.7497 / 2.7490
2″	1.9989 / 1.9982	2.0007 / 2.0000	3.2509 / 3.2500	3.2499 / 3.2490
2 1/2″	2.4986 / 2.4979	2.5007 / 2.5000	3.7509 / 3.7500	3.7499 / 3.7490
3″	2.9986 / 2.9979	3.0007 / 3.0000	4.2509 / 4.2500	-

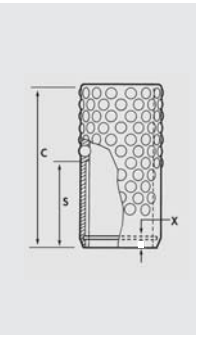
Demountable Pin Selection Guide (-835)

Nominal Pin Diameter O	Flange B	Length E	Length F	Catalog Number
1″	1.31	7/8″	4	5-0816-835
			4 1/2	5-0818-835
			5	5-0820-835
			5 1/2	5-0822-835
			6	5-0824-835
			6 1/2	5-0826-835
			7	5-0828-835
			7 1/2	5-0830-835
1 1/4″	1.56	1 3/16″	4	5-1016-835
			4 1/2	5-1018-835
			5	5-1020-835
			5 1/2	5-1022-835
			6	5-1024-835
			6 1/2	5-1026-835
			7	5-1028-835
			7 1/2	5-1030-835
			8	5-1032-835
			8 1/2	5-1034-835
			9	5-1036-835
			9 1/2	5-1038-835
			10	5-1040-835
1 1/2″	1.87	1 7/16″	5	5-1220-835
			5 1/2	5-1222-835
			6	5-1224-835
			6 1/2	5-1226-835
			7	5-1228-835
			7 1/2	5-1230-835
			8	5-1232-835
			8 1/2	5-1234-835
			9	5-1236-835
			9 1/2	5-1238-835
			10	5-1240-835
			11	5-1244-835
1 3/4″	2.25	1 11/16″	5	5-1420-835
			5 1/2	5-1422-835
			6	5-1424-835
			6 1/2	5-1426-835
			7	5-1428-835
			7 1/2	5-1430-835
			8	5-1432-835
			8 1/2	5-1434-835
			9	5-1436-835
			9 1/2	5-1438-835
			10	5-1440-835
			11	5-1444-835
			12	5-1448-835

Nominal Pin Diameter O	Flange B	Length E	Length F	Catalog Number
2″	2.50	1 15/16″	5	5-1620-835
			5 1/2	5-1622-835
			6	5-1624-835
			6 1/2	5-1626-835
			7	5-1628-835
			7 1/2	5-1630-835
			8	5-1632-835
			8 1/2	5-1634-835
			9	5-1636-835
			9 1/2	5-1638-835
			10	5-1640-835
			11	5-1644-835
			12	5-1648-835
2 1/2″	3.00	1 15/16″	5	5-2020-835
			5 1/2	5-2022-835
			6	5-2024-835
			6 1/2	5-2026-835
			7	5-2028-835
			7 1/2	5-2030-835
			8	5-2032-835
			8 1/2	5-2034-835
			9	5-2036-835
			9 1/2	5-2038-835
			10	5-2040-835
			11	5-2044-835
			12	5-2048-835
			13	5-2052-835
			14	5-2056-835
3″	3.50	2 3/16″	6	5-2424-835
			7	5-2428-835
			8	5-2432-835
			9	5-2436-835
			10	5-2440-835
			11	5-2444-835
			12	5-2448-835
			14	5-2456-835
			16	5-2464-835



Ball Bearing Cage Selection Guide (-8225)



Diameter O	C	S	X	Catalog Number
1″	2	1 1/16	3/16	6-0808-8225
	2 1/2	1 5/16		6-0810-8225
	3	1 9/16		6-0812-8225
	3 1/4	1 13/16		6-0813-8225
	3 1/2	2 1/16		6-0814-8225
	3 3/4	2 5/16		6-0815-8225
1 1/4″	2 3/4	1 7/16	3/16	6-1011-8225
	3 1/4	1 11/16		6-1013-8225
	3 3/4	1 15/16		6-1015-8225
	4	2 3/16		6-1016-8225
	4 1/4	2 7/16		6-1017-8225
	4 3/4	2 15/16		6-1019-8225
1 1/2″	2 3/4	1 7/16	1/4	6-1211-8225
	3 1/2	1 13/16		6-1214-8225
	4 1/4	2 3/16		6-1217-8225
	4 1/2	2 7/16		6-1218-8225
	5	2 15/16		6-1220-8225
	5 1/2	3 7/16		6-1222-8225
	6	3 15/16		6-1224-8225
1 3/4″	3 1/4	1 11/16	1/4	6-1413-8225
	4	2 1/16		6-1416-8225
	4 3/4	2 7/16		6-1419-8225
	5 1/4	2 15/16		6-1421-8225
	5 3/4	3 7/16		6-1423-8225
	6 1/4	3 15/16		6-1425-8225
	6 3/4	4 7/16		6-1427-8225
2″	3 3/4	1 15/16	1/4	6-1615-8225
	4 1/2	2 5/16		6-1618-8225
	5 1/4	2 11/16		6-1621-8225
	5 5/8	3 1/16		6-1623-8225
	6	3 7/16		6-1624-8225
	6 1/2	3 15/16		6-1626-8225
	7	4 7/16		6-1628-8225
	7 1/2	4 15/16		6-1630-8225
2 1/2″	5 3/4	3	3/8	6-2023-8225
	6 1/2	3 3/8		6-2026-8225
	7 1/4	3 3/4		6-2029-8225
	7 3/4	4 1/4		6-2031-8225
	8 1/4	4 3/4		6-2033-8225
	8 3/4	5 1/4		6-2035-8225
3″	5 3/4	3	3/8	6-2423-8225
	6 1/2	3 3/8		6-2426-8225
	7 1/4	3 3/4		6-2429-8225

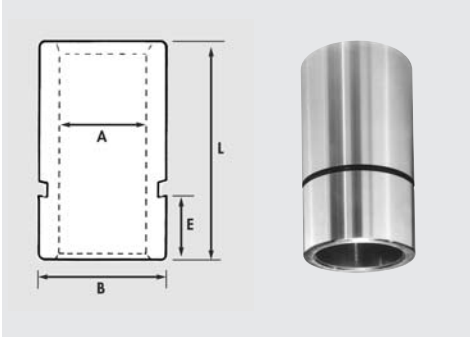
Washer Assemblies sold separately for ball bearing applications.

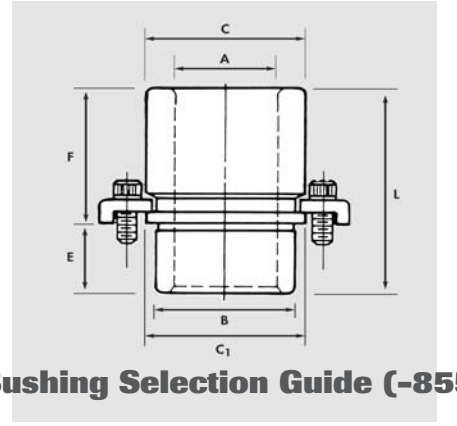
Washer Assemblies

Nominal Pin Diameter O	Catalog Number
1″	6-0008-822
1 1/4″	6-0010-822
1 1/2″	6-0012-822
1 3/4″	6-0014-822
2″	6-0016-822
2 1/2″	6-0020-822
3″	6-0024-822

Straight Sleeve Bushing Selection Guide (-865)

Nominal Post Diameter O	A	B	E	Length L	Catalog Number
1″	1 3/8	1 7/8	n/a	2 1/2	6-0810-865
				3	6-0812-865
				3 1/2	6-0814-865
				4	6-0816-865
				4 1/2	6-0818-865
				5	6-0820-865
1 1/4″	1 5/8	2 1/8	n/a	3	6-1012-865
				3 1/2	6-1014-865
				4	6-1016-865
				4 1/2	6-1018-865
				5	6-1020-865
				6	6-1024-865
1 1/2″	1 7/8	2 1/2	1 3/8	3	6-1212-865
				3 3/4	6-1215-865
				4 1/2	6-1218-865
				5	6-1220-865
				5 1/2	6-1222-865
				6	6-1224-865
				7	6-1228-865
				8	6-1232-865
1 3/4″	2 1/8	2 3/4	1 5/8	3 1/2	6-1414-865
				4 1/4	6-1417-865
				5	6-1420-865
				5 1/2	6-1422-865
				6	6-1424-865
				7	6-1428-865
				8	6-1432-865
				9	6-1436-865
2″	2 1/2	3 1/4	1 7/8	4	6-1616-865
				4 3/4	6-1619-865
				5 1/2	6-1622-865
				6 1/4	6-1625-865
				7	6-1628-865
				8	6-1632-865
				9	6-1636-865
				10	6-1640-865
2 1/2″	3	3 3/4	1 7/8	6	6-2024-865
				6 3/4	6-2027-865
				7 1/2	6-2030-865
				8 1/2	6-2034-865
				9 1/2	6-2038-865
				10 1/2	6-2042-865





Demountable Bushing Selection Guide (-855)

Nominal Post Diameter O	A	B	C	C1	E	F	L	Catalog Number
1″	1 3/8	1 7/8	2 1/8	2.28	1 3/16	1 1/4	2 7/16	6-0805-855
						1 3/4	2 15/16	6-0807-855
						2 1/4	3 7/16	6-0809-855
1 1/4″	1 5/8	2 1/8	2 3/8	2.48	1 3/16	1 3/4	2 15/16	6-1007-855
						2 1/4	3 7/16	6-1009-855
						2 3/4	3 15/16	6-1011-855
1 1/2″	1 7/8	2 1/2	2 7/8	2.98	1 7/16	1 1/2	2 15/16	6-1206-855
						2 1/4	3 11/16	6-1209-855
						3	4 7/16	6-1212-855
						3 1/2	4 15/16	6-1214-855
1 3/4″	2 1/8	2 3/4	3 1/8	3.28	1 11/16	1 3/4	3 7/16	6-1407-855
						2 1/2	4 3/16	6-1410-855
						3 1/4	4 15/16	6-1413-855
2″	2 1/2	3 1/4	3 5/8	3.74	1 15/16	2	3 15/16	6-1608-855
						2 3/4	4 11/16	6-1611-855
						3 1/2	5 7/16	6-1614-855
						4 1/4	6 3/16	6-1617-855
2 1/2″	3	3 3/4	4 1/8	4.25	1 15/16	4	5 15/16	6-2016-855
						4 3/4	6 11/16	6-2019-855
						5 1/2	7 7/16	6-2022-855
3″	3 1/2	4 1/4	4 3/4	4.88	1 15/16	4	5 15/16	6-2416-855
						4 3/4	6 11/16	6-2419-855
						5 1/2	7 7/16	6-2422-855

Bore Sizes for Ball Bearing Bushing and Pin Assembly

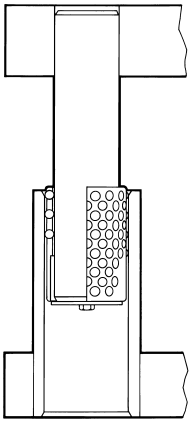
Pin Diameter	-825, -835 Bore Diameter	-55 Bore Diameter	Ball Bushing Bore Diameter	Ring System Bore Diameter
1″	0.9991 0.9985	1.0006 1.0000	1.8756 1.8750	-
1 1/4″	1.2489 1.2482	1.2506 1.2500	2.1257 2.1250	-
1 1/2″	1.4989 1.4982	1.5006 1.5000	2.5007 2.5000	2.4997 2.4990
1 3/4″	1.7489 1.7482	1.7506 1.7500	2.7507 2.7500	2.7497 2.7490
2″	1.9989 1.9982	2.0007 2.0000	3.2509 3.2500	3.2499 3.2490
2 1/2″	2.4986 2.4979	2.5007 2.5000	3.7509 3.7500	3.7499 3.7490
3″	2.9986 2.9979	3.0007 3.0000	4.2509 4.2500	-

READY

Selecting the Proper Operating Conditions

Type I

Continuous Preload

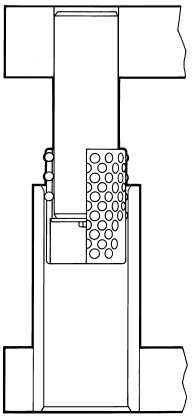


Type **I** is recommended for high speed, high production dies. Throughout the press stroke, all ball bearings remain in preloaded contact with the guide pin and bushing.

Please note that a Type **I** design may be run on a shorter stroke press, but not on a press whose stroke is longer than originally chosen.

Type IIa

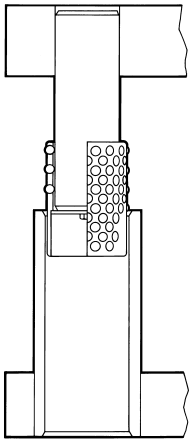
Preload Partially Relieved



At top stroke, some ball bearings have left preload. On the down stroke they reengage the guide pin and bushing, producing a small upward force which helps counteract the natural tendency of the ball cage to creep downward.

Type IIb

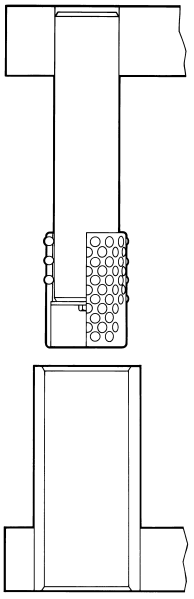
Preload Relieved



Type **IIb** is recommended if creeping is a problem. As soon as the last ball leaves preload on the up stroke, the cage repositions itself. This feature can eliminate a nagging maintenance chore.

Type III

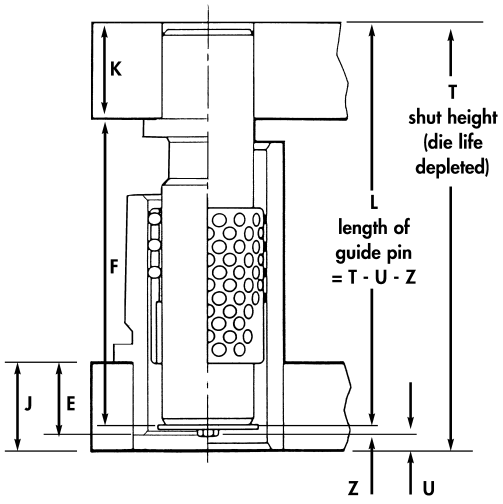
Disengaged



Type **III** permits an unlimited stroke. Also, if shorter bushings and cages can be used, Type **III** is economical.

However, a pinch point is created when the components disengage, so Type **III** should not be selected if it compromises safety.

Selecting the Correct Components



Guide Pins

1. Calculate **L** using one of the following formulas:

   L = T - (U + Z) for assembly with sleeve bushings

   L = T - (U + Z) - J + E for demountable bushings

2. For straight pins, select a length equal to **L**. If **L** is not a standard length, choose a longer pin and cut to L, or choose a shorter length and recess the pin in the punch holder to **L**, making sure that the minimum press fit length is at least equal to the pin diameter.
3. For demountable pins, select a length so that **K + F** is as close as possible to **L** without exceeding it.

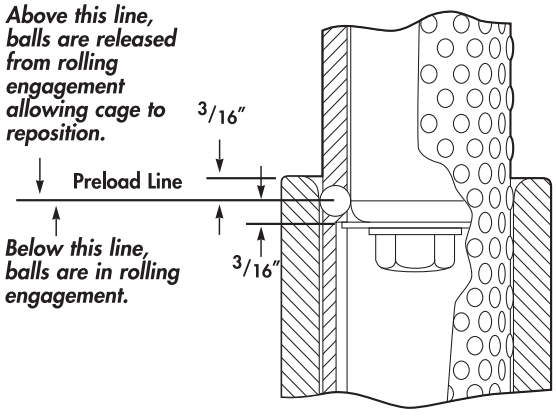
Guide Pin Length Selection

Nominal Guide Pin Diameter O	Z	U + Z	E
1″	15/32	3/4	1 3/16
1 1/4″	15/32		1 3/16
1 1/2″	1/2		1 7/16
1 3/4″	1/2		1 11/16
2″	1/2		1 15/16
2 1/2″	9/16		1 15/16
3″	9/16		1 15/16

Bushings

1. If the tool's working stroke is short and there are no off-center loads, select the shortest bushing which will produce the desired operating condition. Turn to the selection chart on pages 26 and 27, find the stroke, and read down that column until it intersects the operating condition you have selected. The bushing you need is listed on that line.
2. When rigidity and resistance to side load are required, use the selection chart to choose the longest bushing consistent with the desired operating condition.

CAUTION: Make sure the top of the bushing does not strike the punch holder or the demountable pin clamp screw, either when the die is new or die life is depleted. If it does, select the next shorter bushing.



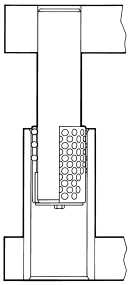
Cages

1. The page 26-27 selection chart automatically gives you the correct cage. It is listed on the same line as the bushing you have selected.
2. Different combinations of cages and bushings are possible, but then the selection chart does not apply. You will need to make a layout of the cage travel from the start of preload to bottom stroke. This figure gives you the position of the guide pin, bushing, and cage at the start of preload. From that point on, the cage travels half the distance of the guide pin.

Bushing and Ball Cage Operating Condition Selection Chart

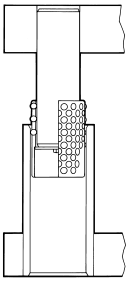
Type I

Continuous Preload



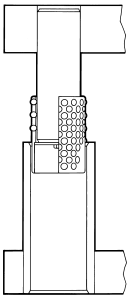
Type IIa

Preload Partially Relieved



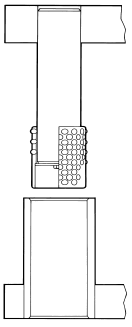
Type IIb

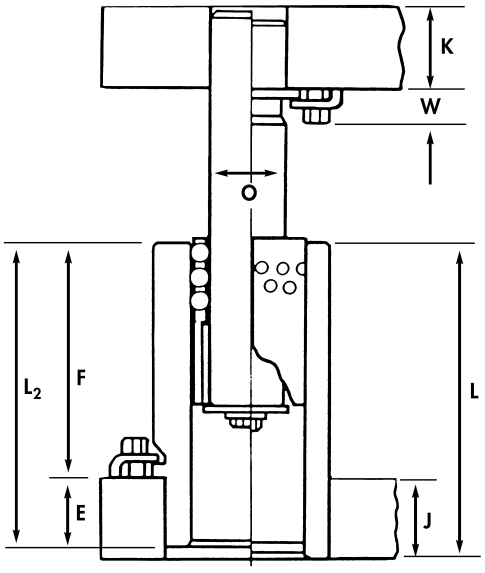
Preload Relieved



Type III

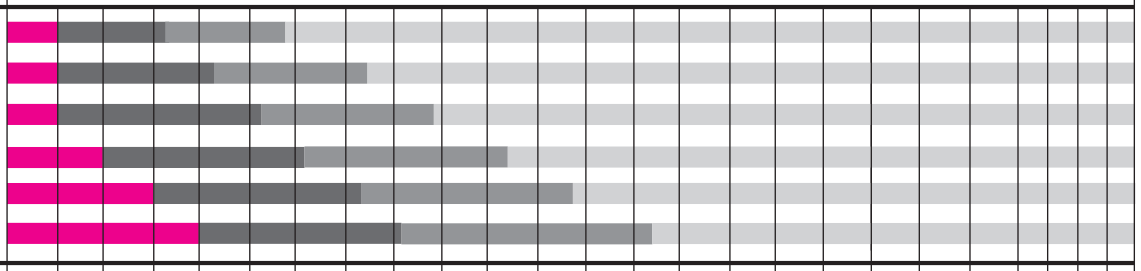
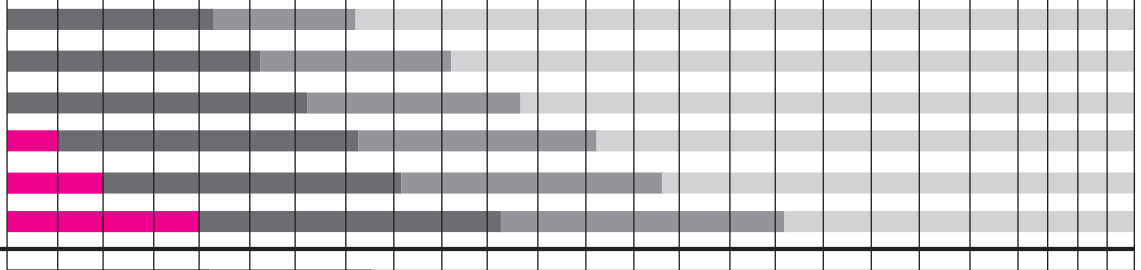
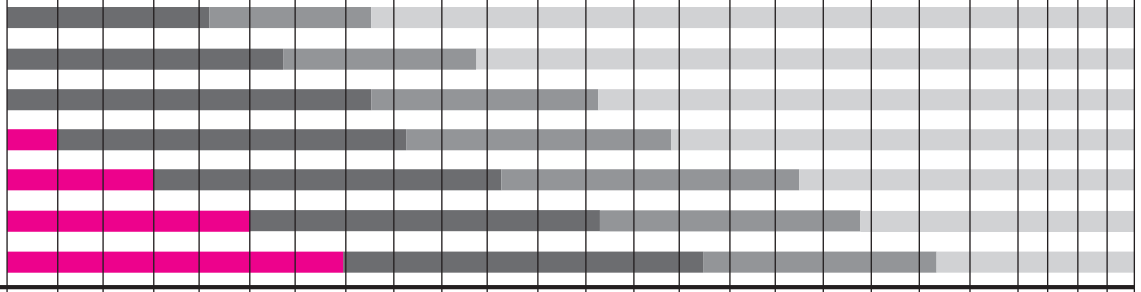
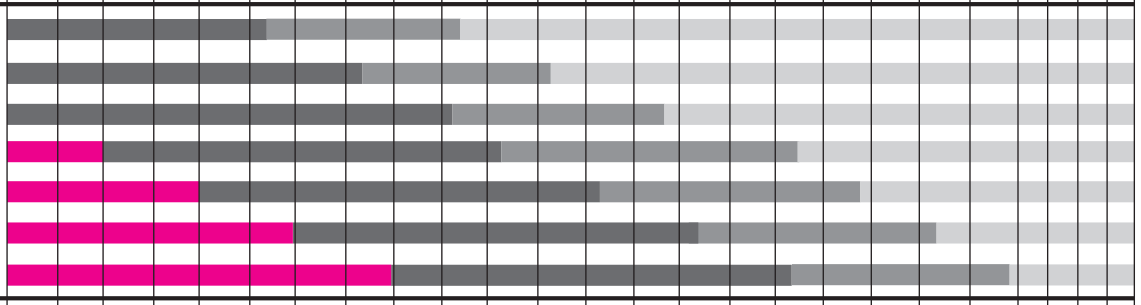
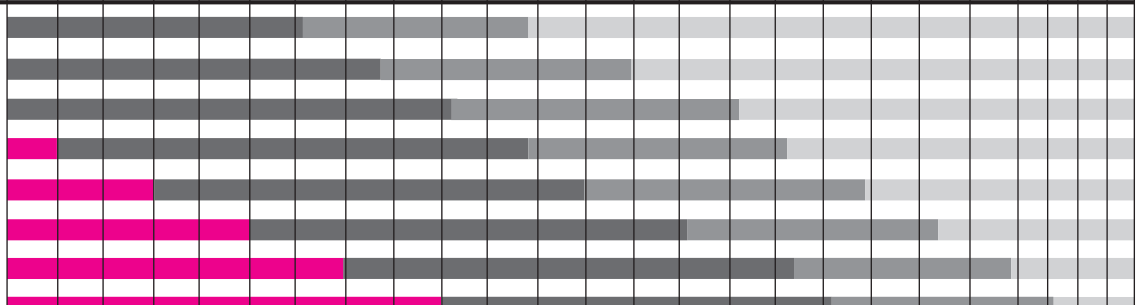
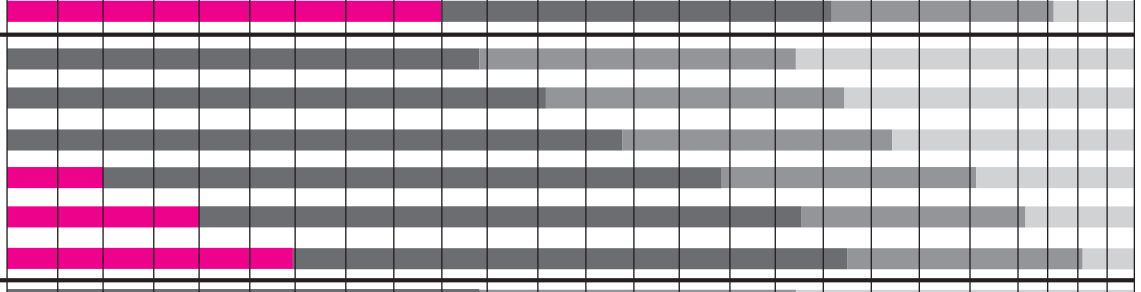
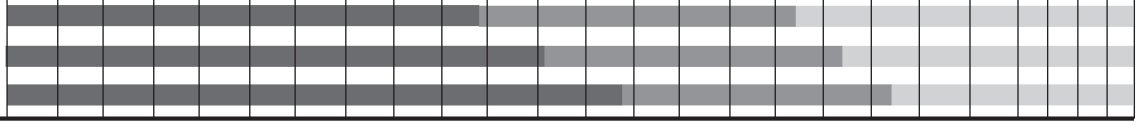
Disengaged





Nominal Pin Diameter O	Straight Sleeve L	Demountable Shoulder L 2
1″	2 1/2	2 7/16
	3	2 15/16
	3 1/2	3 7/16
	4	
	4 1/2	
	5	
1 1/4″	3	2 15/16
	3 1/2	3 7/16
	4	3 15/16
	4 1/2	
	5	
	6	
1 1/2″	3	2 15/16
	3 3/4	3 11/16
	4 1/2	4 7/16
	5	4 15/16
	6	
	7	
	8	
1 3/4″	3 1/2	3 7/16
	4 1/4	4 3/16
	5	4 15/16
	6	
	7	
	8	
	9	
2″	4	3 15/16
	4 3/4	4 11/16
	5 1/2	5 7/16
	6 1/4	6 3/16
	7	
	8	
	9	
	10	
2 1/2″	6	5 15/16
	6 3/4	6 11/16
	7 1/2	7 7/16
	8 1/2	
	9 1/2	
	10 1/2	
3″	-	5 15/16
	-	6 11/16
	-	7 7/16

Caution: Be sure bushing does not strike punch holder or demountable pin clamping screw at minimum shut height. If this condition exists, use a shorter bushing and corresponding ball cage.

Ball Cage C	Clamp Screw W	Stroke "S" at minimum shut height (die life depleted)
2	5/8	
2 1/2		
3		
3 1/4		
3 1/2		
3 3/4		
2 3/4	3/4	
3 1/4		
3 3/4		
4		
4 1/4		
4 3/4		
2 3/4	3/4	
3 1/2		
4 1/4		
4 1/2		
5		
5 1/2		
6		
3 1/4	3/4	
4		
4 3/4		
5 1/4		
5 3/4		
6 1/4		
6 3/4		
3 3/4	3/4	
4 1/2		
5 1/4		
5 5/8		
6		
6 1/2		
7		
7 1/2		
5 3/4	3/4	
6 1/2		
7 1/4		
7 3/4		
8 1/4		
8 3/4		
5 3/4	3/4	
6 1/2		
7 1/4		

Metric Index

READY Metric Plain Bearing and Ball Bearing Components

The following 11 pages represent our extensive line of metric guide components, which have been used by European toolmakers and stamping plants for over 30 years.

Our design is elegantly simple. All of our guide pillars, press fit and demountable, fit an R6 bored hole. All our bushings, ball bearing and plain bearing, straight and demountable, fit an H6 bored hole:

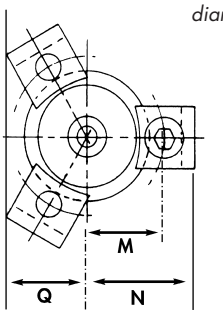
As with our line of inch components, each Ready metric pillar can be used either as a plain bearing or ball bearing pin. Every pin and bushing is color coded for Selective Fit™, providing you with the correct running clearance for your application.

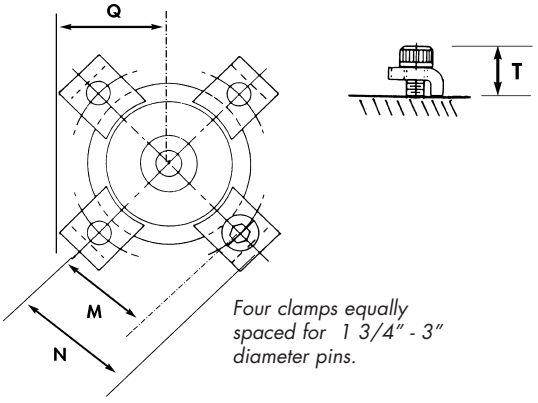
Metric Hole Boring Chart

Pin Diameter O	Pin R6 Bore	Standard Bushing H6 Bore	Ball Bushing H6 Bore
19	18.976 18.963	28.016 28.000	-
25	24.976 24.963	38.016 38.000	45.016 45.000
32	31.971 31.955	45.016 45.000	54.019 54.000
40	39.971 39.955	54.019 54.000	65.019 65.000
50	49.971 49.955	65.019 65.000	81.022 81.000
63	62.965 62.946	81.022 81.000	95.022 95.000
80	79.963 79.944	100.022 100.000	112.022 112.000

Metric Clamp Data

Three clamps equally spaced for 19 mm through 40 mm diameter pins.



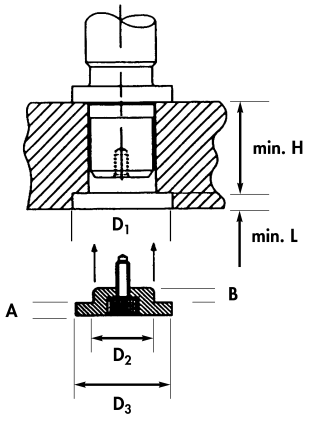


Four clamps equally spaced for 1 3/4" - 3" diameter pins.

Diameter	DEMOUNTABLE PIN						
	Radius			Qty per Pillar	Clamp	Socket Head Cap Screws	
O	M	N	Q			S	T
19	16	23.5	19	3	6-90-1	M 6 x 18	15
25	20.3	27.8	20.8				
32	25.5	35.5	24.6	3	6-93-1	M 8 x 22	19.4
40	30	40	26.9				
50	36.5	46.5	38.5	4	6-93-1	M 8 x 22	19.4
63	42.5	52.5	42.7				
80	51	61	48.8				

Metric Clamp Data (cont.)

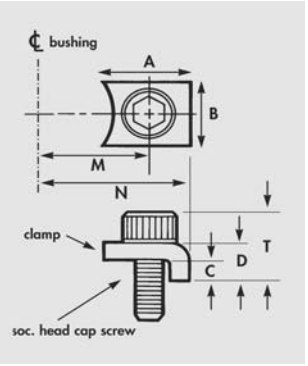
Pin Diameter	Pillar Retaining Plug								
		min.	min.					Catalog	
O	D1	L	H	A	B	D2	D3	Number	Screw
19	26	3.5	26	3.3	4.2	18	25	6-18-3	M 5 x 16
25	33	5.5	30	5	4.2	24	32	6-24-3	M 6 x 20
32	41	5.5	39	5	7	30	40	6-30-3	M 8 x 25
40	51	5.5	49	5	10	40	50	6-40-3	M 10 x 30
50	64	5.5	60	5	13	50	63	6-50-3	M 12 x 40
63	77	5.5	70	5	19	63	76	6-63-3	M 16 x 40
80	94	5.5	87	5	25	80	93	6-80-3	M 20 x 50



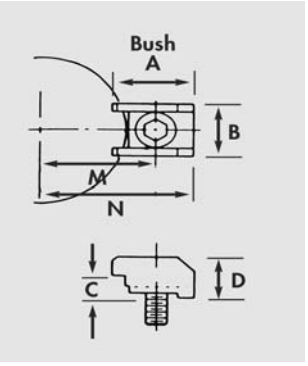
Extra Long, Long and Short Shoulder Bushings

Pillar Dia.	Clamps per Bush	Screw	Clamp number	A mm	B mm	C mm	D mm	M mm	N mm
19	2	M6	6-95-1	12.3	12.7	3.2	5.6	19.5	25.5
25	3	M6	6-90-1	14.3	15.9	4.9	8.7	27.5	35
32	3	M8	6-93-1	19.8	15.9	6.5	11.4	32.5	42.5
40	3	M8	6-93-1	19.8	15.9	6.5	11.4	37	47
50	4	M8	6-93-1	19.8	15.9	6.5	11.4	44.5	54.5
63	4	M8	6-93-1	19.8	15.9	6.5	11.4	52	62
80	4	M8	6-93-1	19.8	15.9	6.5	11.4	62	72

Clamp Numbers: 6-90-1, 6-93-1, 6-95-1



Clamp Numbers: 6-96-1, 6-97-1



Low Profile Bushings

Pillar Dia.	Clamps per Bush	Screw	Clamp number	A mm	B mm	C mm	D mm	M mm	N mm
19	2	M6	6-95-1	12.3	12.7	3.2	5.6	19.5	25.5
25	3	M6	6-96-1	17.5	14.5	5	10	30	37
32	3	M6	6-96-1	17.5	14.5	5	10	34	41
40	3	M8	6-97-1	24.6	18.9	7.9	13	39.5	50.5
50	4	M8	6-97-1	24.6	18.9	7.9	13	46	57
63	4	M8	6-97-1	24.6	18.9	7.9	13	56	67.5
80	4	M8	6-97-1	24.6	18.9	7.9	13	66	77

Ball Bearing Stripper Plate Bushings

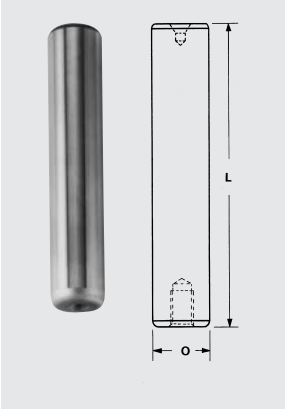
Pillar Dia.	Clamps per Bush	Screw	Clamp number	A mm	B mm	C mm	D mm	M mm	N mm
25	3	M6	6-96-1	17.5	14.5	5	10	32.5	39.5
32	3	M6	6-96-1	17.5	14.5	5	10	37	44
40	4	M6	6-96-1	17.5	14.5	5	10	44.5	51.5
50	4	M6	6-96-1	17.5	14.5	5	10	52.5	59.5

DEMOUNTABLE BALL BEARING BUSHINGS

Nominal Diameter	Radius		Size				Clamp No.	Per Unit	Screw size	T
	M	N	A	B	C	D				
25	32.5	43	19.8	15.9	6.5	11.4	6-93-1	3	M8 X 20	19.4
32	37	47								
40	43.5	54						4		
50	52.5	63								
63	59.5	70								

Precision Pin Selection Guide

Nominal Pin Diameter O	Length L	Catalog Number
19	100	5-1910-82
	110	5-1911-82
	120	5-1912-82
	130	5-1913-82
	140	5-1914-82
	150	5-1915-82
	160	5-1916-82
	170	5-1917-82
	180	5-1918-82
	190	5-1919-82
	200	5-2120-82
25	100	5-2510-82
	110	5-2511-82
	120	5-2512-82
	130	5-2513-82
	140	5-2514-82
	150	5-2515-82
	160	5-2516-82
	170	5-2517-82
	180	5-2518-82
	190	5-2519-82
	200	5-2520-82
	220	5-2522-82
	240	5-2524-82
	260	5-2526-82
	280	5-2528-82
32	130	5-3213-82
	140	5-3214-82
	150	5-3215-82
	160	5-3216-82
	170	5-3217-82
	180	5-3218-82
	190	5-3219-82
	200	5-3220-82
	220	5-3222-82
	240	5-3224-82
	260	5-3226-82
	280	5-3228-82
	320	5-3232-82



Nominal Pin Diameter O	Length L	Catalog Number
40	130	5-4013-82
	140	5-4014-82
	150	5-4015-82
	160	5-4016-82
	170	5-4017-82
	180	5-4018-82
	190	5-4019-82
	200	5-4020-82
	220	5-4022-82
	240	5-4024-82
	260	5-4026-82
	280	5-4028-82
	320	5-4032-82
	360	5-4036-82
50	160	5-5016-82
	180	5-5018-82
	200	5-5020-82
	220	5-5022-82
	240	5-5024-82
	260	5-5026-82
	280	5-5028-82
	320	5-5032-82
	330	5-5033-82
	360	5-5036-82
	400	5-5040-82
	450	5-5045-82
63	200	5-6320-82
	220	5-6322-82
	240	5-6324-82
	260	5-6326-82
	280	5-6328-82
	320	5-6332-82
	360	5-6336-82
	400	5-6340-82
	450	5-6345-82
	500	5-6350-82
80	240	5-8024-82
	260	5-8026-82
	280	5-8028-82
	320	5-8032-82
	360	5-8036-82
	400	5-8040-82
	450	5-8045-82
	500	5-8050-82

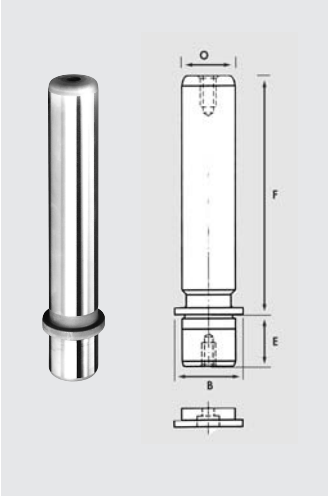
Guide Pin Tap Sizes		*Recommended Seating Torque*
Nominal Pin Diameter O	Tap Size	Kg-M
25 - 32	M6	0.90
40 - 80	M10	4.40

Demountable Pin Selection Guide

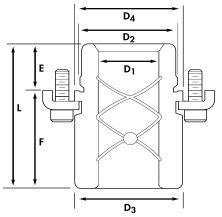
O	B	E	Length F	Catalog Number
19	25.6	20	70	5-1907-83
			80	5-1908-83
			90	5-1909-83
			100	5-1910-83
			110	5-1911-83
			120	5-1912-83
			130	5-1913-83
			140	5-1914-83
			150	5-1915-83
			160	5-1916-83
25	32.6	24	70	5-2507-83
			80	5-2508-83
			90	5-2509-83
			100	5-2510-83
			110	5-2511-83
			120	5-2512-83
			130	5-2513-83
			140	5-2514-83
			150	5-2515-83
			160	5-2516-83
			170	5-2517-83
			180	5-2518-83
			200	5-2520-83
32	40.6	30	90	5-3209-83
			100	5-3210-83
			110	5-3211-83
			120	5-3212-83
			130	5-3213-83
			140	5-3214-83
			150	5-3215-83
			160	5-3216-83
			170	5-3217-83
			180	5-3218-83
			200	5-3220-83
			220	5-3222-83
			240	5-3224-83
			280	5-3228-83
40	50.8	37	100	5-4010-83
			110	5-4011-83
			120	5-4012-83
			130	5-4013-83
			140	5-4014-83
			150	5-4015-83
			160	5-4016-83
			170	5-4017-83
			180	5-4018-83
			200	5-4020-83
			220	5-4022-83
			240	5-4024-83
			280	5-4028-83

Demountable Pin Selection Guide Continued

O	B	E	Length F	Catalog Number
50	63.8	45	110	5-5011-83
			120	5-5012-83
			130	5-5013-83
			140	5-5014-83
			150	5-5015-83
			160	5-5016-83
			170	5-5017-83
			180	5-5018-83
			200	5-5020-83
			220	5-5022-83
			240	5-5024-83
			260	5-5026-83
			280	5-5028-83
			320	5-5032-83
			360	5-5036-83
			400	5-5040-83
63	76	49	120	5-6312-83
			140	5-6314-83
			160	5-6316-83
			180	5-6318-83
			200	5-6320-83
			220	5-6322-83
			240	5-6324-83
			280	5-6328-83
			320	5-6332-83
			360	5-6336-83
			400	5-6340-83
80	93	60	180	5-8018-83
			200	5-8020-83
			220	5-8022-83
			240	5-8024-83
			280	5-8028-83
			320	5-8032-83
			360	5-8036-83
			400	5-8040-83



Demountable Steel Bushings and Sintered Bronze Bushings



Low Profile Bushings

D_1 mm	D_2 mm	D_3 mm	D_4 mm	E mm	F mm	L mm	X mm	Steel Catalog Number	Sintered Bronze Catalog Number
19	28	28	32.5	18	10	28	6	6-1928-68	6-1928-48
25	38	36	47	23	10	33	6	6-2538-68	6-2538-48
32	45	43	54	30	10	40	10	6-3245-68	6-3245-48
40	54	48	63	38	14	52	10	6-4054-68	6-4054-48
50	65	64	75	48	14	62	20	6-5065-68	6-5065-48
63	81	79	93	61	14	75	20	6-6381-68	6-6381-48
80	100	99	115	78	14	92	32	6-8010-68	6-8010-48

Short Shoulder Bushings

D_1 mm	D_2 mm	D_3 mm	D_4 mm	E mm	F mm	L mm	Steel Catalog Number	Sintered Bronze Catalog Number
19	28	28.5	32.5	18	16	34	6-1928-63	6-1928-43
25	38	44	47	23	21	44	6-2538-63	6-2538-43
32	45	51	54	25	21	46	6-3245-63	6-3245-43
40	54	60	63	30	21	51	6-4054-63	6-4054-43
50	65	73	75	35	25	60	6-5065-63	6-5065-43
63	81	90	93	48	27	75	6-6381-63	6-6381-43
80	100	110	115	48	27	75	6-8010-63	6-8010-43

Standard Shoulder Bushings

D_1 mm	D_2 mm	D_3 mm	D_4 mm	E mm	F mm	L mm	Steel Catalog Number	Sintered Bronze Catalog Number
19	28	28.5	32.5	18	32	50	6-1928-64	6-1928-44
25	38	44	47	23	47	70	6-2538-64	6-2538-44
32	45	51	54	25	50	75	6-3245-64	6-3245-44
40	54	60	63	30	50	80	6-4054-64	6-4054-44
50	65	73	75	35	50	85	6-5065-64	6-5065-44
63	81	90	93	48	52	100	6-6381-64	6-6381-44
80	100	110	115	48	52	100	6-8010-64	6-8010-44

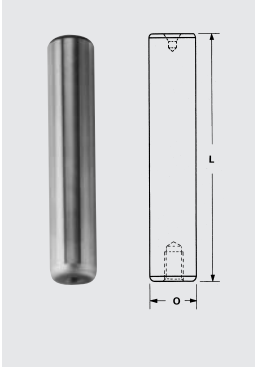
Extra Long Shoulder Bushings

D_1 mm	D_2 mm	D_3 mm	D_4 mm	E mm	F mm	L mm	Steel Catalog Number	Sintered Bronze Catalog Number
25	38	44	47	23	75	98	6-2538-65	6-2538-45
32	45	51	54	25	75	100	6-3245-65	6-3245-45
40	54	60	63	30	85	115	6-4054-65	6-4054-45
50	65	73	75	35	100	135	6-5065-65	6-5065-45
63	81	90	93	48	100	148	6-6381-65	6-6381-45

Please Note: The Demountable Clamp Data is located on page 29.

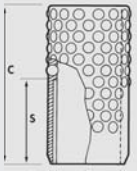
Precision Pin Selection Guide

Nominal Pin Diameter O	Length L	Catalog Number
19	100	5-1910-82
	110	5-1911-82
	120	5-1912-82
	130	5-1913-82
	140	5-1914-82
	150	5-1915-82
	160	5-1916-82
	170	5-1917-82
	180	5-1918-82
	190	5-1919-82
	200	5-2120-82
25	100	5-2510-82
	110	5-2511-82
	120	5-2512-82
	130	5-2513-82
	140	5-2514-82
	150	5-2515-82
	160	5-2516-82
	170	5-2517-82
	180	5-2518-82
	190	5-2519-82
	200	5-2520-82
	220	5-2522-82
	240	5-2524-82
	260	5-2526-82
	280	5-2528-82
32	130	5-3213-82
	140	5-3214-82
	150	5-3215-82
	160	5-3216-82
	170	5-3217-82
	180	5-3218-82
	190	5-3219-82
	200	5-3220-82
	220	5-3222-82
	240	5-3224-82
	260	5-3226-82
	280	5-3228-82
	320	5-3232-82
40	130	5-4013-82
	140	5-4014-82
	150	5-4015-82
	160	5-4016-82
	170	5-4017-82
	180	5-4018-82
	190	5-4019-82
	200	5-4020-82
	220	5-4022-82
	240	5-4024-82
	260	5-4026-82
	280	5-4028-82
	320	5-4032-82
	360	5-4036-82
50	160	5-5016-82
	180	5-5018-82
	200	5-5020-82
	220	5-5022-82
	240	5-5024-82
	260	5-5026-82
	280	5-5028-82
	320	5-5032-82
	330	5-5033-82
	360	5-5036-82
	400	5-5040-82
	450	5-5045-82
63	200	5-6320-82
	220	5-6322-82
	240	5-6324-82
	260	5-6326-82
	280	5-6328-82
	320	5-6332-82
	360	5-6336-82
	400	5-6340-82
	450	5-6345-82
	500	5-6350-82
80	240	5-8024-82
	260	5-8026-82
	280	5-8028-82
	320	5-8032-82
	360	5-8036-82
	400	5-8040-82
	450	5-8045-82
	500	5-8050-82



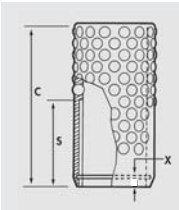
Ball Bearing Cage Selection Guide

Nominal Pillar Diameter D mm	Type I C mm	Type I S mm	Catalog Number
25	36	11.5	6-2503-81
	48	17.5	6-2504-81
32	36	11.5	6-3203-81
	48	17.5	6-3204-81
40	48	17.5	6-4004-81
	50	23.5	6-4006-81
50	70	28.5	6-5007-81
	84	35.5	6-5008-81
63	98	42.5	6-6309-81
80	98	42.5	6-8009-81

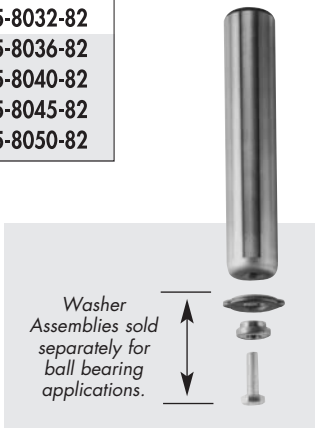


Type I

Nominal Pillar Diameter D mm	Type II C mm	Type II S mm	Type II X mm	Catalog Number
25	55	31	4.2	6-2505-82
	70	40		6-2507-82
	90	47		6-2509-82
	100	55		6-2510-82
	110	65		6-2511-82
32	70	40	4.2	6-3207-82
	90	47		6-3209-82
	105	55		6-3210-82
	115	65		6-3211-82
	125	75		6-3212-82
	135	85		6-3213-82
40	70	40	5.8	6-4007-82
	85	48		6-4008-82
	105	55		6-4010-82
	115	65		6-4011-82
	125	75		6-4012-82
	135	85		6-4013-82
	145	98		6-4014-82
	155	107		6-4015-82
50	105	58	7.0	6-5010-82
	120	65		6-5012-82
	140	75		6-5014-82
	150	85		6-5015-82
	160	95		6-5016-82
	170	108		6-5017-82
	185	121		6-5018-82
	195	133		6-5019-82
63	145	76	7.0	6-6314-82
	165	86		6-6316-82
	180	96		6-6318-82
	190	107		6-6319-82
	205	121		6-6320-82
	215	132		6-6321-82
80	145	76	8.5	6-8014-82
	165	86		6-8016-82
	180	96		6-8018-82
	190	107		6-8019-82
	205	121		6-8020-82
	215	132		6-8021-82



Type II

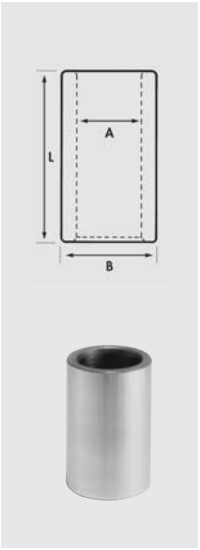


Washer Assemblies sold separately for ball bearing applications.

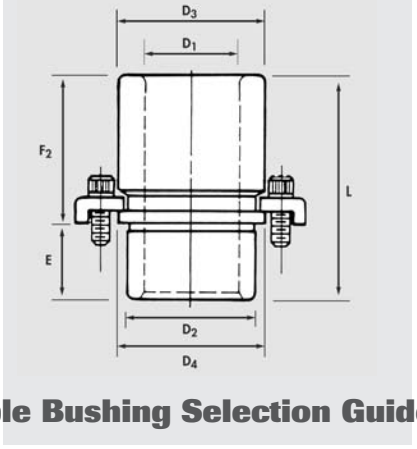
Washer Assemblies

Pin Diameter mm	Ball Cage Type I	Ball Cage Type II	Screw Size
25	6-2500-81	6-2500-82	M6
32	6-3200-81	6-3200-82	M6
40	6-4000-81	6-4000-82	M10
50	6-5000-81	6-5000-82	M10
63	6-6300-81	6-6300-82	M10
80	6-8000-81	6-8000-82	M10

Straight Sleeve Bushing Selection Guide



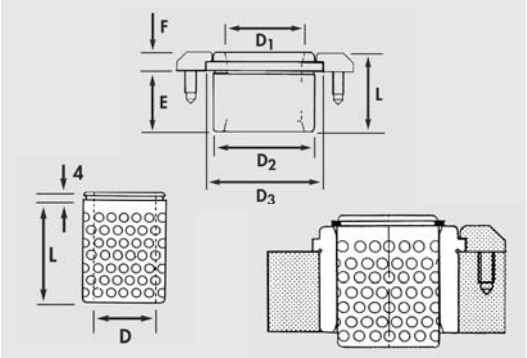
Nominal Pillar Diameter mm	I. D. A mm	O. D. B mm	Length L mm	Catalog Number
25	33	45	65	6-2506-86
			80	6-2508-86
			95	6-2509-86
			110	6-2511-86
			130	6-2513-86
32	40	54	80	6-3208-86
			95	6-3209-86
			110	6-3211-86
			130	6-3213-86
			150	6-3215-86
			170	6-3217-86
40	48	65	80	6-4008-86
			95	6-4009-86
			110	6-4011-86
			130	6-4013-86
			150	6-4015-86
			170	6-4017-86
			190	6-4019-86
			215	6-4021-86
50	62	81	110	6-5011-86
			130	6-5013-86
			150	6-5015-86
			170	6-5017-86
			190	6-5019-86
			215	6-5021-86
			240	6-5024-86
			265	6-5026-86
63	75	95	150	6-6315-86
			170	6-6317-86
			190	6-6319-86
			215	6-6321-86
			240	6-6324-86
			265	6-6326-86
80	92	112	150	6-8015-86
			170	6-8017-86
			190	6-8019-86
			215	6-8021-86
			240	6-8024-86
			265	6-8026-86



Demountable Bushing Selection Guide

Nominal Post Diameter D	D_1 mm	D_2 mm	D_3 mm	D_4 mm	E mm	F_2 mm	L mm	Catalog Number
25	33	45	50	54	30	35	65	6-2503-85
						50	80	6-2505-85
						65	95	6-2506-85
32	40	54	59	63	30	50	80	6-3205-85
						65	95	6-3206-85
						80	110	6-3208-85
40	48	65	73	75	30	50	80	6-4005-85
						65	95	6-4006-85
						80	110	6-4008-85
						100	130	6-4010-85
50	62	81	91	91	50	60	110	6-5006-85
						80	130	6-5008-85
						100	150	6-5010-85
						120	170	6-5012-85
63	75	95	105	105	50	100	150	6-6310-85
						120	170	6-6312-85
						140	190	6-6314-85

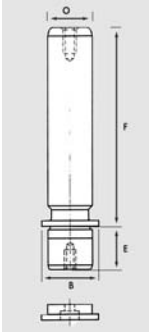
Stripper Plate Bushing and Cage Selection Guide



D mm	D_1 mm	D_2 mm	D_3 mm	E mm	F mm	L mm	Bushing Catalog Number	L mm	Cage Catalog Number
25	33	45	51	20	10	30	6-2520-87	40	6-2504-83
				25		35	6-2525-87	52	6-2505-83
32	40	54	60	20	10	30	6-3220-87	40	6-3204-83
				25		35	6-3225-87	52	6-3205-83
				32		42	6-3232-87		
40	48	65	75	29	10	39	6-4029-87	52	6-4005-83
				36		46	6-4036-87	64	6-4006-83
				44		54	6-4044-87		
50	62	81	91	36	10	46	6-5036-87	74	6-5007-83
				44		54	6-5044-87	88	6-5008-83
63	75	95	105	50	10	60	6-6350-87	98	6-6309-83

Demountable Pin Selection Guide

O	B	E	Length F	Catalog Number
19	25.6	20	70	5-1907-83
			80	5-1908-83
			90	5-1909-83
			100	5-1910-83
			110	5-1911-83
			120	5-1912-83
			130	5-1913-83
			140	5-1914-83
			150	5-1915-83
			160	5-1916-83
25	32.6	24	70	5-2507-83
			80	5-2508-83
			90	5-2509-83
			100	5-2510-83
			110	5-2511-83
			120	5-2512-83
			130	5-2513-83
			140	5-2514-83
			150	5-2515-83
			160	5-2516-83
			170	5-2517-83
			180	5-2518-83
			200	5-2520-83
32	40.6	30	90	5-3209-83
			100	5-3210-83
			110	5-3211-83
			120	5-3212-83
			130	5-3213-83
			140	5-3214-83
			150	5-3215-83
			160	5-3216-83
			170	5-3217-83
			180	5-3218-83
			200	5-3220-83
			220	5-3222-83
			240	5-3224-83
			280	5-3228-83
40	50.8	37	100	5-4010-83
			110	5-4011-83
			120	5-4012-83
			130	5-4013-83
			140	5-4014-83
			150	5-4015-83
			160	5-4016-83
			170	5-4017-83
			180	5-4018-83
			200	5-4020-83
			220	5-4022-83
			240	5-4024-83
			280	5-4028-83
50	63.8	45	110	5-5011-83
			120	5-5012-83
			130	5-5013-83
			140	5-5014-83
			150	5-5015-83
			160	5-5016-83
			170	5-5017-83
			180	5-5018-83
			200	5-5020-83
			220	5-5022-83
			240	5-5024-83
			260	5-5026-83
			280	5-5028-83
			320	5-5032-83
			360	5-5036-83
			400	5-5040-83
63	76	49	120	5-6312-83
			140	5-6314-83
			160	5-6316-83
			180	5-6318-83
			200	5-6320-83
			220	5-6322-83
			240	5-6324-83
			280	5-6328-83
			320	5-6332-83
			360	5-6336-83
			400	5-6340-83
80	93	60	180	5-8018-83
			200	5-8020-83
			220	5-8022-83
			240	5-8024-83
			280	5-8028-83
			320	5-8032-83
			360	5-8036-83
			400	5-8040-83

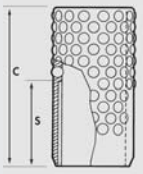


Washer Assemblies sold separately for ball bearing applications.

Washer Assemblies

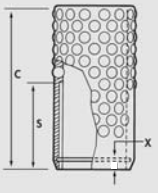
Pin Diameter mm	Ball Cage		Screw Size
	Type I	Type II	
25	6-2500-81	6-2500-82	M6
32	6-3200-81	6-3200-82	M6
40	6-4000-81	6-4000-82	M10
50	6-5000-81	6-5000-82	M10
63	6-6300-81	6-6300-82	M10
80	6-8000-81	6-8000-82	M10

Ball Bearing Cage Selection Guide



Type I

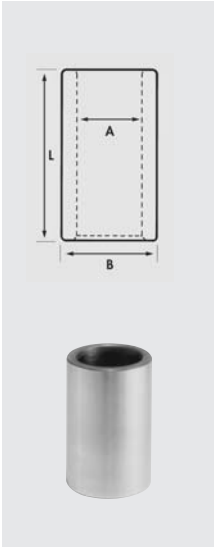
Nominal Pillar Diameter D mm	Type I		Catalog Number
	C mm	S mm	
25	36	11.5	6-2503-81
	48	17.5	6-2504-81
32	36	11.5	6-3203-81
	48	17.5	6-3204-81
40	48	17.5	6-4004-81
	50	23.5	6-4006-81
50	70	28.5	6-5007-81
	84	35.5	6-5008-81
63	98	42.5	6-6309-81
80	98	42.5	6-8009-81



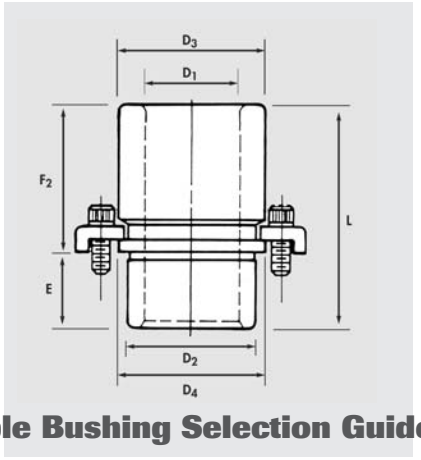
Type II

Nominal Pillar Diameter D mm	C mm	Type II		Catalog Number
		S mm	X mm	
25	55	31	4.2	6-2505-82
	70	40		6-2507-82
	90	47		6-2509-82
	100	55		6-2510-82
	110	65		6-2511-82
32	70	40	4.2	6-3207-82
	90	47		6-3209-82
	105	55		6-3210-82
	115	65		6-3211-82
	125	75		6-3212-82
	135	85		6-3213-82
40	70	40	5.8	6-4007-82
	85	48		6-4008-82
	105	55		6-4010-82
	115	65		6-4011-82
	125	75		6-4012-82
	135	85		6-4013-82
	145	98		6-4014-82
	155	107		6-4015-82
50	105	58	7.0	6-5010-82
	120	65		6-5012-82
	140	75		6-5014-82
	150	85		6-5015-82
	160	95		6-5016-82
	170	108		6-5017-82
	185	121		6-5018-82
	195	133		6-5019-82
63	145	76	7.0	6-6314-82
	165	86		6-6316-82
	180	96		6-6318-82
	190	107		6-6319-82
	205	121		6-6320-82
	215	132		6-6321-82
80	145	76	8.5	6-8014-82
	165	86		6-8016-82
	180	96		6-8018-82
	190	107		6-8019-82
	205	121		6-8020-82
	215	132		6-8021-82

Straight Sleeve Bushing Selection Guide



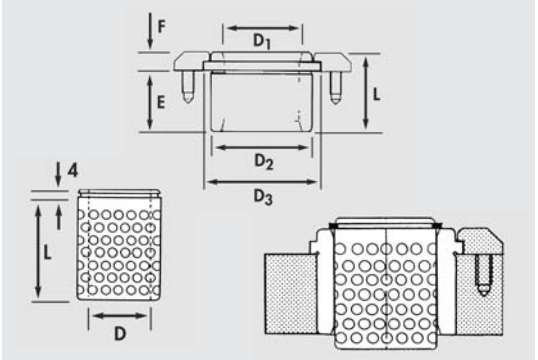
Nominal Pillar Diameter mm	I. D. A mm	O. D. B mm	Length L mm	Catalog Number
25	33	45	65	6-2506-86
			80	6-2508-86
			95	6-2509-86
			110	6-2511-86
			130	6-2513-86
32	40	54	80	6-3208-86
			95	6-3209-86
			110	6-3211-86
			130	6-3213-86
			150	6-3215-86
			170	6-3217-86
40	48	65	80	6-4008-86
			95	6-4009-86
			110	6-4011-86
			130	6-4013-86
			150	6-4015-86
			170	6-4017-86
			190	6-4019-86
			215	6-4021-86
50	62	81	110	6-5011-86
			130	6-5013-86
			150	6-5015-86
			170	6-5017-86
			190	6-5019-86
			215	6-5021-86
			240	6-5024-86
			265	6-5026-86
63	75	95	150	6-6315-86
			170	6-6317-86
			190	6-6319-86
			215	6-6321-86
			240	6-6324-86
			265	6-6326-86
80	92	112	150	6-8015-86
			170	6-8017-86
			190	6-8019-86
			215	6-8021-86
			240	6-8024-86
			265	6-8026-86



Demountable Bushing Selection Guide

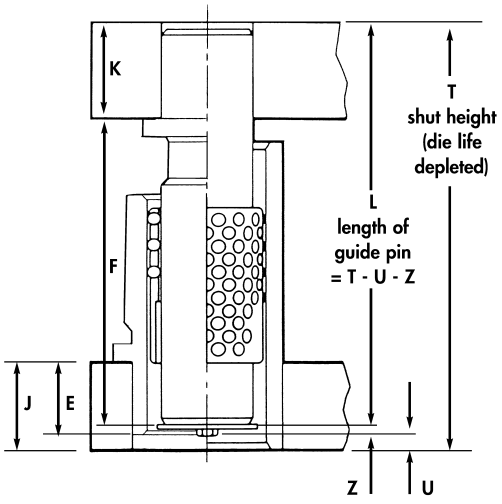
Nominal Post Diameter D	D_1 mm	D_2 mm	D_3 mm	D_4 mm	E mm	F_2 mm	L mm	Catalog Number
25	33	45	50	54	30	35	65	6-2503-85
						50	80	6-2505-85
						65	95	6-2506-85
32	40	54	59	63	30	50	80	6-3205-85
						65	95	6-3206-85
						80	110	6-3208-85
40	48	65	73	75	30	50	80	6-4005-85
						65	95	6-4006-85
						80	110	6-4008-85
						100	130	6-4010-85
50	62	81	91	91	50	60	110	6-5006-85
						80	130	6-5008-85
						100	150	6-5010-85
						120	170	6-5012-85
63	75	95	105	105	50	100	150	6-6310-85
						120	170	6-6312-85
						140	190	6-6314-85

Stripper Plate Bushing and Cage Selection Guide



D mm	D_1 mm	D_2 mm	D_3 mm	E mm	F mm	L mm	Bushing Catalog Number	L mm	Cage Catalog Number
25	33	45	51	20	10	30	6-2520-87	40	6-2504-83
				25		35	6-2525-87	52	6-2505-83
32	40	54	60	20	10	30	6-3220-87	40	6-3204-83
				25		35	6-3225-87	52	6-3205-83
				32		42	6-3232-87		
40	48	65	75	29	10	39	6-4029-87	52	6-4005-83
				36		46	6-4036-87	64	6-4006-83
				44		54	6-4044-87		
50	62	81	91	36	10	46	6-5036-87	74	6-5007-83
				44		54	6-5044-87	88	6-5008-83
63	75	95	105	50	10	60	6-6350-87	98	6-6309-83

Selecting Components



Guide Pins

1. Calculate **L** using one of the following formulas:

   L = T - (U + Z) for assembly with sleeve bushings

   L = T - (U + Z) - J + E for demountable bushings

2. For straight pins, select a length equal to **L**. If **L** is not a standard length, choose a longer pin and cut to L, or choose a shorter length and recess the pin in the punch holder to **L**, making sure that the minimum press fit length is at least equal to the pin diameter.

3. For demountable pins, select a length so that **K + F** is as close as possible to **L** without exceeding it.

Guide Pin Length Selection

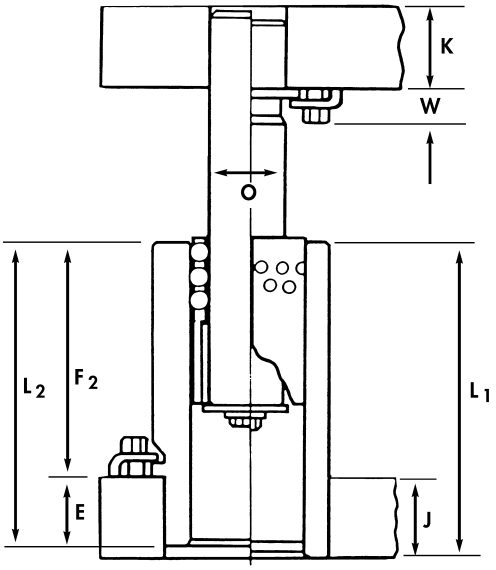
Nominal Guide Pin Diameter O	Type I Cages		Type II Cages		
	U	Z	U	Z	E
25	3	7	3.5	10.5	30
32	3	7	3.5	10.5	30
40	3	9.5	4	13	30
50	3	9.5	4	13	50
63	3	9.5	4	13	50
80	3	9.5	4	13	--

Bushings

1. If the tool's working stroke is short and there are no off-center loads, choose the shortest bushing. Find the stroke in the selection chart and read down that column until it intersects the color bar. The bushing you need is listed on that line.

2. If rigidity and resistance to side load are required, choose the longest bushing. Check that the top of the bushing will not hit the underside of the punch holder (or clamping screw in the case of demountable pins) at minimum shut height.

CAUTION: Make sure the top of the bushing does not strike the punch holder or the demountable pin clamp screw, either when the die is new or die life is depleted. If it does, select the next shorter bushing.



Cages

1. For Type I cages, choose the length whose color code in the adjacent selection chart matches that of the bushing you have selected.

2. For Type II cages, the selection chart on page 39 automatically gives you the correct cage. It is listed on the same line as the bushing you have selected.

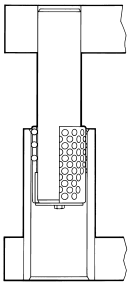
Type I Cages

Nominal Pin Diameter	Demountable Bushing			Straight Sleeve	Ball Cage	Stroke "S" at maximum shut height (new dies)	Die Life
O	F_2	E	L_2	L_1	C	20 40 60 80 100 120 140 160	X
25	35	30	65	65	36	If your selection falls in a white Square, use Type II or Type III.	10
	50	30	80	80			
	65	30	95	95			
				110			
				130	48		
32	50	30	80	80	36		10
	65	30	95	95			
	80	30	110	110			
				130			
				150			
				170	48		
40	50	30	80	80	48		10
	65	30	95	95			
	80	30	110	110			
	100	30	130	130			
				150			
				170			
				190			
				215	60		
50	60	50	110	110	70		10
	80	50	130	130			
	100	50	150	150			
	120	50	170	170			
				190			
				215			
				240	84		
				265			
63	100	50	150	150	98		15
	120	50	170	170			
	140	50	190	190			
				215			
				240			
				265			
80				150	98		15
				170			
				190			
				215			
				240			
				265			

Selecting Type II Components

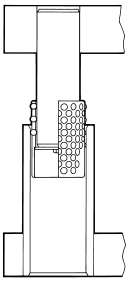
Type I

Continuous Preload



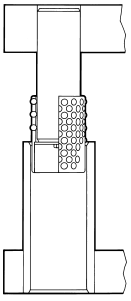
Type IIa

Preload Partially Relieved



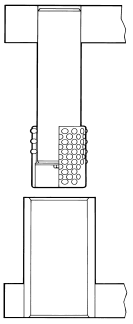
Type IIb

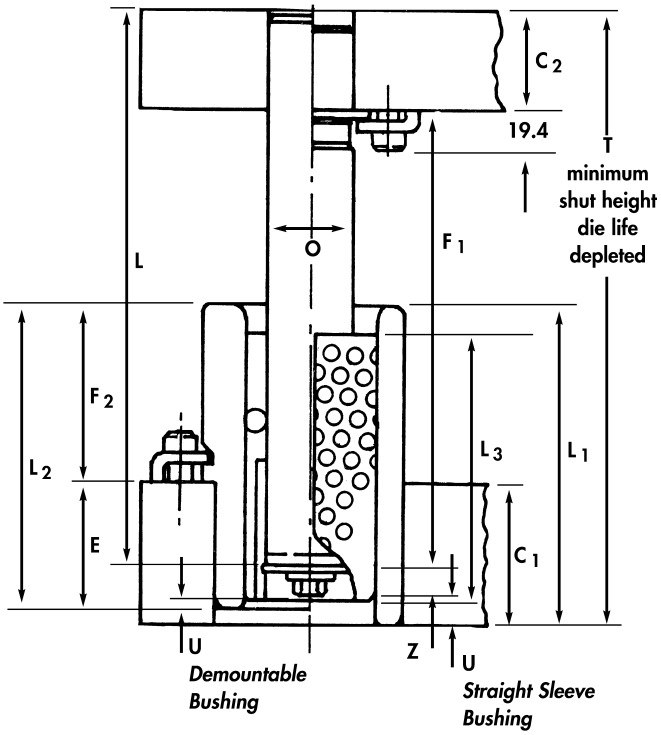
Preload Relieved



Type III

Disengaged





Caution: Be sure bushing does not strike punch holder (or in the case of demountable pins, the clamps retaining the pins) at minimum shut height. If this condition exists, use a shorter bushing and corresponding ball cage.

Type II Cages

Nominal Pin Diameter	Demountable Bushing			Straight Sleeve	Ball Cage	Stroke "S" at minimum shut height (die life depleted)
O	F_2	E	L_2	L_1	L_3	20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 340 360 380
25	35	30	65	65	55	
	50	30	80	80	70	
	65	30	95	95	90	
				110	100	
				130	110	
32	50	30	80	80	70	
	65	30	95	95	90	
	80	30	110	110	105	
				130	115	
				150	125	
				170	135	
40	50	30	80	80	70	
	65	30	95	95	85	
	80	30	110	110	105	
	100	30	130	130	115	
				150	125	
				170	135	
				190	145	
				215	155	
50	60	50	110	110	105	
	80	50	130	130	120	
	100	50	150	150	140	
	120	50	170	170	150	
				190	160	
				215	170	
				240	185	
				265	195	
63	100	50	150	150	145	
	120	50	170	170	165	
	140	50	190	190	180	
				215	190	
				240	205	
				265	215	
80				150	145	
				170	165	
				190	180	
				215	190	
				240	205	
				265	215	

READY

The Innovator of Our Industry℠

Our factories and offices:

U.S.A. • U.K. • France • Belgium • Germany • Sweden • Netherlands • Singapore

READY TECHNOLOGY, INC.

333 Progress Rd. • Dayton, OH 45449
(800) 543-4355 • (937) 866-7200 • fax (937) 866-7226

www.readytechnology.com

CATALOG # 0211