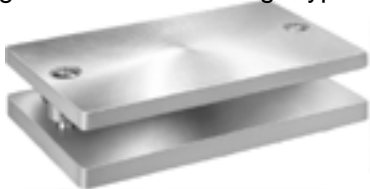
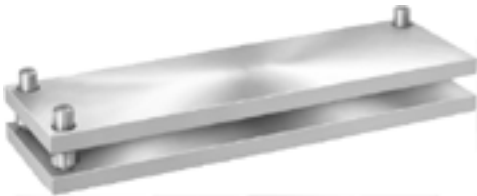




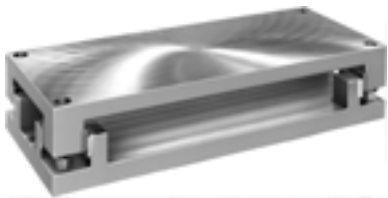
STYLE 20 - Two pin, square back with shank. Available in Standard Flange, Milled Flange and Bolt Slot Flange types.



STYLE 35 - Two centered pin type.



STYLE 50 - Three corner pin type.



WEAR PLATE DIE SETS - Heavy duty sets. Available with bosses and heel blocks. in U, L, and V System configurations.



BALL BEARING DIE SETS - High speed design for all above styles of Friction Ball Bearing die sets.



FORTAL PLATE MATERIAL -

Lightweight, high strength easy to machine aluminum alloy material for all die sets. This stable material has higher strength than 1020 steel.

LAMINATION DIE SETS - The best precision die set manufactured to tight tolerances required for high volume operations with sustainable accuracy.

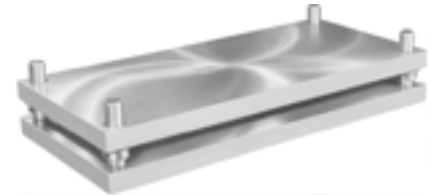
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STYLE 25 - Two back pin type.



STYLE 45 - Two diagonal pin type.



STYLE 75 - Four pin type.



MULTI-SLIDE DIE SETS



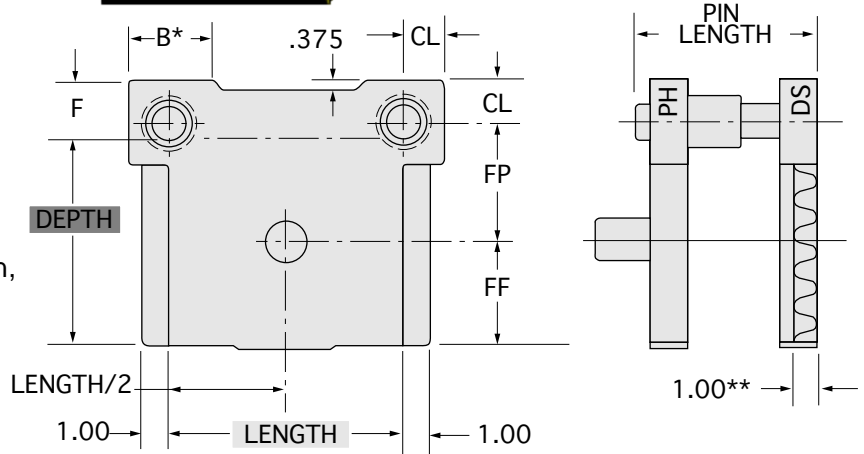
BOSS DIE SETS - Heavy duty design for Friction or Ball Bearing die sets.

PLATE CAPABILITIES - Raw plate inventories, torch cutting, stress relieving, shot blasting, Blanchard or surface grinding, machining and inspection.

**STANDARD FLANGE
STYLE 20 F**



NOTE: * See Ball Bearing Die Set information, for B dimension when ordering STYLE BB 20 F.



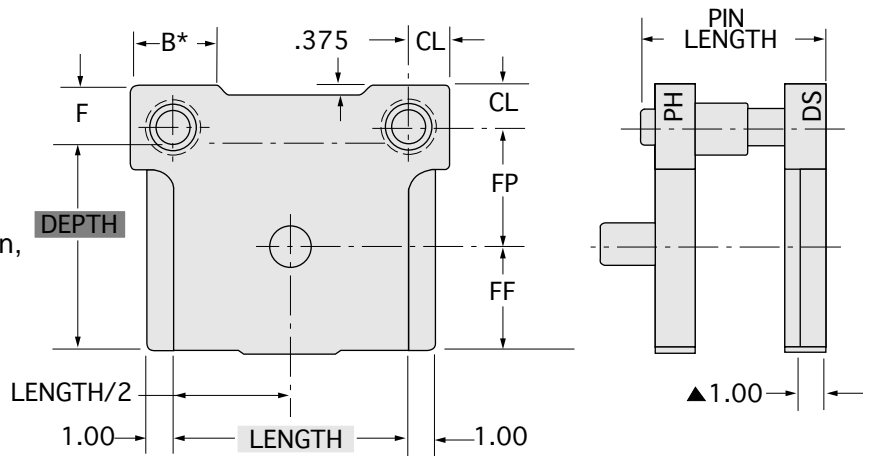
** Minimum die shoe thickness - 1 1/4"

**MILLED FLANGE
STYLE 20 M**



NOTE: * See Ball Bearing Die Set information, for B dimension when ordering STYLE BB 20 M.

- ▲ If $DS \geq 1 \frac{1}{4}$ ", thickness of flange is 1".
- If $DS > \frac{3}{4} < 1 \frac{1}{4}$ ", thickness of flange is $\frac{3}{4}$ ".
- If $DS \leq \frac{3}{4}$ ", thickness of flange is DS thickness.

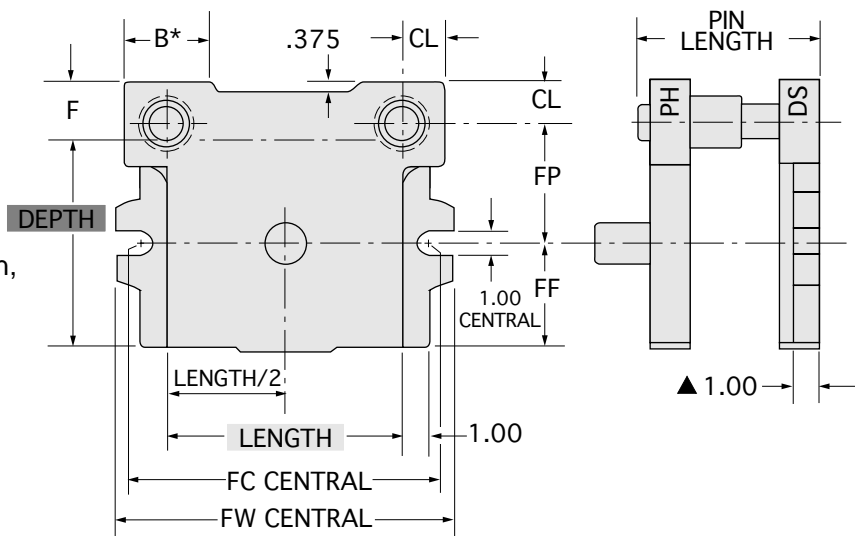


**BOLT SLOT FLANGE
STYLE 20 B**



NOTE: * See Ball Bearing Die Set information, for B dimension when ordering STYLE BB 20 B.

- ▲ If $DS \geq 1 \frac{1}{4}$ ", thickness of flange is 1".
- If $DS > \frac{3}{4} < 1 \frac{1}{4}$ ", thickness of flange is $\frac{3}{4}$ ".
- If $DS \leq \frac{3}{4}$ ", thickness of flange is DS thickness.



Superior Style 20 die sets are available in three types and in a wide range of work area sizes and design features, along with a selection of shank, guide pin and bushing options.

Style 20 die sets are offered in a range of punch holder and die shoe thicknesses. Precision square back design has finished rear edges for your convenience.

STYLE 20 F - Standard flange type for clamping and lifting. Welded flanges are only available on die sets weighing **200** pounds or less.

STYLE 20 M - Milled flange has milled clamping surfaces on the edges of the die shoe.

STYLE 20 B - Bolt slot is flame cut with milled flange for easy mounting.

WHEN ORDERING PLEASE SPECIFY:

1. Style 20 F, 20 M, 20 B, Friction or Ball Bearing
ex. Style 20 M, Style BB 20 B
2. Quantity
3. Punch Holder (**PH**)

Thickness

Depth

 * Length
4. Die Shoe (**DS**)

Thickness

Depth

 * Length
5. Pin Type and Size
6. Bushing Type and Material
(1" or 2" Demountable Steel Shoulder Standard)
7. Shank Type and Size (if required)

- NOTES:**
1. * When Depth is less than 5", STYLE 20 F (STANDARD FLANGE) cannot be furnished.
 2. For Ball Bearing Die Set Information.



SUPERIOR STYLE 20 F, 20 M, 20 B DIE SET DIMENSIONS									
DIE AREA		GUIDE PIN DIA.	FW	FC	FF	FP	CL	B	F
DEPTH	LENGTH								
3	3	1	7	5	1 1/2	2	1 1/2	3	2
3	4	1	8	6	1 1/2	2	1 1/2	3	2
3	5	1	9	7	1 1/2	2	1 1/2	3	2
3	6	1	10	8	1 1/2	2	1 1/2	3	2
4	4	1	8	6	2	2 1/2	1 1/2	3	2
4	5	1	9	7	2	2 1/2	1 1/2	3	2
4	6	1	10	8	2	2 1/2	1 1/2	3	2
4	7	1	11	9	2	2 1/2	1 1/2	3	2
4	8	1	12	10	2	2 1/2	1 1/2	3	2
5	5	1	9	7	2 1/2	3	1 1/2	3	2
5	6	1	10	8	2 1/2	3	1 1/2	3	2
5	7	1	11	9	2 1/2	3	1 1/2	3	2
5	8	1 1/4	12	10	2 1/2	3 1/8	1 5/8	3 1/4	2 1/4
5	9	1 1/4	13	11	2 1/2	3 1/8	1 5/8	3 1/4	2 1/4
5	10	1 1/4	14	12	2 1/2	3 1/8	1 5/8	3 1/4	2 1/4
6	6	1	10	8	3	3 1/2	1 1/2	3	2
6	7	1 1/4	11	9	3	3 5/8	1 5/8	3 1/4	2 1/4
6	8	1 1/4	12	10	3	3 5/8	1 5/8	3 1/4	2 1/4
6	9	1 1/4	13	11	3	3 5/8	1 5/8	3 1/4	2 1/4
6	10	1 1/4	14	12	3	3 5/8	1 5/8	3 1/4	2 1/4
6	11	1 1/4	15	13	3	3 5/8	1 5/8	3 1/4	2 1/4
6	12	1 1/4	16	14	3	3 5/8	1 5/8	3 1/4	2 1/4
7	7	1 1/4	11	9	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
7	8	1 1/4	12	10	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
7	9	1 1/4	13	11	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
7	10	1 1/4	14	12	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
7	11	1 1/4	15	13	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
7	12	1 1/4	16	14	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
7	13	1 1/4	17	15	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
7	14	1 1/4	18	16	3 1/2	4 1/8	1 5/8	3 1/4	2 1/4
8	8	1 1/4	12	10	4	4 5/8	1 5/8	3 1/4	2 1/4
8	9	1 1/4	13	11	4	4 5/8	1 5/8	3 1/4	2 1/4
8	10	1 1/4	14	12	4	4 5/8	1 5/8	3 1/4	2 1/4
8	11	1 1/4	15	13	4	4 5/8	1 5/8	3 1/4	2 1/4
8	12	1 1/4	16	14	4	4 5/8	1 5/8	3 1/4	2 1/4
8	13	1 1/2	17	15	4	4 3/4	1 3/4	3 1/2	2 1/2
8	14	1 1/2	18	16	4	4 3/4	1 3/4	3 1/2	2 1/2
8	15	1 1/2	19	17	4	4 3/4	1 3/4	3 1/2	2 1/2
8	16	1 1/2	20	18	4	4 3/4	1 3/4	3 1/2	2 1/2
9	9	1 1/4	13	11	4 1/2	5 1/8	1 5/8	3 1/4	2 1/4
9	10	1 1/4	14	12	4 1/2	5 1/8	1 5/8	3 1/4	2 1/4
9	11	1 1/4	15	13	4 1/2	5 1/8	1 5/8	3 1/4	2 1/4
9	12	1 1/2	16	14	4 1/2	5 1/4	1 3/4	3 1/2	2 1/2
9	13	1 1/2	17	15	4 1/2	5 1/4	1 3/4	3 1/2	2 1/2
9	14	1 1/2	18	16	4 1/2	5 1/4	1 3/4	3 1/2	2 1/2
9	15	1 1/2	19	17	4 1/2	5 1/4	1 3/4	3 1/2	2 1/2



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H&O Die Supply
7200 Interstate 20 Kennedale, TX 76060

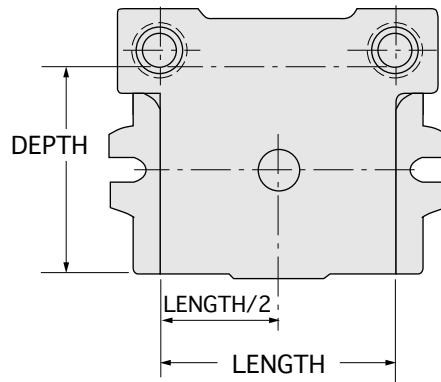
Phone: 214-630-6660
Fax: 214-630-6693

SUPERIOR STYLE 20 F, 20 M, 20 B DIE SET DIMENSIONS									
DIE AREA		GUIDE PIN DIA.	FW	FC	FF	FP	CL	B	F
DEPTH	LENGTH								
10	10	1 1/4	14	12	5	5 5/8	1 5/8	3 1/4	2 1/4
10	11	1 1/2	15	13	5	5 3/4	1 3/4	3 1/2	2 1/2
10	12	1 1/2	16	14	5	5 3/4	1 3/4	3 1/2	2 1/2
10	13	1 1/2	17	15	5	5 3/4	1 3/4	3 1/2	2 1/2
10	14	1 1/2	18	16	5	5 3/4	1 3/4	3 1/2	2 1/2
10	15	1 1/2	19	17	5	5 3/4	1 3/4	3 1/2	2 1/2
10	16	1 1/2	20	18	5	5 3/4	1 3/4	3 1/2	2 1/2
11	11	1 1/2	15	13	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	12	1 1/2	16	14	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	13	1 1/2	17	15	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	14	1 1/2	18	16	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	15	1 1/2	19	17	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	16	1 1/2	20	18	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	17	1 1/2	21	19	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	18	1 1/2	22	20	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	19	1 1/2	23	21	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
11	20	1 1/2	24	22	5 1/2	6 1/4	1 3/4	3 1/2	2 1/2
12	12	1 1/2	16	14	6	6 3/4	1 3/4	3 1/2	2 1/2
12	13	1 1/2	17	15	6	6 3/4	1 3/4	3 1/2	2 1/2
12	14	1 1/2	18	16	6	6 3/4	1 3/4	3 1/2	2 1/2
12	15	1 1/2	19	17	6	6 3/4	1 3/4	3 1/2	2 1/2
12	16	1 1/2	20	18	6	6 3/4	1 3/4	3 1/2	2 1/2
12	17	1 1/2	21	19	6	6 3/4	1 3/4	3 1/2	2 1/2
12	18	1 1/2	22	20	6	6 3/4	1 3/4	3 1/2	2 1/2
12	19	1 3/4	23	21	6	6 7/8	1 7/8	3 3/4	2 3/4
12	20	1 3/4	24	22	6	6 7/8	1 7/8	3 3/4	2 3/4
13	13	1 1/2	17	15	6 1/2	7 1/4	1 3/4	3 1/2	2 1/2
13	14	1 1/2	18	16	6 1/2	7 1/4	1 3/4	3 1/2	2 1/2
13	15	1 1/2	19	17	6 1/2	7 1/4	1 3/4	3 1/2	2 1/2
13	16	1 1/2	20	18	6 1/2	7 1/4	1 3/4	3 1/2	2 1/2
13	17	1 1/2	21	19	6 1/2	7 1/4	1 3/4	3 1/2	2 1/2
13	18	1 3/4	22	20	6 1/2	7 3/8	1 7/8	3 3/4	2 3/4
13	19	1 3/4	23	21	6 1/2	7 3/8	1 7/8	3 3/4	2 3/4
13	20	1 3/4	24	22	6 1/2	7 3/8	1 7/8	3 3/4	2 3/4
14	14	1 1/2	18	16	7	7 3/4	1 3/4	3 1/2	2 1/2
14	15	1 1/2	19	17	7	7 3/4	1 3/4	3 1/2	2 1/2
14	16	1 1/2	20	18	7	7 3/4	1 3/4	3 1/2	2 1/2
14	17	1 3/4	21	19	7	7 7/8	1 7/8	3 3/4	2 3/4
14	18	1 3/4	22	20	7	7 7/8	1 7/8	3 3/4	2 3/4
14	19	1 3/4	23	21	7	7 7/8	1 7/8	3 3/4	2 3/4
14	20	1 3/4	24	22	7	7 7/8	1 7/8	3 3/4	2 3/4
15	15	1 3/4	19	17	7 1/2	8 3/8	1 7/8	3 3/4	2 3/4
15	16	1 3/4	20	18	7 1/2	8 3/8	1 7/8	3 3/4	2 3/4
15	17	1 3/4	21	19	7 1/2	8 3/8	1 7/8	3 3/4	2 3/4
15	18	1 3/4	22	20	7 1/2	8 3/8	1 7/8	3 3/4	2 3/4
15	19	1 3/4	23	21	7 1/2	8 3/8	1 7/8	3 3/4	2 3/4
15	20	1 3/4	24	22	7 1/2	8 3/8	1 7/8	3 3/4	2 3/4

Superior Style 20B Stock Die Sets are available in a wide range of work area dimensions, punch holder and die shoe thicknesses, guide pin and bushing options. Style 20B Stock Die Sets are available with only bolt slot flanges and welded shanks in either 1 1/2" (A) or 1 9/16" (B) diameters.

WHEN ORDERING PLEASE SPECIFY:

1. Style 20B
2. Quantity
3. Catalog Number
4. Pin Length
5. Bushing Length (1", 2" or 3")
 Bushing Material (steel, bronze or Bronze-Rite™)



WORK AREA		THICKNESS		PIN DIA	CATALOG NUMBER
DEPTH	LENGTH	PH	DS		
4	4	1 1/4	1 1/2	1	S1-0404A12
4	4	1 1/4	1 1/2	1	S1-0404B12
4	5	1 1/4	1 1/2	1	S1-0405A12
4	6	1 1/4	1 1/2	1	S1-0406A12
4	8	1 1/4	1 1/2	1	S1-0408A12
5	5	1 1/4	1 1/2	1	S1-0505A12
5	5	1 1/4	1 1/2	1	S1-0505B12
5	6	1 1/4	1 1/2	1	S1-0506A12
5	7	1 1/4	1 1/2	1	S1-0507A12
5	10	1 1/2	1 1/2	1 1/4	S1-0510A22
6	6	1 1/4	1 1/2	1	S1-0606A12
6	6	1 1/4	1 3/4	1	S1-0606A13
6	6	1 1/2	1 1/2	1	S1-0606A22
6	6	1 1/2	1 3/4	1	S1-0606A23
6	6	1 1/4	1 1/2	1	S1-0606B12
6	6	1 1/4	1 3/4	1	S1-0606B13
6	6	1 1/2	1 1/2	1	S1-0606B22
6	6	1 1/2	1 3/4	1	S1-0606B23
6	8	1 1/4	1 1/2	1 1/4	S1-0608A12
6	12	1 1/4	1 1/2	1 1/4	S1-0612A12

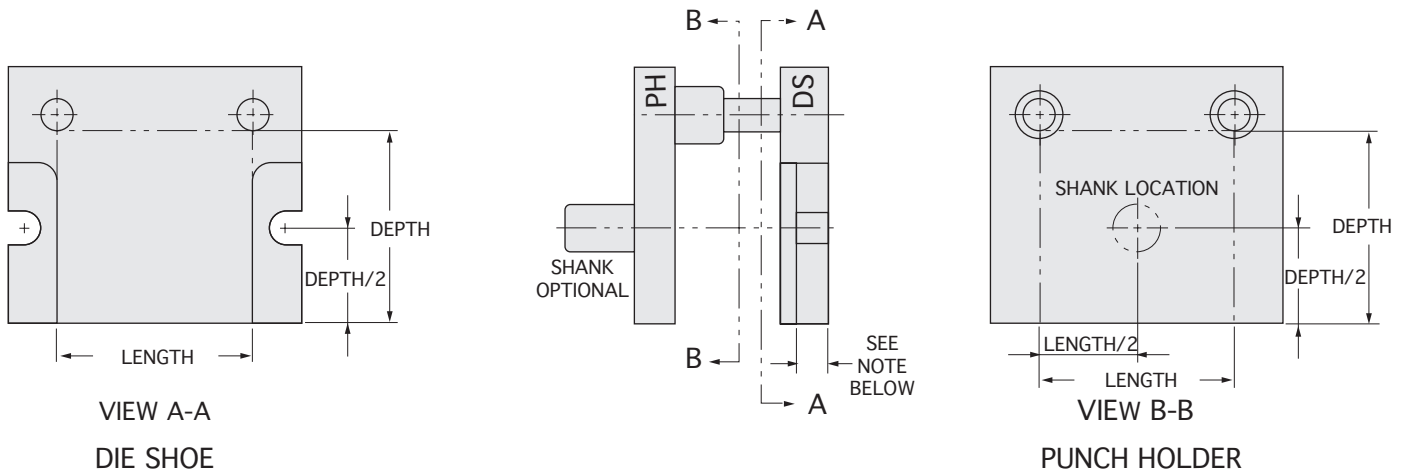
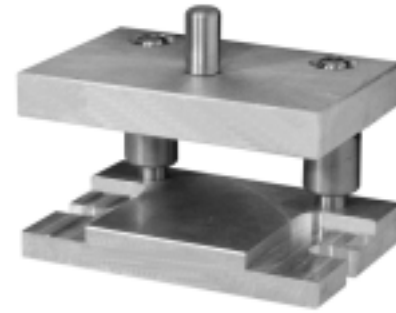
WORK AREA		THICKNESS		PIN DIA	CATALOG NUMBER
DEPTH	LENGTH	PH	DS		
7	7	1 1/4	1 1/2	1 1/4	S1-0707A12
7	10	1 1/4	1 1/2	1 1/4	S1-0710A12
8	8	1 1/4	1 1/2	1 1/4	S1-0808A12
8	8	1 1/4	1 3/4	1 1/4	S1-0808A13
8	8	1 1/2	1 1/2	1 1/4	S1-0808A22
8	8	1 1/2	1 3/4	1 1/4	S1-0808A23
8	8	1 1/4	1 1/2	1 1/4	S1-0808B12
8	8	1 1/4	1 3/4	1 1/4	S1-0808B13
8	8	1 1/2	1 1/2	1 1/4	S1-0808B22
8	8	1 1/2	1 3/4	1 1/4	S1-0808B23
10	10	1 1/4	1 1/2	1 1/4	S1-1010A12
10	10	1 1/4	1 3/4	1 1/4	S1-1010A13
10	10	1 1/2	1 1/2	1 1/4	S1-1010A22
10	10	1 1/2	1 3/4	1 1/4	S1-1010A23
10	10	1 1/4	1 1/2	1 1/4	S1-1010B12
10	10	1 1/4	1 3/4	1 1/4	S1-1010B13
10	10	1 1/2	1 1/2	1 1/4	S1-1010B22
10	10	1 1/2	1 3/4	1 1/4	S1-1010B23

Superior Style 21 die sets combine the features of our Style 20 die set but in a rectangular design. Milled or bolt slot flanges in die shoe help in quick die change. Full size punch holder for ultimate work area space.

Style 21 die sets are offered in Fortal™ or steel, in any plate size and thickness. Choose for a large selection of shank, guide pin and bushing options.

Style 21 M - Milled flange has milled clamping surfaces only on the edges of the die shoe.

Style 21 B - Bolt slot has milled clamping surfaces and bolt slots on the edges of the die shoe.



WHEN ORDERING PLEASE SPECIFY:

1. Style 21 M, 21 B, Friction or Ball Bearing
ex. Style 21 M, Style BB 21 B
2. Quantity
3. Punch Holder (**PH**) Thickness Depth Length
4. Die Shoe (**DS**) Thickness Depth Length
5. Pin Type and Size
6. Bushing Type and Material
7. Shank Type and Size (if required)

NOTE: If $DS \geq 1-1/4"$,
thickness of flange is 1".

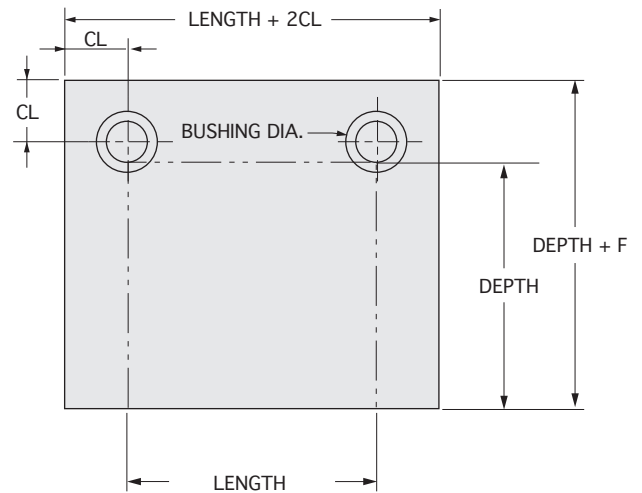
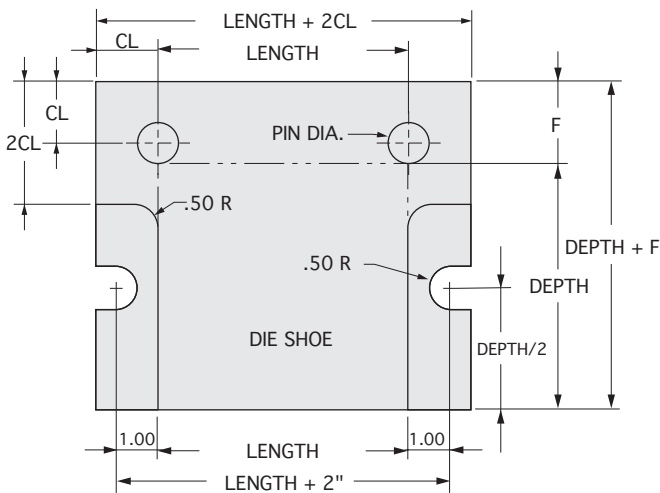
If $DS > 3/4" < 1-1/4"$,
thickness of flange is 3/4".

If $DS \leq 3/4"$,
thickness of flange is DS thickness.



STANDARD GUIDE PIN SIZES																			
WORK AREA	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	
4		1.00	1.00	1.00	1.00	1.00	1.00	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	
5			1.00	1.00	1.00	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	
6				1.00	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.5	1.5	1.5	1.5	
7					1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.5	1.5	1.5	1.5	1.5	1.5	
8						1.25	1.25	1.25	1.25	1.25	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
9							1.25	1.25	1.25	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
10								1.25	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
11									1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
12										1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.75	1.75	
13											1.5	1.5	1.5	1.5	1.5	1.75	1.75	1.75	
14												1.5	1.5	1.5	1.75	1.75	1.75	1.75	
15													1.75	1.75	1.75	1.75	1.75	1.75	
16														1.75	1.75	1.75	1.75	1.75	
17															1.75	1.75	1.75	1.75	
18																1.75	1.75	1.75	
19																	1.75	1.75	
20																		1.75	

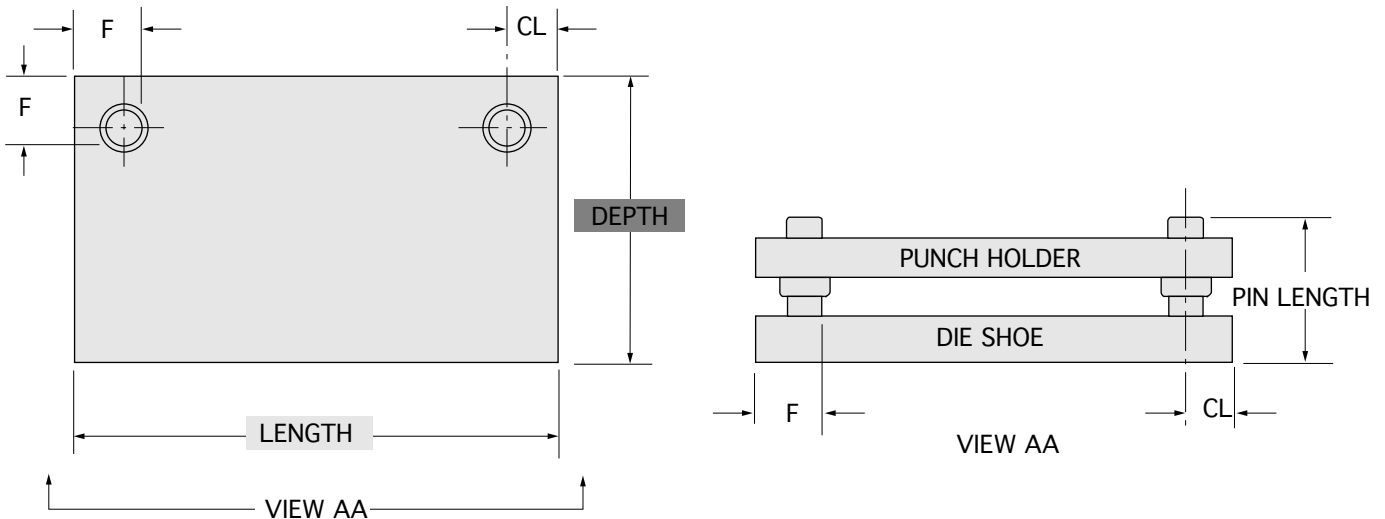
Standard Guide Pin diameters for Superior Friction or Ball Bearing die sets are determined by the work area depth and length dimensions of the die set. The standard guide pin diameter is provided unless a smaller or larger diameter guide pin is specified when ordering. Charts shown are commonly used guidelines. Specific tooling forces should be taken into account when ordering die set style, pin size, punch holder and die shoe thicknesses.



STYLE 21 STANDARD PIN LOCATIONS					
GUIDE PIN DIAMETER	FRICTION		BALL BEARING		
	CL	F	CL	F DMT	F SLV
1.000	1.500	2.000	1.500	2.500	2.358
1.250	1.625	2.250	1.750	2.938	2.803
1.500	1.750	2.500	2.000	3.343	3.218
1.750	1.875	2.750	2.125	3.625	3.498
2.000	2.000	3.000	2.375	4.156	3.955

NOTE: F Dimension refers to distance from outside edge of die shoe to inside edge of component in die shoe.

Superior Style 25 Two-Pin Rectangular Die Sets have guide pins located to the rear, an ideal design for progressive dies. With stock flow from one side in front of the pins, this style affords maximum work area. For symmetrical parts, full resistance is provided against tooling forces and pin deflection while maintaining precise die alignment. Left to Right feed (System LR) bushing clamp location is standard on Style 25 die sets. Style 25 die sets are available in Friction or Ball Bearing styles.



WHEN ORDERING PLEASE SPECIFY:

1. Style 25, Friction or Ball Bearing
2. Quantity
3. Punch Holder (PH)

Thickness	Depth	* Length
-----------	-------	----------
4. Die Shoe (DS)

Thickness	Depth	* Length
-----------	-------	----------
5. Pin Type and Size
6. Bushing Type and Material
(2" Steel Shoulder Standard)
7. Shank Type and Size (if required)

NOTES: 1. For Ball Bearing Die Set Information.



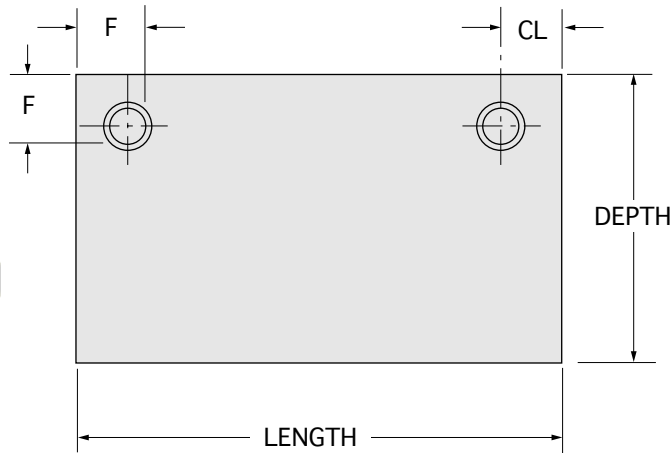
STANDARD PIN LOCATIONS - FRICTION BEARING							
Guide Pin Diameter	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F Dimension	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL Dimension	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

NOTE: F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets.)

Superior Style 25 Stock Die Sets are available in a two pin back post design. These die sets are also offered in a wide choice of work area dimensions, punch holder and die shoe thicknesses, guide pin and bushing options. Style 25 Stock Die Sets are furnished without a shank.

WHEN ORDERING PLEASE SPECIFY:

1. Style 25
2. Quantity
3. Catalog Number
4. Pin Length
5. Bushing Length (1", 2" or 3")
 Bushings Material (steel, bronze or Bronze-Rite™)

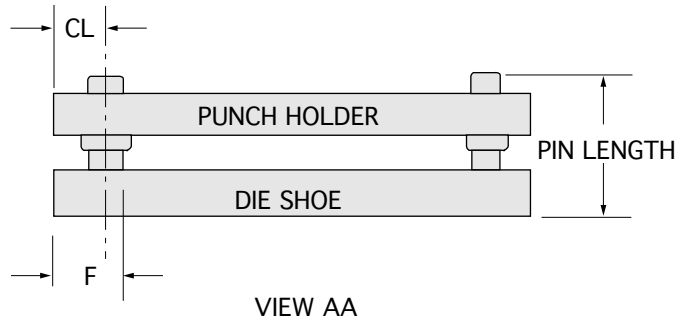
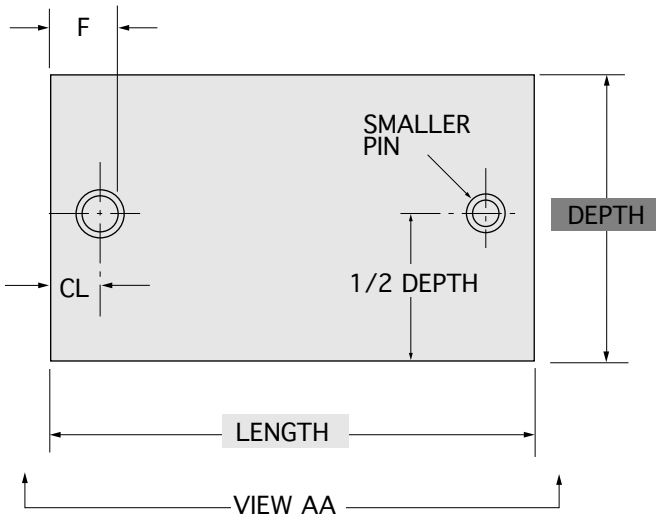
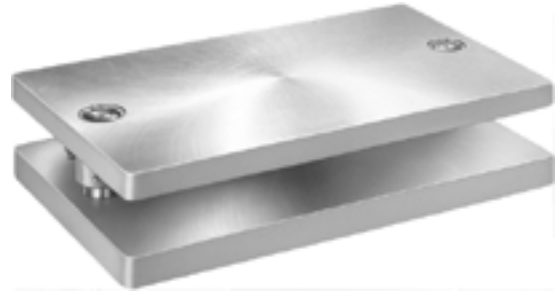


OVERALL		THICKNESS		PIN DIA	CATALOG NUMBER
DEPTH	LENGTH	PH	DS		
8	8	1 1/4	1 1/4	1 1/4	S2-0808-11
8	8	1 1/4	1 1/2	1 1/4	S2-0808-12
8	8	1 1/2	1 1/4	1 1/4	S2-0808-21
8	8	1 1/2	1 1/2	1 1/4	S2-0808-22
8	10	1 1/4	1 1/4	1 1/4	S2-0810-11
8	10	1 1/4	1 1/2	1 1/4	S2-0810-12
8	10	1 1/4	1 3/4	1 1/4	S2-0810-13
8	10	1 1/2	1 1/4	1 1/4	S2-0810-21
8	10	1 1/2	1 1/2	1 1/4	S2-0810-22
8	10	1 1/2	1 3/4	1 1/4	S2-0810-23
8	12	1 1/2	1 1/2	1 1/2	S2-0812-22
10	10	1 1/4	1 1/2	1 1/4	S2-1010-12
10	10	1 1/4	1 3/4	1 1/4	S2-1010-13
10	10	1 1/2	1 1/2	1 1/4	S2-1010-22
10	10	1 1/2	1 3/4	1 1/4	S2-1010-23
10	12	1 1/4	1 1/2	1 1/2	S2-1012-12
10	12	1 1/4	1 3/4	1 1/2	S2-1012-13
10	12	1 1/2	1 1/2	1 1/2	S2-1012-22
10	12	1 1/2	1 3/4	1 1/2	S2-1012-23
10	12	1 3/4	1 1/2	1 1/2	S2-1012-32
10	12	1 3/4	1 3/4	1 1/2	S2-1012-33

OVERALL		THICKNESS		PIN DIA	CATALOG NUMBER
DEPTH	LENGTH	PH	DS		
10	14	1 1/2	1 1/2	1 1/2	S2-1014-22
10	16	1 1/2	1 1/2	1 1/2	S2-1016-22
12	12	1 1/2	1 1/2	1 1/2	S2-1212-22
12	12	1 1/2	1 3/4	1 1/2	S2-1212-23
12	12	1 1/2	2	1 1/2	S2-1212-24
12	12	1 3/4	1 1/2	1 1/2	S2-1212-32
12	12	1 3/4	1 3/4	1 1/2	S2-1212-33
12	12	1 3/4	2	1 1/2	S2-1212-34
12	12	2	1 1/2	1 1/2	S2-1212-42
12	12	2	1 3/4	1 1/2	S2-1212-43
12	12	2	2	1 1/2	S2-1212-44
12	14	1 1/2	1 1/2	1 1/2	S2-1214-22
12	16	1 1/2	1 1/2	1 1/2	S2-1216-22
8	10	1 1/4	1 1/2	1 1/4	S2F0810-12
8	10	1 1/2	1 1/2	1 1/4	S2F0810-22
10	10	1 1/4	1 1/2	1 1/4	S2F1010-12
10	10	1 1/2	1 1/2	1 1/4	S2F1010-22
10	12	1 1/2	1 1/2	1 1/2	S2F1012-22
12	12	1 1/2	1 1/2	1 1/2	S2F1212-22
12	14	1 1/2	1 1/2	1 1/2	S2F1214-22
12	14	1 1/2	1 3/4	1 1/2	S2F1214-23

These sizes manufactured from Fortal®

Superior Style 35 Two-Pin Rectangular Die Sets have guide pins located to the centerline of the depth dimension. Work area is centered between the pins and stock flow is usually from front to rear. Style 35 Die Sets are furnished with guide pins of differing dimensions to prevent reversing of the punch holder during assembly. Front to Back feed (System FB) bushing clamp location is standard on Style 35 die sets. Style 35 die sets are available in Friction or Ball Bearing styles.



WHEN ORDERING PLEASE SPECIFY:

1. Style 35, Friction or Ball Bearing
2. Quantity
3. Punch Holder (PH)

Thickness	Depth	* Length
-----------	-------	----------
4. Die Shoe (DS)

Thickness	Depth	* Length
-----------	-------	----------
5. Pin Type and Size
6. Bushing Type and Material
(2" Steel Shoulder Standard)
7. Shank Type and Size (if required)

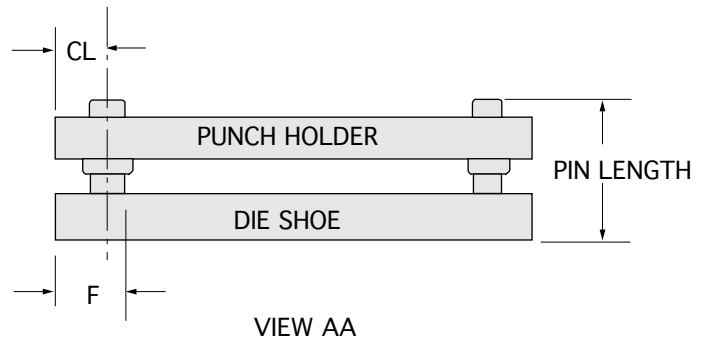
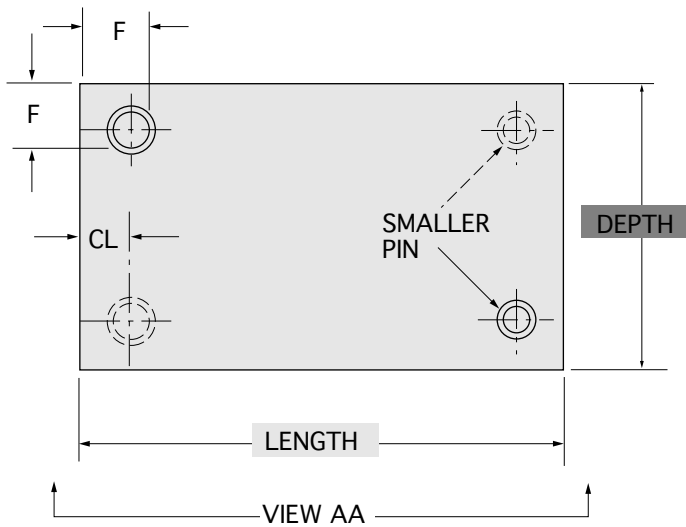
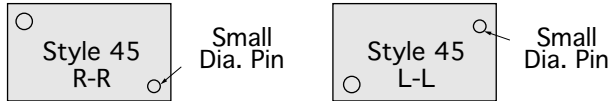
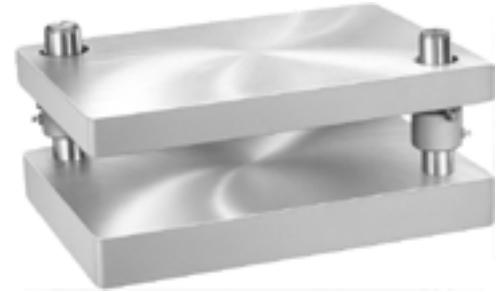
NOTES: 1. For Ball Bearing Die Set Information.



STANDARD PIN LOCATIONS - FRICTION BEARING							
Guide Pin Diameter	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F Dimension	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL Dimension	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

NOTE: F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets.)
CL Dimension for the smaller pin is the same as the large pin.

Superior Style 45 Two-Pin Rectangular Die Sets are available with guide pins located diagonally at position "RR" or "LL" (see illustration below). The pin arrangement shown affords ease of stock movement where the pin is absent at the front of the die set. Style 45 Die Sets are furnished with pins of differing diameters to prevent reversing of the punch holder during assembly. Left to Right feed (System LR) bushing clamp location is standard on Style 45 die sets. Style 45 die sets are available in Friction or Ball Bearing styles.



WHEN ORDERING PLEASE SPECIFY:

1. Style 45, Friction or Ball Bearing
2. Quantity
3. Punch Holder (PH)

Thickness

Depth

 * Length
4. Die Shoe (DS)

Thickness

Depth

 * Length
5. Pin Type and Size
6. Pin Configuration (RR or LL)
7. Bushing Type and Material
(2" Steel Shoulder Standard)
8. Shank Type and Size (if required)

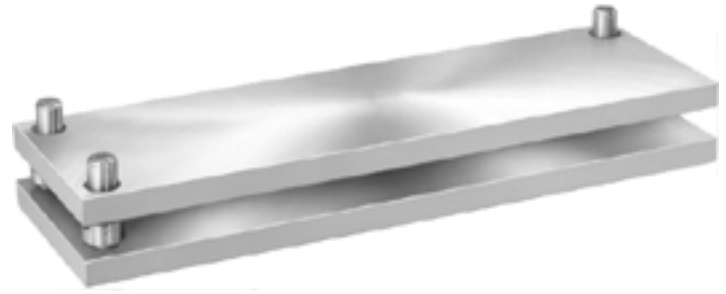
NOTES: 1. For Ball Bearing Die Set Information.



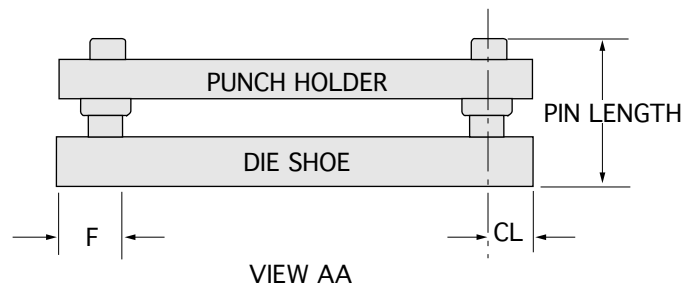
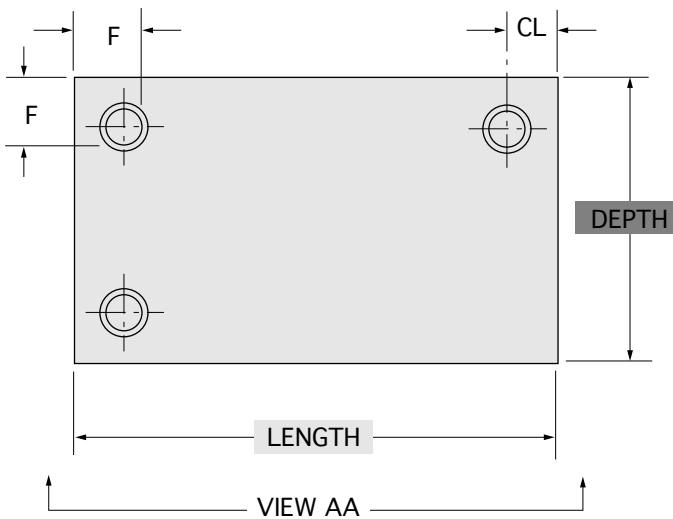
STANDARD PIN LOCATIONS - FRICTION BEARING							
Guide Pin Diameter	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F Dimension	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL Dimension	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

NOTE: F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets.)
CL Dimension for the smaller pin is the same as the large pin.

Superior Style 50 Three-Pin Rectangular Die Sets are available with guide pins located at any three corners. The three-pin layout provides greater rigidity than two-pin sets. It also allows free movement of stock in the corner area where the pin is omitted. There is no offset pin on Style 50 die sets. Left to Right feed (System LR) bushing clamp location is standard on Style 50 die sets. Style 50 die sets are available in Friction or Ball Bearing styles.



Pin to be omitted must be specified when ordering.



WHEN ORDERING PLEASE SPECIFY:

1. Style 50, Friction or Ball Bearing
2. Quantity
3. Punch Holder (PH)

Thickness	Depth	* Length
-----------	-------	----------
4. Die Shoe (DS)

Thickness	Depth	* Length
-----------	-------	----------
5. Pin Type and Size
6. Bushing Type and Material
(2" Steel Shoulder Standard)
7. Shank Type and Size (if required)
8. Which Pin to Omit (ex: Omit Right Front)

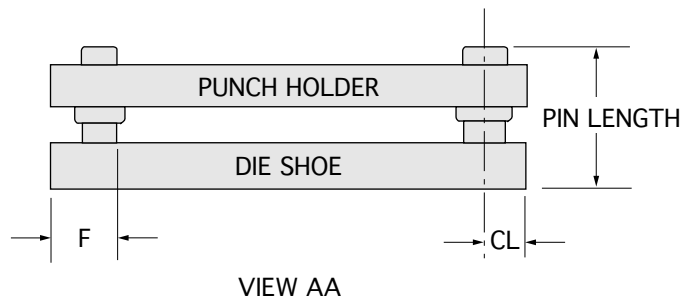
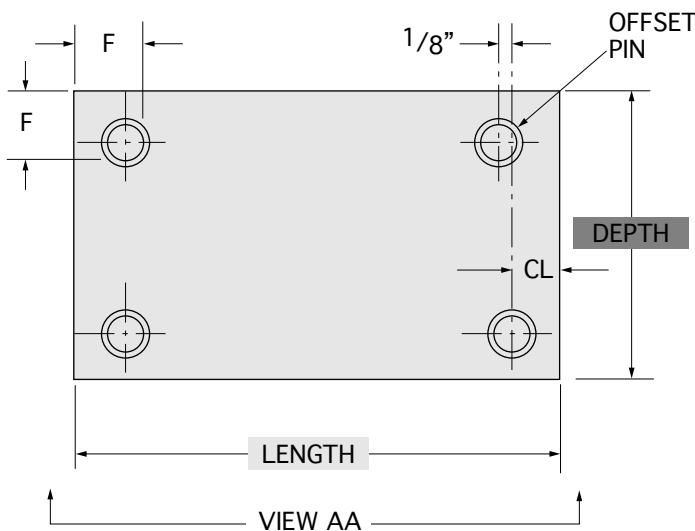
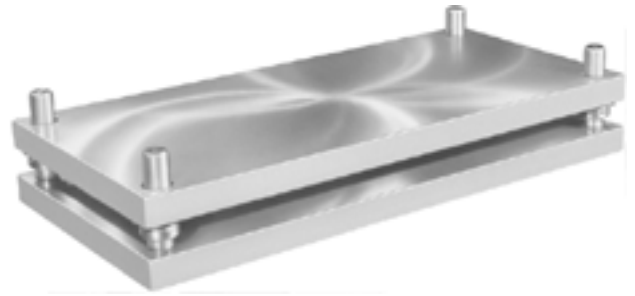
NOTES: 1. For Ball Bearing Die Set Information.

STANDARD PIN LOCATIONS - FRICTION BEARING							
Guide Pin Diameter	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F Dimension	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL Dimension	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

NOTE: F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets.)



Superior Style 75 Four-Pin Rectangular Die Sets are designed for applications where multi-directional or unequal tooling forces are generated by a non-symmetrical die shape or heavy stock. The four-pin arrangement provides maximum resistance to side thrust and misalignment. On Style 75 Die Sets, the right rear pin is offset 1/8" to left direction to prevent reversing of the punch holder during assembly. Inverted die sets, right front pin is offset by 1/8". Left to Right feed (System LR) bushing clamp location is standard on Style 75 die sets. Style 75 die sets are available in Friction or Ball Bearing styles.



WHEN ORDERING PLEASE SPECIFY:

1. Style 75, Friction or Ball Bearing
2. Quantity
3. Punch Holder (PH)

Thickness

Depth

 * Length
4. Die Shoe (DS)

Thickness

Depth

 * Length
5. Pin Type and Size
6. Bushing Type and Material
(2" Steel Shoulder Standard)
7. Shank Type and Size (if required)

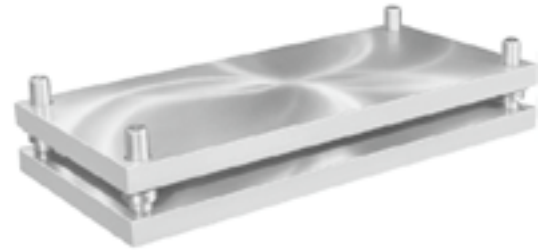
NOTES: 1. For Ball Bearing Die Set Information.



STANDARD PIN LOCATIONS - FRICTION BEARING							
Guide Pin Diameter	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F Dimension	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL Dimension	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

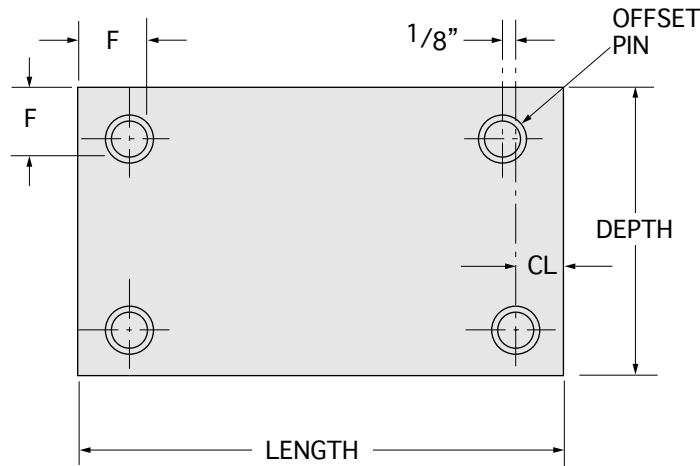
NOTE: F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets.)

Superior Style 75 Stock Die Sets are four pin sets designed for applications where multi-directional or unequal tooling forces are generated by a non-symmetrical die shape or heavy stock. The four pin arrangement provides maximum resistance to side thrust and misalignment. On Style 75 Stock Die Sets, the right rear pin is offset 1/8" to left direction to prevent reversing of the punch holder during assembly. Left to right feed (System LR) bushing clamp location is standard on Style 75 Stock Die Sets. Style 75 Stock Die Sets are furnished without a shank.



WHEN ORDERING PLEASE SPECIFY:

1. Style 75
2. Quantity
3. Catalog Number
4. Pin Length
5. Bushing Length (1", 2" or 3")
 Bushing Material (steel, bronze or Bronze-Rite™)



OVERALL		THICKNESS		PIN DIA	CATALOG NUMBER
DEPTH	LENGTH	PH	DS		
10	10	1 1/4	1 1/2	1 1/4	S4-1010-12
10	12	1 1/4	1 1/2	1 1/2	S4-1012-12
10	14	1 1/2	1 1/2	1 1/2	S4-1014-22
10	16	1 1/2	1 1/2	1 1/2	S4-1016-22
12	12	1 1/2	1 1/2	1 1/2	S4-1212-22
12	14	1 1/2	1 1/2	1 1/2	S4-1214-22
12	16	1 1/2	1 1/2	1 1/2	S4-1216-22
12	18	1 1/2	1 1/2	1 1/2	S4-1218-22
14	14	1 1/2	1 1/2	1 1/2	S4-1414-22
14	16	1 1/2	1 1/2	1 1/2	S4-1416-22
14	18	1 1/2	1 1/2	1 1/2	S4-1418-22

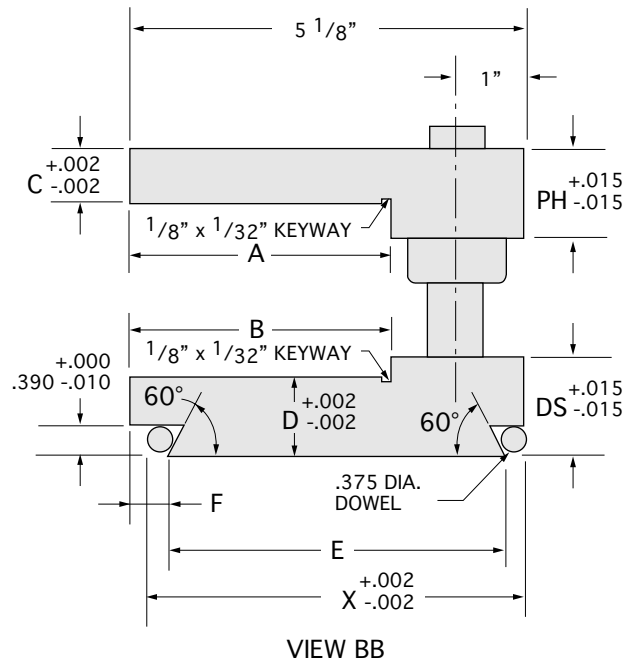
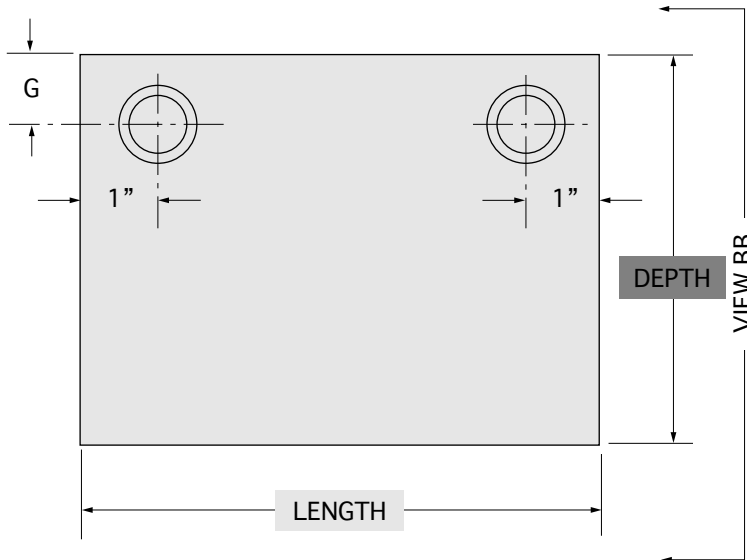


Multi-Slide die sets are manufactured to meet or exceed specifications required on Four-Slide machines. Superior has these die sets available in three sizes and are manufactured to the length you specify.

Multi-Slide die sets are furnished in FORTAL® Aluminum. Upon request, Multi-Slide die sets can be manufactured from steel or other metals. See Material Types.



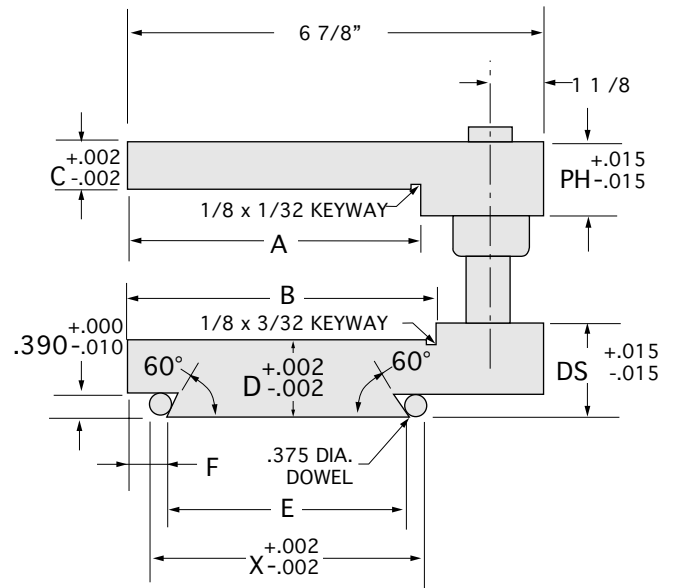
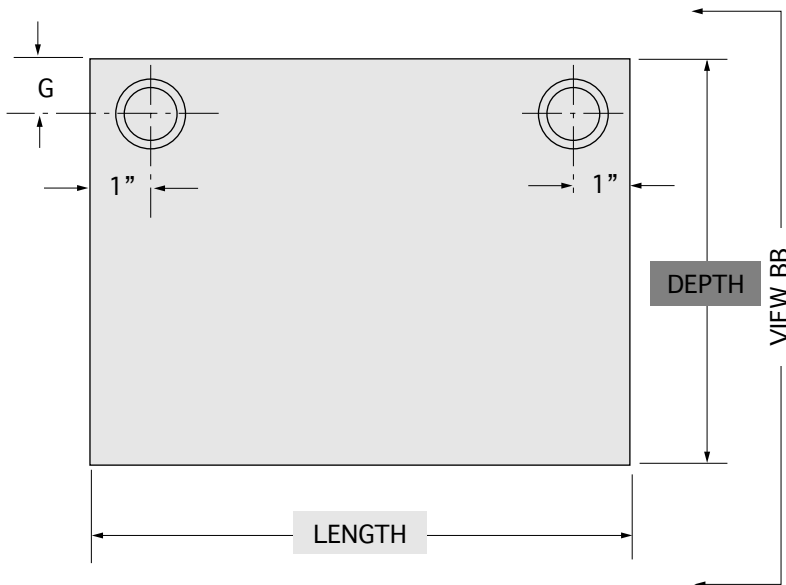
STYLE M-28



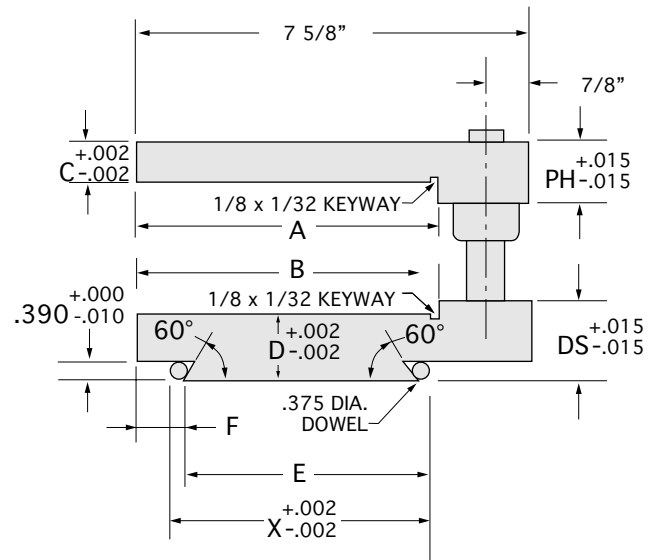
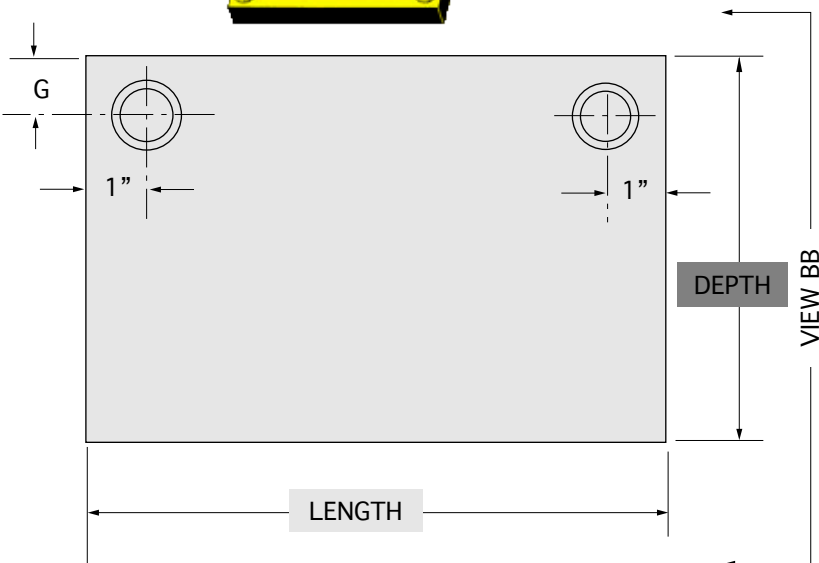
WHEN ORDERING PLEASE SPECIFY:

1. Style 28, 33 or 35, Friction or Ball Bearing
2. Length
3. Quantity



STYLE M-33


VIEW BB


STYLE M-35


VIEW BB

MULTI-SLIDE DIE SET DIMENSIONS

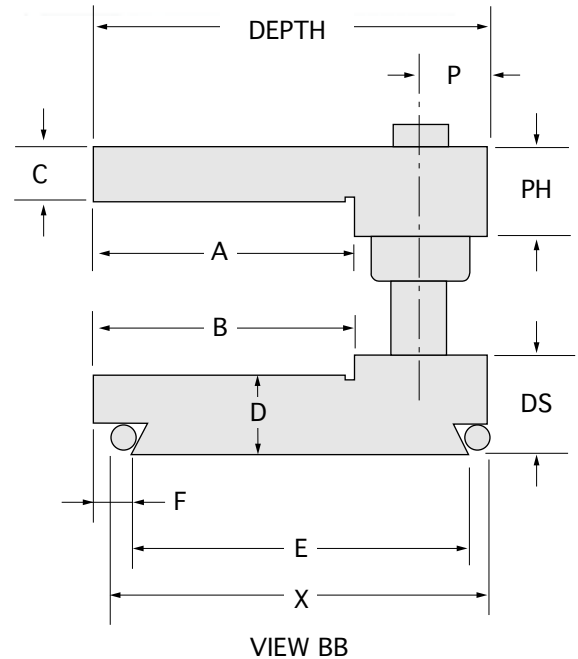
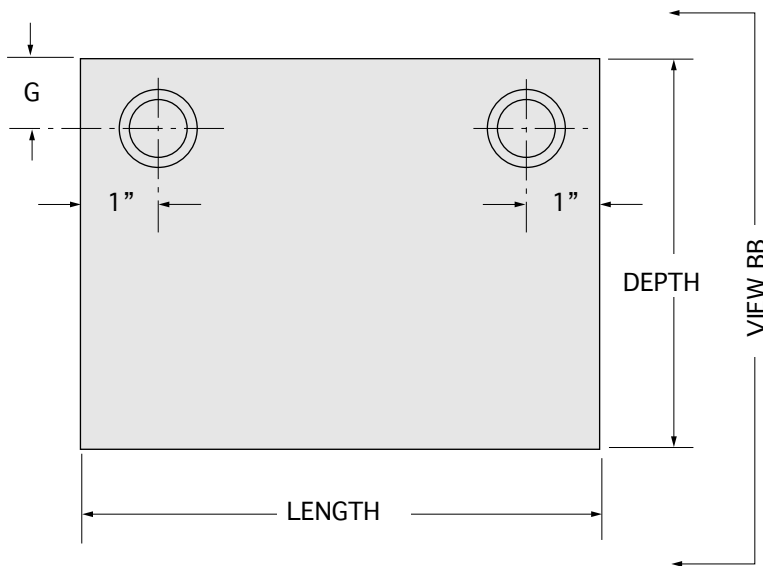
Style No.	SIZE		THICKNESS		PINS		A	B	C	D	E	F	G	X
	Length	Depth	PH	DS	Diameter/Length									
M-28	Specify	8.125	1.125	1.250	3/4 x 4		3.375	3.375	0.688	1.000	4.375	.437	1.000	4.950
M-33	Specify	6.875	1.125	1.500	3/4 x 4		4.875	5.125	0.688	1.250	4.000	.625	1.125	4.573
M-35	Specify	7.625	1.125	1.500	3/4 x 4 1/2		5.875	5.875	0.688	1.250	4.500	.875	0.875	5.078

NOTE: Bushings in Multi-Slide die sets are solid bronze 2" long.

Superior Multi-Slide Stock Die Sets are manufactured to meet or exceed specifications required on Four-Slide machines. Superior has these die sets available from stock in three styles and sizes. Multi-Slide Stock Die Sets are manufactured from Fortal®.

WHEN ORDERING PLEASE SPECIFY:

1. Quantity
2. Catalog Number



MULTI-SLIDE DIE SET SIZE INFORMATION															
STYLE	SIZE		THICKNESS		PIN LGTH	A	B	C	D	E	F	G	P	X	CATALOG NUMBER
	LGTH	DEPTH	PH	DS											
M-28	8	5.125	1.125	1.250	4	3.375	3.375	0.688	1.000	4.375	0.437	1.000	1.000	4.950	MF-28-08
M-28	10	5.125	1.125	1.250	4	3.375	3.375	0.688	1.000	4.375	0.437	1.000	1.000	4.950	MF-28-10
M-28	12	5.125	1.125	1.250	4	3.375	3.375	0.688	1.000	4.375	0.437	1.000	1.000	4.950	MF-28-12
M-33	8	6.875	1.125	1.500	4	4.875	5.125	0.688	1.250	4.000	0.625	1.125	1.125	4.573	MF-33-08
M-33	10	6.875	1.125	1.500	4	4.875	5.125	0.688	1.250	4.000	0.625	1.125	1.125	4.573	MF-33-10
M-33	12	6.875	1.125	1.500	4	4.875	5.125	0.688	1.250	4.000	0.625	1.125	1.125	4.573	MF-33-12
M-35	8	7.625	1.125	1.500	4.5	5.875	5.875	0.688	1.250	4.500	0.875	0.875	0.875	5.078	MF-35-08
M-35	10	7.625	1.125	1.500	4.5	5.875	5.875	0.688	1.250	4.500	0.875	0.875	0.875	5.078	MF-35-10
M-35	12	7.625	1.125	1.500	4.5	5.875	5.875	0.688	1.250	4.500	0.875	0.875	0.875	5.078	MF-35-12



H&O Die Supply
7200 Interstate 20 Kennedale, TX 76060

Phone: 214-630-6660
Fax: 214-630-6693

Type A Ball Bearing Die Sets

COMPONENT DESIGN SELECTION

Superior Type A Ball Bearing Die Sets are manufactured with a grooved guide pin and an aluminum alloy ball cage with ball bearings. These components are used instead of friction guide pins and bushings and contribute to longer die life. Ideal applications for ball bearing die sets are those which require high press speeds and easier assembly/disassembly of the die set.

Lubrication of Type A ball bearing components is recommended for optimum life. Lubriplate MAG-00 is available from Superior Die Set for ball bearing die set lubrication.

Superior's MAXICAGE System for Type A ball bearing die sets can allow the condition for the cage to rotate while not under preload.

WHEN ORDERING PLEASE SPECIFY:

1. Style (ex. BB 75)
2. Quantity
3. Punch Holder (PH)

Thickness

Depth

 * Length
4. Die Shoe (DS)

Thickness

Depth

 * Length
5. Pin Length or Minimum Shut Height
6. Bushing Type, Demountable Shoulder or Straight Sleeve



Style 20 Ball Bearing Die Sets

Boss size, pin and bushing data are for Superior Style 20 Standard Flange, Milled Flange or Bolt Slot Flange Ball Bearing Die Sets. These dimensions are different than Style 20 Friction Die Sets and should be considered when ordering. Dimensions are found in the Standard Pin Location Chart.

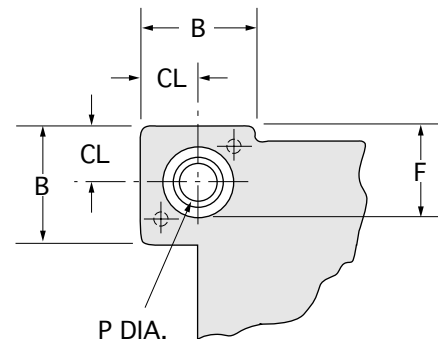
Revised 1/92

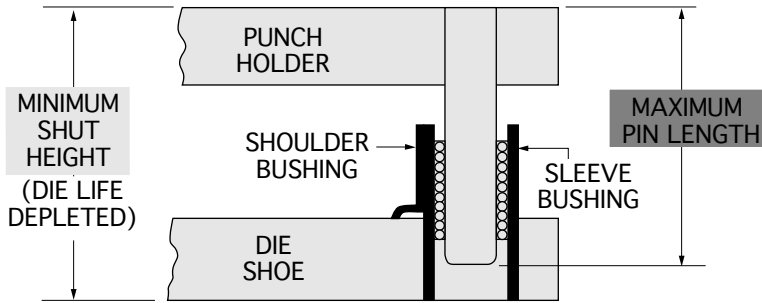


Superior Type A Ball Bearing Die Set with demountable shoulder bushings.



On ball bearing die sets with extended open height, recommended maximum bearing cage length may be exceeded. In this case, precision alignment is maintained by installing Superior sleeve-type ball bearings. The required extra cage length is supported with hardened steel sleeves.





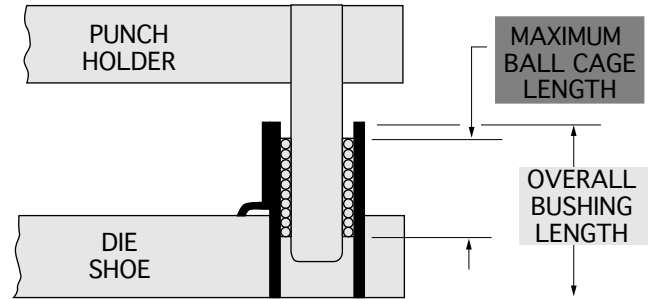
MAXIMUM PIN LENGTH

Straight Guide Pin **Maximum Pin Length** = **Minimum Shut Height** - 1/4"

Demountable Guide Pin **Maximum Pin Length** = **Minimum Shut Height** - **Punch Holder Thickness** - 1/4"

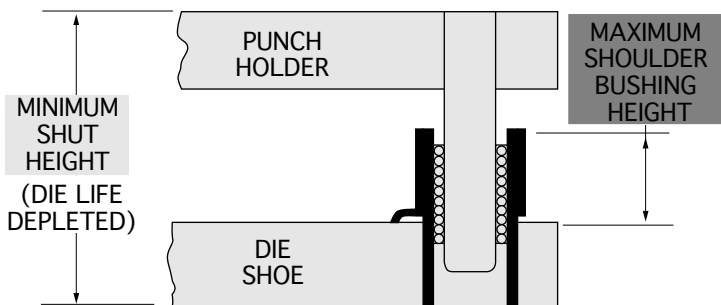
NOTE: Select nearest shorter standard pin length.

MAXIMUM BALL CAGE LENGTH



Maximum Ball Cage Length = **Overall Bushing Length** - 1/2"

NOTE: Select nearest shorter standard cage length.

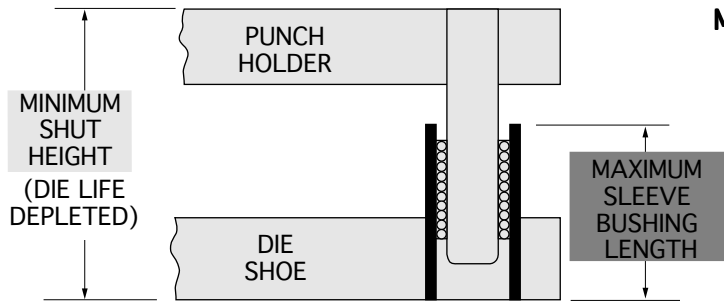


MAXIMUM SHOULDER BUSHING HEIGHT ABOVE DIE SHOE

Straight Guide Pin **Maximum Bushing Height** = **Minimum Shut Height** - (**Punch Holder Thickness** + **Die Shoe Thickness**) - 1/4"

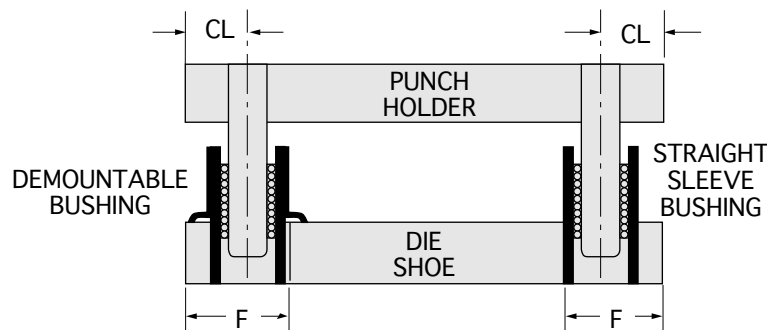
Demountable Guide Pin **Maximum Bushing Height** = **Minimum Shut Height** - (**Punch Holder Thickness** + **Die Shoe Thickness**) - 1"

NOTE: Select nearest shorter standard bushing height.

MAXIMUM STRAIGHT SLEEVE BUSHING LENGTH


Straight Guide Pin **Maximum Sleeve Bushing Length** = **Minimum Shut Height** - Punch Holder - 1/4" Thickness
 Demountable Guide Pin **Maximum Sleeve Bushing Length** = **Minimum Shut Height** - Punch Holder - 1" Thickness

NOTE: Select nearest shorter standard bushing length.

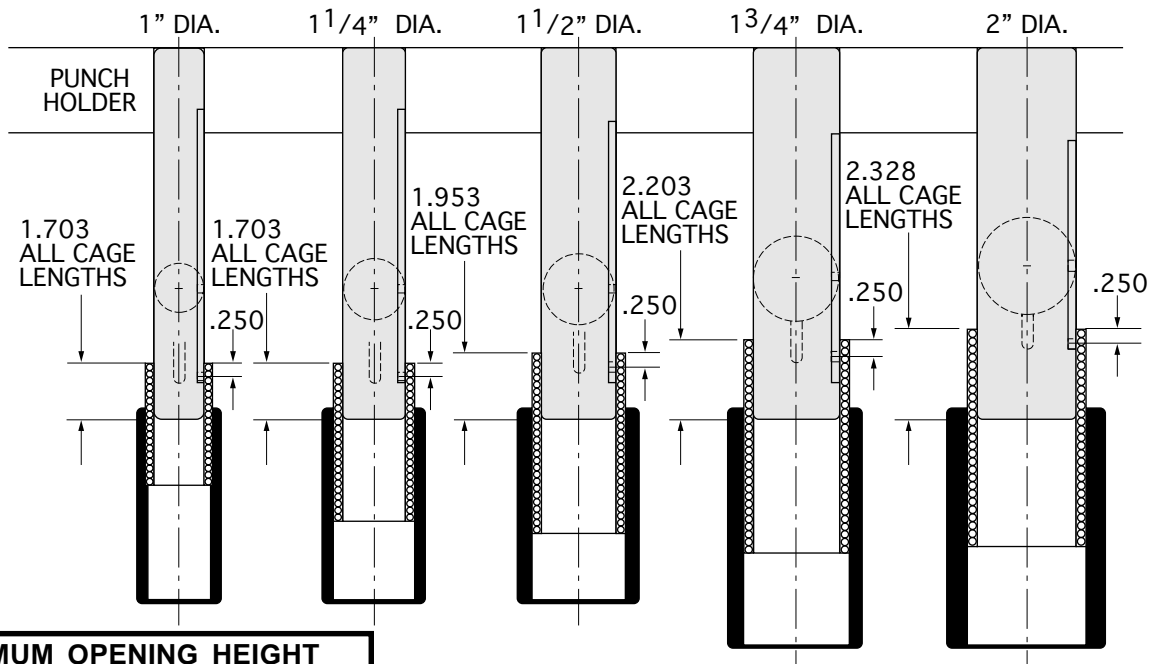
BALL BEARING STANDARD PIN LOCATIONS


Commonly used pin diameter locations are shown in the chart. However, specific tooling forces should be taken into account when ordering ball bearing die set style, pin size, punch holder and die shoe thicknesses.

Standard Pin Locations - Ball Bearing							
Guide Pin Diameter	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
Straight Sleeve F Dim.	2.358	2.803	3.218	3.498	3.955	4.465	4.965
Demount. Bushing F Dim.	2.500	2.937	3.343	3.625	4.156	4.656	5.156
Style 20 B Dim.	3.00	3.50	4.00	4.25	-	-	-
CL Dimension	1.500	1.750	2.000	2.125	2.375	2.625	2.875

NOTE: F Dimension refers to distance from edge of die shoe to inside edge of bushing in die shoe.

BALL BEARING ENGAGEMENT POINTS

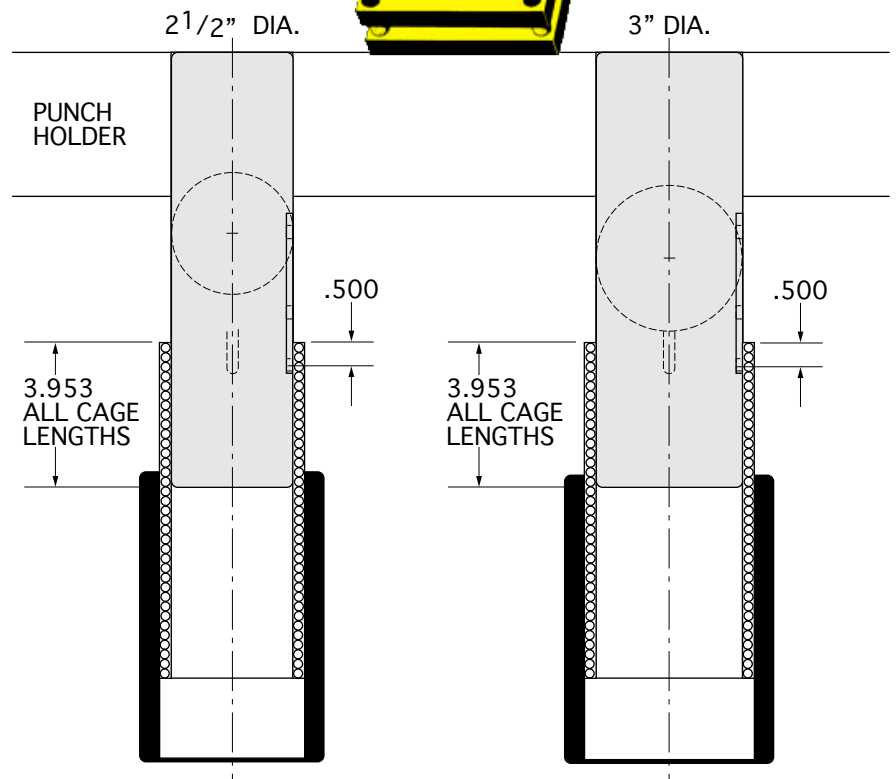
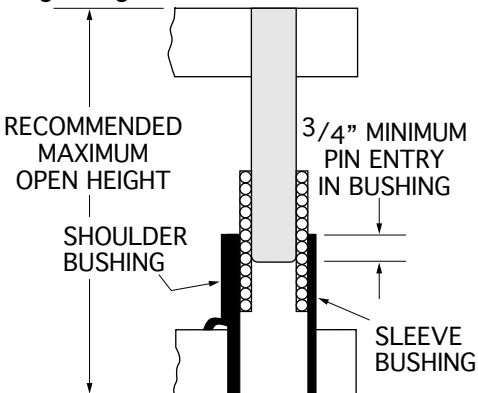


MAXIMUM OPENING HEIGHT

Superior recommends that for maximum ball bearing component life, the pin should remain in the bushing **at least 3/4"** at the maximum open height during die set operation.

The guide pin should be engaged in the bushing by at least 1 1/2 times the pin diameter at the point in the press stroke where the punch is 1/4" above the material.

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 and gib alignment.

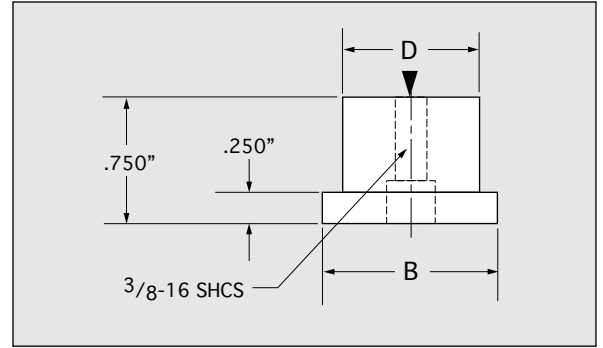


FORTAL® end cap is secured to ball bearing die set pins with a recessed socket head cap screw. The Superior MaxiCage System is typically used when there is partial or full disengagement of the guide pin and bushing. While under this no-preload condition, the end cap permits the ball cage to rotate freely about the guide pin.

The Superior MaxiCage System maximizes Type A ball cage surface bearing efficiency -- with complete ball coverage throughout the cage.

For retrofitting existing die sets with the Superior MaxiCage System, contact Superior. Please supply us with your present die set specifications.

MaxiCage system permits ball cage to rotate about guide pin while not under preload.



WHEN ORDERING PLEASE SPECIFY:

1. Part Number
2. Quantity

NOTE:

1. ► Indicates CAD Merge Point.
2. Select nearest shorter standard ball cage length.
3. Select nearest shorter standard pin length.



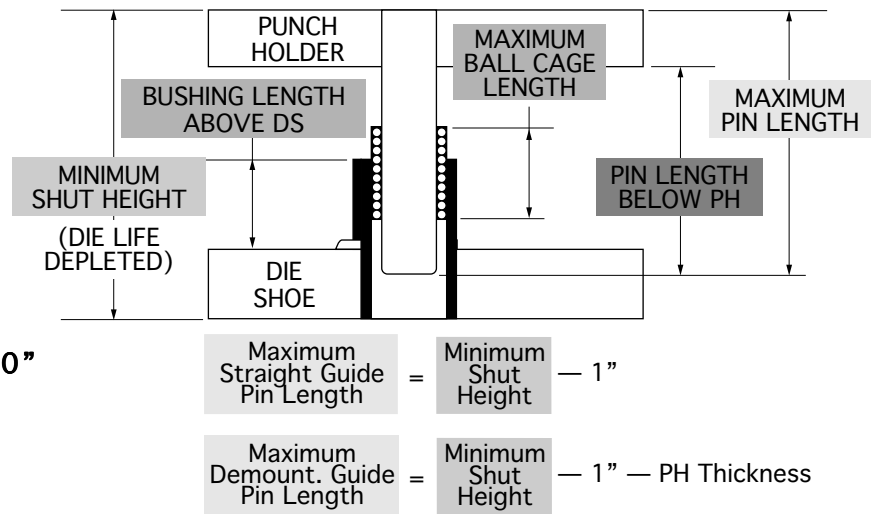
Determining Maximum Ball Cage Length for MaxiCage System

Step 1 $C = \text{Pin Length Below PH} + .375"$

Step 2 $E = \text{Pin Length Below PH} + \text{Bushing Length Above DS} + \text{PH Thickness} + \text{DS Thickness} + .500"$

Step 3 $A = E - \text{Minimum Shut Height}$

Step 4 Straight Guide Pin $\text{Maximum Ball Cage Length} = C - \frac{A}{2}$ OR Demountable Guide Pin $\text{Maximum Ball Cage Length} = (C - \frac{A}{2}) - .625"$



END CAP DIMENSIONS							
Guide Pin Diameter	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
PART NO.	334-0804	334-1004	334-1204	334-1404	334-1604	334-2004	334-2404
D Dimension	7/8"	1 1/8"	1 3/8"	1 5/8"	1 7/8"	2 3/8"	2 7/8"
B Dimension	1 1/4"	1 1/2"	1 3/4"	2"	2 3/8"	2 7/8"	3 3/8"

HANDLING HOLES - For easy and safe handling, drilled and tapped handling holes can be put into the punch holder and die shoe. Three options are available for use with standard lifting eyes.

HANDLING HOLE INFORMATION

Optional handling (eye bolt) holes may be added to die sets by specifying the diameter desired and one of the locational options shown. The diameter of the handling holes must **always** be specified. Any other configuration may be requested.

OPTION 1

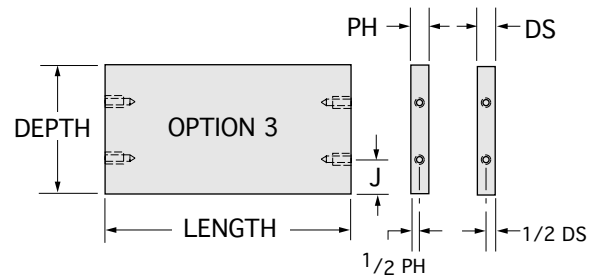
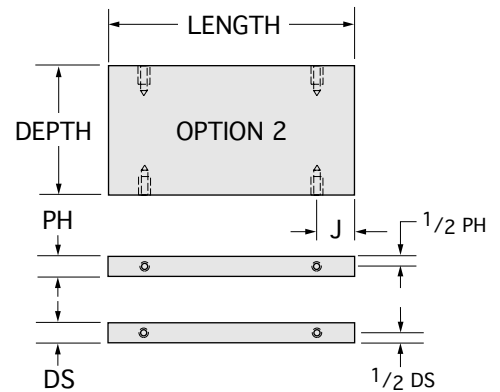
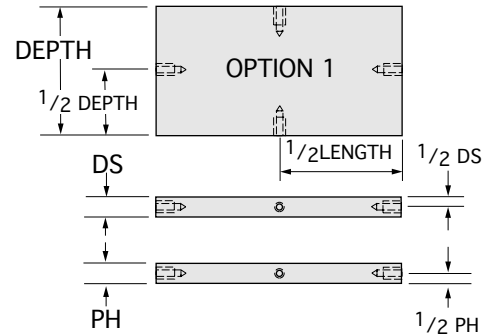
NOTE: 1. Handling holes are centered on length and depth edges.

OPTIONS 2 AND 3

NOTE: 1. J Dimension 4 inches minimum, on die sets up to and including 29 inch length or depth.

NOTE: 2. J Dimension equals 3 times guide pin diameter, on die sets over 29 inch length to and including 57 inch length or depth.

NOTE: 3. J Dimension equals 1/6 of the length, on die sets over 57 inch length or depth.





AIR VENTS - An air relief can be machined into any Superior die set to avoid trapped air in bushings.

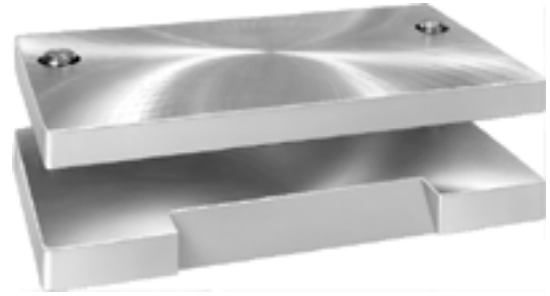


WELDED LUGS - Typical welded lugs on the die shoe are used for mounting in presses.

LAMINATION DIE SETS - Superior lamination die sets are precision engineered and manufactured for extremely critical, tight tolerance applications. These lamination die sets perform where the most demanding specifications call for sustainable precision, and durable use in high-volume production operations. Superior lamination die sets assure top performance in these applications. For specific tolerances see inspection report.

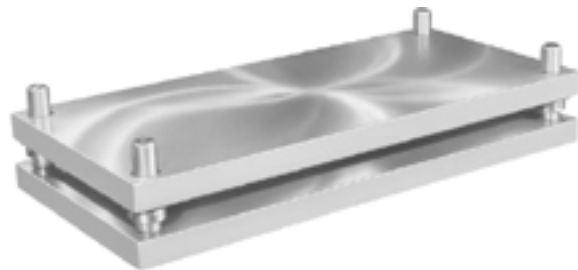
CLASS 1 FIT OPTION - For a tighter tolerance on standard die sets, the guide pin and bushing fit can be furnished with tighter clearance, typically specified as a Class 1 Fit. This is an economic alternative for standard die sets requiring better operating tolerances. See inspection report for specifications.

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SLUG CHUTES - A slug discharge chute provides efficient clearing of slugs and trim. A milled slug chute is shown. Flame cut chutes can be provided with a minimum angle of 28 degrees. All other slug chute angles less than 28 degrees are milled.

FLAME CUT SLOTS - Flame cut slots in the punch holder, die shoe or both can be used for bolting or chain handling. Specify slot size when ordering.



FORTAL DIE SET FEATURES

Standard:

- Saw-cut edges
- All edges chamfered
1.5mm x 45°
- Top and bottom surfaces
Blanchard ground
+1.5 mm to -3.0mm
Tighter tolerances available
upon request



Optional:

- Top and Bottom surfaces
surface ground
- Edges either milled or ground
- Machining services also
available

CHEMICAL COMPOSITION

Superior FORTAL is a high strength, lightweight, easy to machine alloy. Stronger than 1020 steels, FORTAL is an ideal material for all types of die sets. FORTAL HR is solution heat treated then artificially aged and stress relieved by stretching. FORTAL HP is solution heat treated, stabilized, artificially aged and stress relieved by stretching.

Cu.....1.6	Cr..... .23
Mg.....2.5	Zn..... 5.6
	Al..... 90.07

WHEN ORDERING A FORTAL DIE SET, PLEASE SPECIFY:

1. Fortal Material
2. Style Number, Friction or Ball Bearing
3. Quantity
4. Punch Holder Thickness* (in mm)
Depth (in mm) Length (in mm)
5. Die Shoe Thickness* (in mm)
Depth (in mm) Length (in mm)
6. Pin Type and Size Number
7. Bushing Type and Material
(2" Steel Shoulder Standard)
8. Shank Type and Size (if required)

* See standard die set thicknesses in chart above.

DIMENSIONAL DATA

Dimensions in mm	STOCK RAW PLATE WIDTH X LENGTH						
	1 5 0 0	1 2 5 0	1 2 0 0	1 0 6 0	9 9 0	9 0 0	8 1 0
Raw Plate Thickness	X	X	X	X	X	X	X
3 0 0 0	2 5 0 0	2 5 0 0	2 5 0 0	2 5 0 0	2 5 0 0	2 5 0 0	2 5 0 0
14		HR					
18.5	HR						
22.5	HR						
28	HR						
35.5	HR						
39	HR						
43.5	HR						
46	HR						
53.5	HR						
65	HR						
72	HR						
82	HR						
92	HR						
102		HP					
127			HP				
152				HP			
162					HP		
182						HP	
202							HP

NOTE: 1mm = .03937 inches, 1 inch = 25.4 mm

Larger sizes are readily available upon request.

MECHANICAL PROPERTIES

PARAMETERS	FORTAL HR (typical)	FORTAL HP (typical)	STEEL 1020 HR
Thickness (mm)	<92	>92	-
Tensile strength (PSI)	78,320	74,000	64,000
Yield strength (PSI)	69,600	63,800	50,200
Shear strength (PSI)	48,000	48,000	48,000
Hardness Brinell	150	150	142
Density (pounds/inch ³)	0.1	0.1	.2833
Modulus of elasticity (pounds/inch ²)	10.44 x 10 ⁶	10.3 x 10 ⁶	30 x 10 ⁶
Lineal coefficient of expansion (10-6 x °F) between 68° and 212° F	13.05	12.78	6.30
Thermal conductivity (W/m x k)	130	160	40

IMPORTANT NOTE: Cutting of FORTAL can be by wire EDM, conventional EDM or Plasma. Flamecutting and welding of Fortal are not recommended. For welding criteria and other information, see **Fortal Technical Data Manual**.

Superior steel bosses are available on all friction or ball bearing die sets. Bosses can be furnished on the punch holder, die shoe or both. When used on the die shoe, bosses shorten the unsupported guide pin length, reducing pin deflection. Bosses are commonly used when the guide pin diameter is greater than the punch holder or die shoe thicknesses.

Steel bosses are flame cut from the same steel as the punch holder or die shoe, ground top and bottom, mounted to the punch holder and/or die shoe, then drilled and bored for guide pins and bushings. Standard bosses are available in: Welded, Screwed and Welded or Removable Styles. Welded bosses are commonly used for a majority of applications and are most economical.

Specific tooling forces should be taken into account when ordering boss size, guide pin size, punch holder and die shoe thicknesses. Special bosses can be ordered in almost any height and size. Punch holder bosses and die shoe bosses can be of different heights.

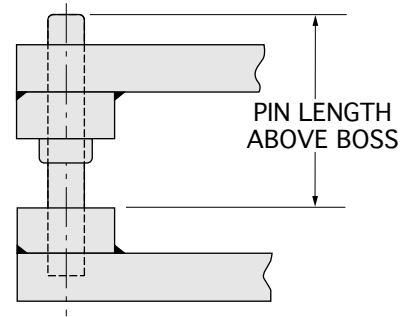


FIGURE 1

STANDARD BOSS DIE SETS				
NOM. PIN DIA. A DIM.	FRICTION		BALL BEARING	
	SQUARE OF BOSS B DIM.	CL	SQUARE OF BOSS B DIM.	CL
1	3	1.500	3	1.500
1 1/4	3 1/4	1.625	3 1/2	1.750
1 1/2	3 1/2	1.750	4	2.000
1 3/4	3 3/4	1.875	4 1/4	2.125
2	4	2.000	4 3/4	2.375
2 1/2	5	2.500	5 1/4	2.625
3	5 1/2	2.750	5 3/4	2.875

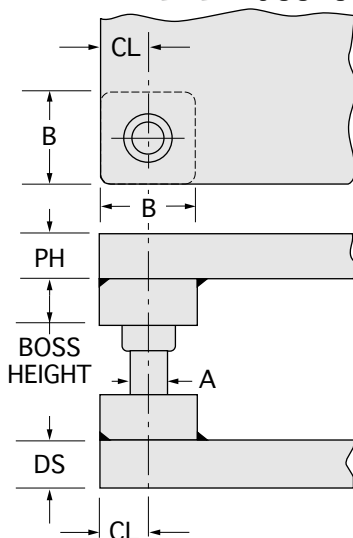
WHEN ORDERING PLEASE SPECIFY:

1. Boss Type (ex. Welded)
2. Boss Size and Height
3. Location, Punch Holder and/or Die Shoe
4. For Guide Pin Bosses Specify Pin Length Above Boss - See Fig. 1

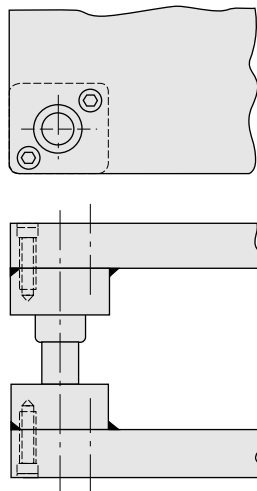
NOTE:

1. * Dowels are not used when component extends past the boss.
2. When punch holder or die shoe thickness is 1 1/4" or less, screwed and doweled bosses are standard.
3. ▲ Bosses over 7" height are screwed and welded as standard.

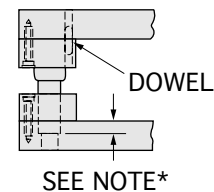
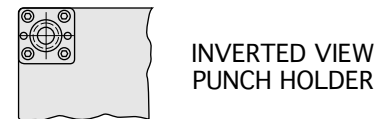
WELDED BOSSES



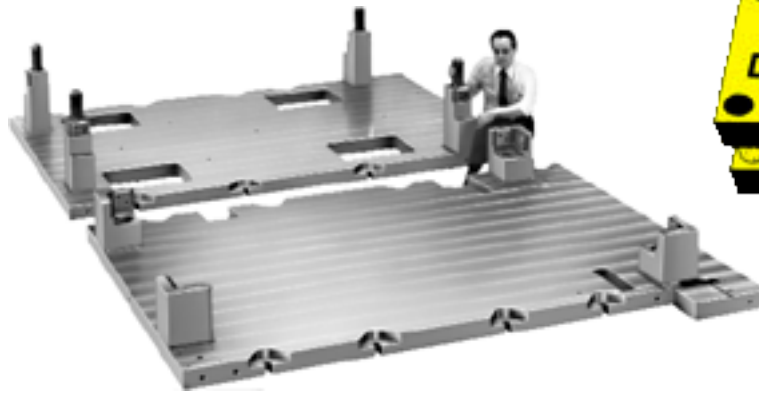
▲ SCREWED & WELDED BOSSES



*** SCREWED & DOWELED BOSSES**

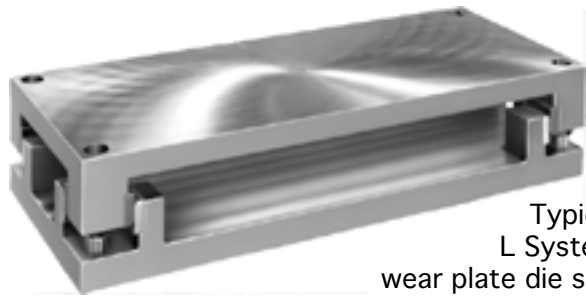


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WEAR PLATE DIE SETS - Provide maximum die set rigidity and accuracy for large and heavy gauge parts. These die sets incorporate a variety of boss, heel block and wear plate arrangements for maximum strength and precision operation under heavy loads. Wear plate die sets are commonly used in applications that generate high internal die forces such as blanking and forming of heavy gauge materials.

Unique manufacturing capabilities allow Superior to furnish wear plate die sets in sizes to 30 Tons, in almost any configuration, with two, three, four or more guide pins and bushings including open design (without guide pins or bushings).



Typical L System wear plate die set.

BALL BEARING WEAR PLATE DIE SETS - This type of wear plate die set features precise set-up alignment and easy assembly/disassembly when mounting in a large press. Once set-up is complete, the ball cages are sometimes removed before press operation to allow the wear plates full control of die set engagement. After press operation, ball cages are quickly replaced onto the guide pins for die set assembly.



Right angle wear plate L block.



Right angle wear plate boss.



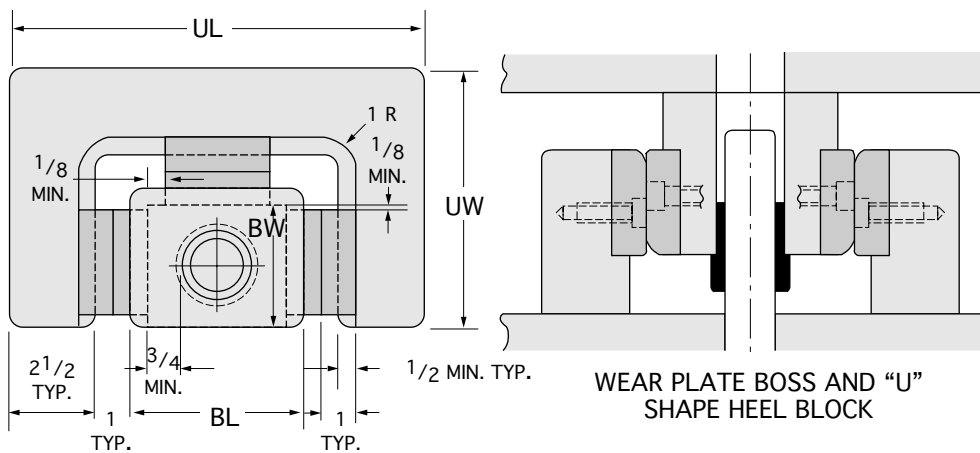
A typical die set application using wear plate L blocks and bosses for stamping of a large, heavy gauge part.

Three typical boss and heel block wear plate systems (U, L and V) are available from Superior. These approaches to wear plate die set construction allow the designer to build in greater rigidity at any given point in the stroke. Wear plates are positioned to resist offsetting die forces. Proper wear plate system design substantially reduces wear on die blocks, punches and other die components.

Heavy duty die set construction utilizing wear plates also helps to maintain die life even though the press ram may be poorly aligned.

Superior Wear Plates are available in hardened steel or durable aluminum bronze.

U SYSTEM

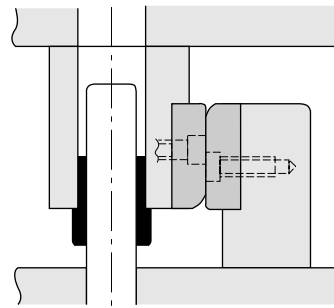
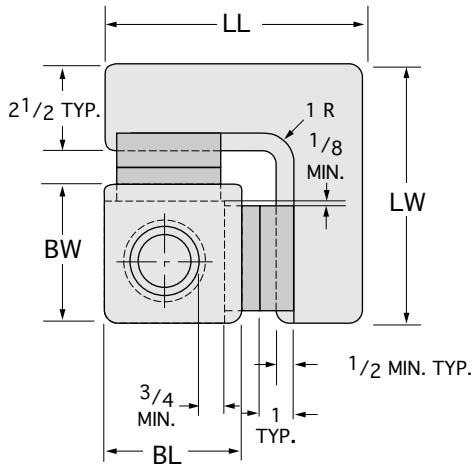


U SYSTEM DIMENSION				
*TYPICAL BLOCK & BOSS SIZES FRICTION BEARING PINS/BUSHINGS				
NOM PIN DIA	UL	UW	BL	BW
1 1/2	11 1/2	7 1/2	4 1/2	4
1 3/4	12	7 3/4	5	4 1/4
2	12 1/2	8	5 1/2	4 1/2
2 1/2	13	9	6	5 1/2
3	13 1/2	9 1/2	6 1/2	6

U SYSTEM DIMENSION				
*TYPICAL BLOCK & BOSS SIZES BALL BEARING PINS/BUSHINGS				
NOM PIN DIA	UL	UW	BL	BW
1 1/2	12	8	5	4 1/2
1 3/4	12 1/2	8 1/4	5 1/2	4 3/4
2	13	8 3/4	6	5 1/4
2 1/2	13 1/2	9 1/4	6 1/2	5 3/4
3	14	9 3/4	7	6 1/4



L SYSTEM



WEAR PLATE BOSS AND "L" BLOCK

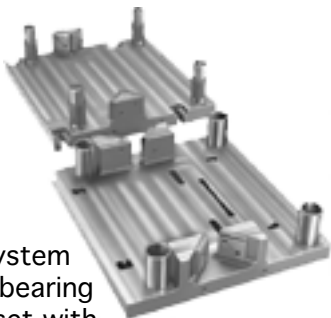
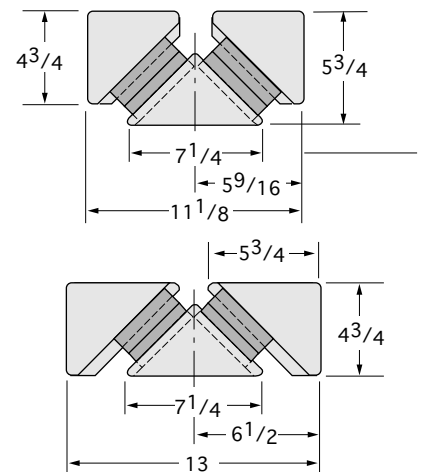
L SYSTEM DIMENSION				
*TYPICAL BLOCK & BOSS SIZES				
FRICTION BEARING PINS/BUSHINGS				
NOM PIN DIA	LL	LW	BL	BW
1 1/2	7 1/2	7 1/2	4	4
1 3/4	7 3/4	7 3/4	4 1/4	4 1/4
2	8 1/4	8 1/4	4 3/4	4 3/4
2 1/2	9	9	5 1/2	5 1/2
3	9 1/2	9 1/2	6	6

L SYSTEM DIMENSION				
*TYPICAL BLOCK & BOSS SIZES				
BALL BEARING PINS/BUSHINGS				
NOM PIN DIA	LL	LW	BL	BW
1 1/2	8 1/4	8 1/4	4 3/4	4 3/4
1 3/4	8 1/4	8 1/4	4 3/4	4 3/4
2	8 3/4	8 3/4	5 1/4	5 1/4
2 1/2	9 1/4	9 1/4	5 3/4	5 3/4
3	9 3/4	9 3/4	6 1/4	6 1/4

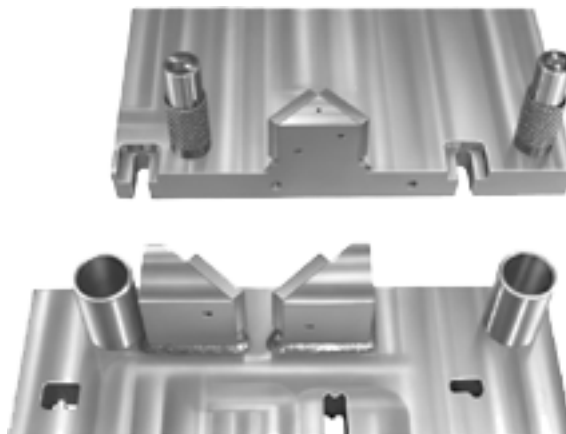
V SYSTEM

Superior V System offers unique advantages. 45° Angled bosses and heel blocks use up space between the guide pins and bushings without obstructing the work area. Commonly used on four pin die sets, the V System wear plates take the high internal die forces and have less boss and heel block components. Custom angled bosses are available.

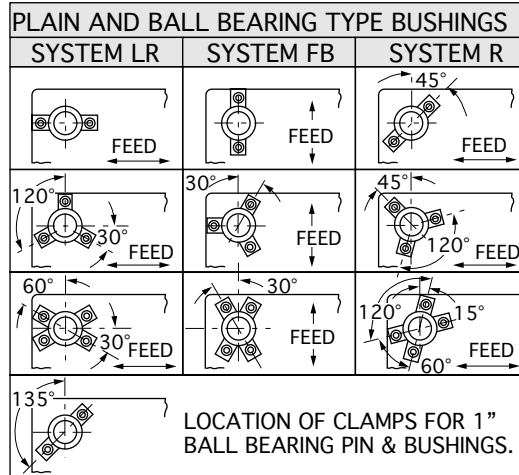
*TYPICAL V SYSTEM DIMENSIONS



V System ball bearing die set with custom machining.

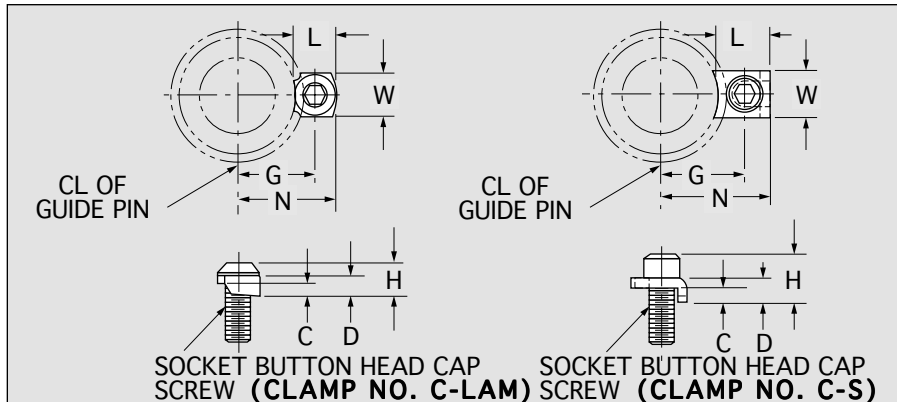


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BUSHING CLAMP LOCATION SYSTEMS

Three bushing clamp location systems are available for Superior die sets. The LR, FB, and R Systems allow for various material feeding directions and should be considered when ordering any die set. Special bushing clamp configurations are available as an option.



BUSHING CLAMPS

Bushing clamps are available in **two styles**. See chart for specific die set component application. All slip fit demountable guide pins or bushings are supplied with clamps and socket head cap screws.

WHEN ORDERING PLEASE SPECIFY:

1. Bushing Clamp Part Number C-LAM or C-S
2. Quantity

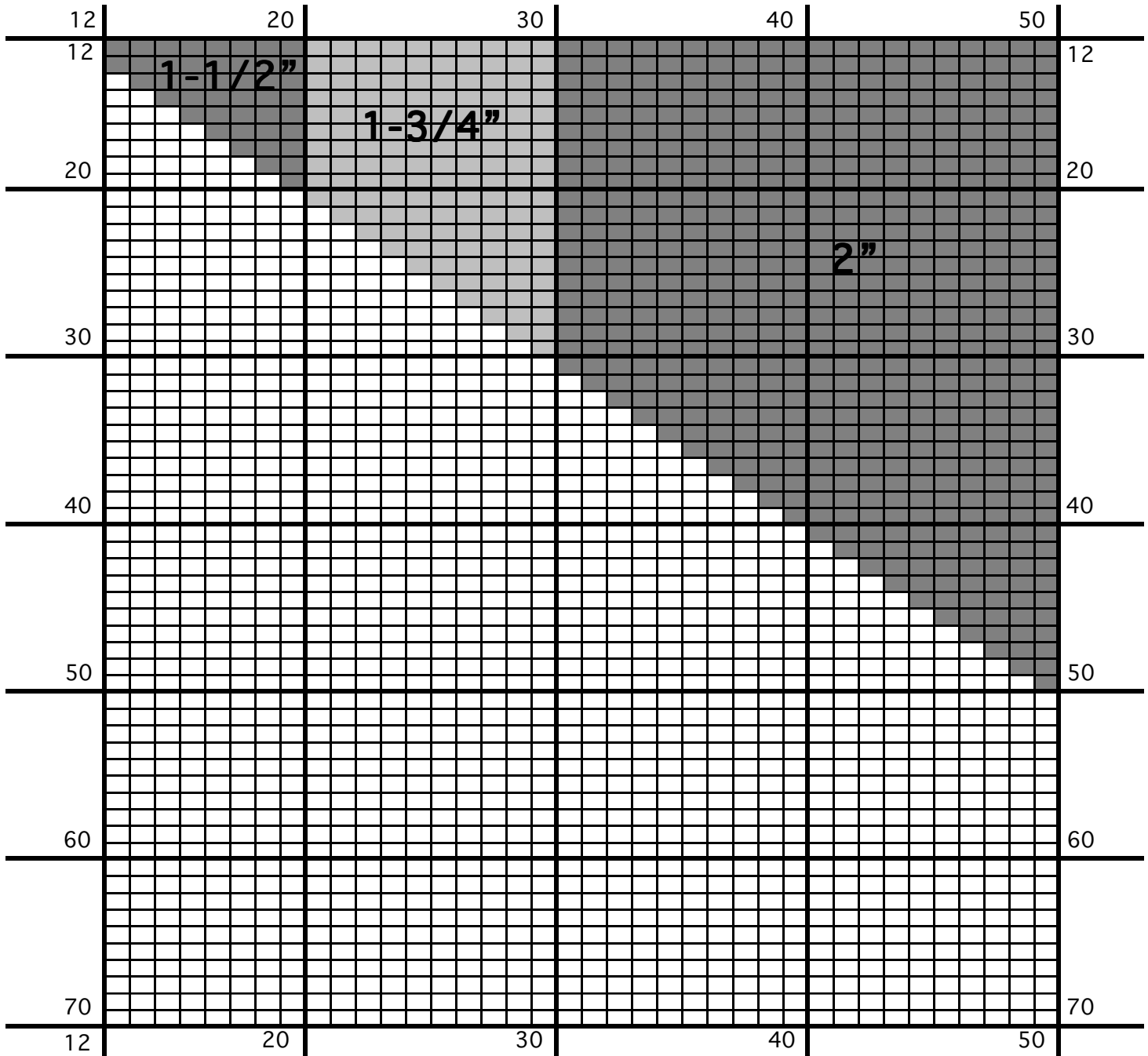
COMPONENT	BUSHING CLAMP DIMENSIONS									BORING SIZE FOR PIN OR BUSHING TOLERANCE +.0005/- .0000		
	NOM DIA.	LOCATION		SIZE					PART NO.			
	BUSH I.D. PIN O.D.	G	N	L	W	C	D	H				
BUSHINGS: DEMOUNTABLE STEEL, BRONZE, SHOULDER	5/8	.875	1.260	.745	.688	.188	.370	.688	C-S	2	5/16 X 3/4	1.0000
	3/4	.938	1.322	.745	.688	.188	.370	.688	C-S	2	5/16 X 3/4	1.1250
	7/8	1.062	1.448	.745	.688	.188	.370	.688	C-S	2	5/16 X 3/4	1.2500
	1	1.125	1.510	.745	.688	.188	.370	.688	C-S	2	5/16 X 3/4	1.5000
	1 1/4	1.250	1.635	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	1.7500
	1 1/2	1.375	1.760	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	2.0000
	1 3/4	1.500	1.885	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	2.2500
	"SUPERIOR" BRONZE-RITETM	2	1.625	2.010	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4
	2 1/2	1.938	2.323	.745	.688	.188	.370	.688	C-S	4	5/16 X 3/4	3.1250
	3	2.188	2.573	.745	.688	.188	.370	.688	C-S	4	5/16 X 3/4	3.6250
BUSHINGS: DEMOUNTABLE BRONZE PLATED ALL SHOULDER LENGTHS EXCEPT SHORT	3/4	.859	1.140	.547	.562	.188	.281	.447	C-LAM	2	5/16 X 3/4	1.1250
	7/8	.984	1.265	.547	.562	.188	.281	.447	C-LAM	2	5/16 X 3/4	1.3750
	1	1.078	1.359	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	1.5000
	1 1/4	1.250	1.531	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	1.7500
	1 1/2	1.375	1.656	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	2.0000
	1 3/4	1.500	1.781	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	2.2500
	2	1.765	2.046	.547	.562	.188	.281	.447	C-LAM	4 *	5/16 X 3/4	2.5000
	2 1/2	2.015	2.296	.547	.562	.188	.281	.447	C-LAM	4	5/16 X 3/4	3.0000
3	2.390	2.671	.547	.562	.188	.281	.447	C-LAM	4	5/16 X 3/4	3.6250	
BUSHINGS: DEMOUNTABLE BRONZE PLATED SHORT SHOULDER LENGTH	3/4	.859	1.140	.547	.562	.188	.281	.447	C-LAM	2	5/16 X 3/4	1.1250
	7/8	.984	1.265	.547	.562	.188	.281	.447	C-LAM	2	5/16 X 3/4	1.3750
	1	1.078	1.359	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	1.5000
	1 1/4	1.250	1.531	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	1.7500
	1 1/2	1.375	1.656	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	2.0000
	1 3/4	1.500	1.781	.547	.562	.188	.281	.447	C-LAM	3	5/16 X 3/4	2.2500
	2	1.672	1.953	.547	.562	.188	.281	.447	C-LAM	4	5/16 X 3/4	2.5000
	2 1/2	1.890	2.171	.547	.562	.188	.281	.447	C-LAM	4	5/16 X 3/4	3.0000
3	2.140	2.421	.547	.562	.188	.281	.447	C-LAM	4	5/16 X 3/4	3.5000	
BUSHINGS: DEMOUNTABLE BALL BEARING TYPE	1	1.250	1.635	.745	.688	.188	.370	.688	C-S	2	5/16 X 3/4	1.7160
	1 1/4	1.428	1.813	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	2.1060
	1 1/2	1.593	1.978	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	2.4360
	1 3/4	1.748	2.133	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	2.7460
	2	2.045	2.430	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	3.1610
	2 1/2	2.295	2.680	.745	.688	.188	.370	.688	C-S	4	5/16 X 3/4	3.6810
3	2.500	2.885	.745	.688	.188	.370	.688	C-S	4	5/16 X 3/4	4.1810	
GUIDE PINS: DEMOUNTABLE	1	.875	1.260	.745	.688	.188	.370	.688	C-S	2	5/16 X 3/4	1.0000
	1 1/4	1.000	1.385	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	1.2500
	1 1/2	1.125	1.510	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	1.5000
	1 3/4	1.250	1.635	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	1.7500
	2	1.500	1.885	.745	.688	.188	.370	.688	C-S	3	5/16 X 3/4	2.0000
	2 1/2	1.750	2.135	.745	.688	.188	.370	.688	C-S	4	5/16 X 3/4	2.5000
3	2.000	2.385	.745	.688	.188	.370	.688	C-S	4	5/16 X 3/4	3.0000	

NOTE: 1. * This bushing requires the 3 clamp arrangement whenever the SYSTEM R configuration is chosen.
2. Bushing clamp configurations other than those shown are available as an option.

Standard Guide Pin diameters for Superior Friction or Ball Bearing die sets are determined by the overall width and length dimensions of the die set. The standard guide pin diameter is provided unless a smaller or larger diameter guide pin is specified when ordering. Charts shown are commonly used guidelines. Specific tooling forces should be taken into account when ordering die set style, pin size, punch holder and die shoe thicknesses.

When using the chart below to determine standard guide pin diameter, use the following procedure:

- 1) Determine overall length and depth dimensions of die set.
- 2) On fractional sizes for overall length or depth, round up fraction to next largest inch when using chart.
- 3) The **longest** dimension determines the guide pin diameter. On standard sets the length dimension is greater than the depth, so the chart can be used exactly as it is set up.



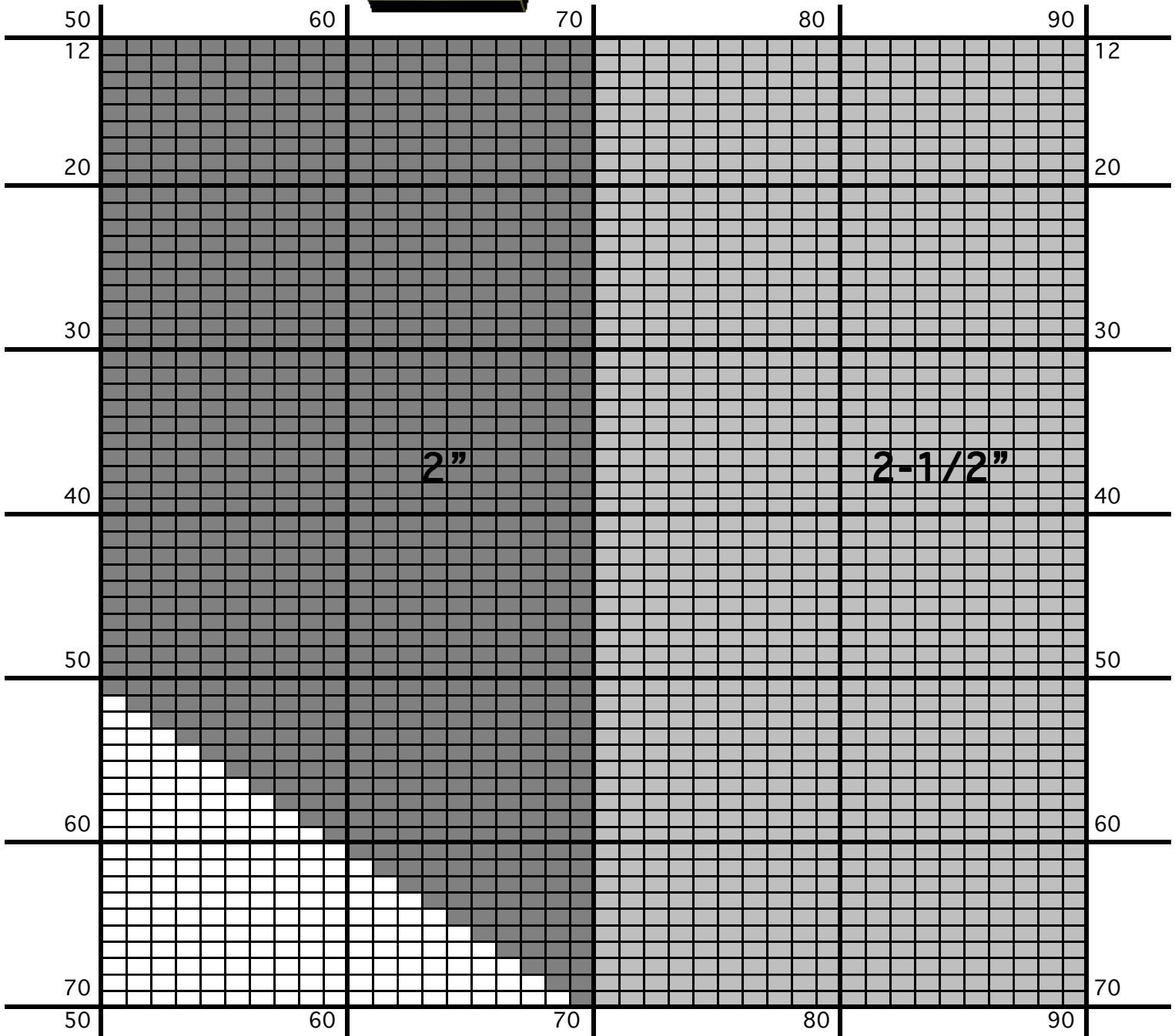
Common Example: Style 25 die set length 24", depth 12". From the chart we determine that the standard pin diameter is 1 3/4".

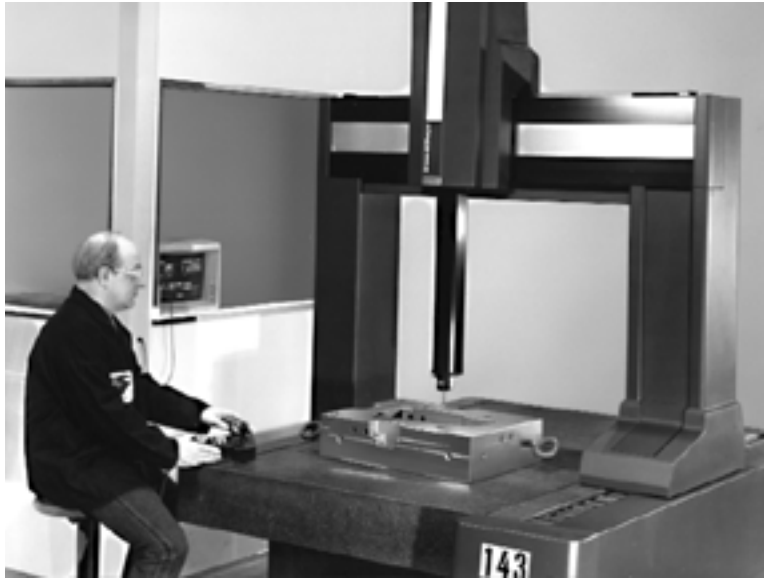
When a **Reverse** set is specified, the depth dimension is greater than the length. Therefore, the **depth** determines the standard pin diameter since it is the longest dimension.



Common Example: Style 25 Reverse die set length 12", depth 24". The standard pin diameter is 1 3/4".

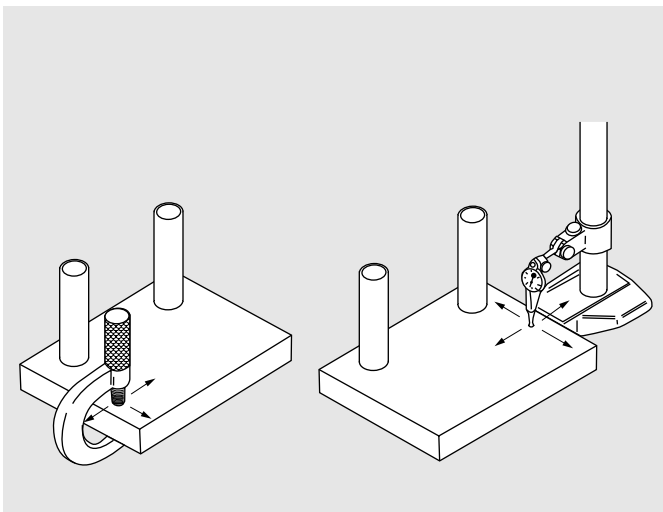
The standard guide pin diameters are suggested by Superior, based on those selections most commonly used. Smaller or larger guide pins other than standard guide pins can be provided. Refer to pages 7 thru 14 for specific die set style, pin, and bushing locations.



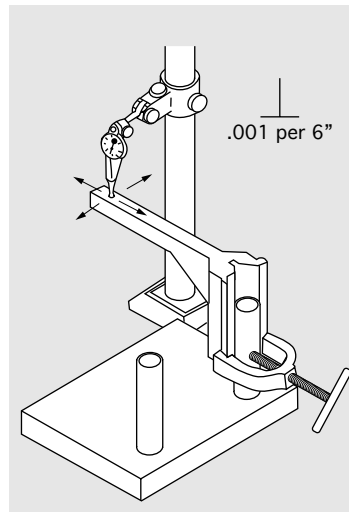


COMPUTERIZED COORDINATE MEASURING - Current updating to new manufacturing technology is ongoing at Superior. Quicker, more accurate inspection equipment helps us to provide consistent quality for all die sets we manufacture. Refer to Superior inspection reports for specific die set component tolerances.

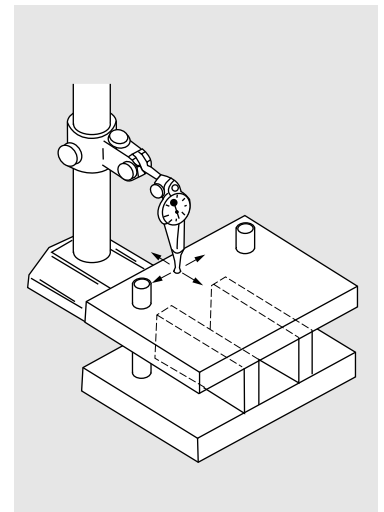
DIE SET INSPECTION METHODS



Flatness and Parallelism of punch holder or die shoe.



Guide pin squareness.



Dual parallel method for checking parallelism of all assembled die sets.

SUPERIOR ORDER NO.	STANDARD DIE SETS AND BOSS DIE SETS	DATE:
CUSTOMER:		CUSTOMER ORDER NO.
JOB DESCRIPTION:		DRAWING NO.
SPECIAL MATERIALS AND/OR TOOLS:		

TOLERANCES OF DIE SETS

GRINDING TOLERANCE
Die Shoe Top and Bottom Surface

	<u>STD</u>	<u>ACTUAL</u>
FLATNESS	Standard .001/FT Boss .002/FT	_____
PARALLELISM	Standard .001/FT Boss .002/FT	_____
THICKNESS	+1/16 -1/8	_____


GRINDING TOLERANCE
Punch Holder Top and Bottom Surface

	<u>STD</u>	<u>ACTUAL</u>
FLATNESS	Standard .001/FT Boss .002/FT	_____
PARALLELISM	Standard .001/FT Boss .002/FT	_____
THICKNESS	+1/16 -1/8	_____

Clearance Between Guide Pin and Bushing

<u>DIA</u>	<u>CLEARANCE</u>	<u>ACTUAL</u>
1 "	.0002-.0005	_____
1 - 1/4 "	.0002-.0005	_____
1 - 1/2 "	.0003-.0006	_____
1 - 3/4 "	.0004-.0007	_____
2 "	.0004-.0008	_____
2 - 1/2 "	.0005-.0009	_____
3 "	.0007-.0011	_____

Shank

DIAMETER	+0 -.002	_____
LENGTH	+0 -1/32	_____
TAPER	.001 MAX	_____

Parallelism of Assembled Set

<u>STD</u>	<u>ACTUAL</u>
------------	---------------

Guide Posts

SQUARENESS TO D.S.	.001 in 6"	_____
--------------------	------------	-------

STANDARD .0015/FT	_____
BOSS .002/FT	_____

REMARKS:
INSPECTOR: _____

DATE: _____

SUPERIOR ORDER NO.	LAMINATION DIE SETS	DATE:
CUSTOMER:		CUSTOMER ORDER NO.
JOB DESCRIPTION:		DRAWING NO.
SPECIAL MATERIALS AND/OR TOOLS:		

TOLERANCES OF DIE SETS

GRINDING TOLERANCE
Die Shoe Top and Bottom Surface

	<u>STD</u>	<u>ACTUAL</u>
FLATNESS	.0005/FT	
PARALLELISM	.0005/FT	
THICKNESS	+1/16 -1/8	


GRINDING TOLERANCE
Punch Holder Top and Bottom Surface

	<u>STD</u>	<u>ACTUAL</u>
FLATNESS	.0005/FT	
PARALLELISM	.0005/FT	
THICKNESS	+1/16 -1/8	

Clearance Between Guide Pin and Bushing

<u>DIA</u>	<u>CLEARANCE</u>	<u>ACTUAL</u>
1 "	.0002-.0004	
1 - 1/4 "	.0002-.0004	
1 - 1/2 "	.0002-.0004	
1 - 3/4 "	.0003-.0005	
2 "	.0003-.0005	
2 - 1/2 "	.0004-.0006	
3 "	.0006-.0010	

Shank

	<u>STD</u>	<u>ACTUAL</u>
DIAMETER	+0 -.002	
LENGTH	+0 -1/32	
TAPER	.001 MAX	

Parallelism of Assembled Set

<u>STD</u>	<u>ACTUAL</u>
.001/FT	

Guide Posts

	<u>STD</u>	<u>ACTUAL</u>
SQUARENESS TO D.S.	.001 in 6"	

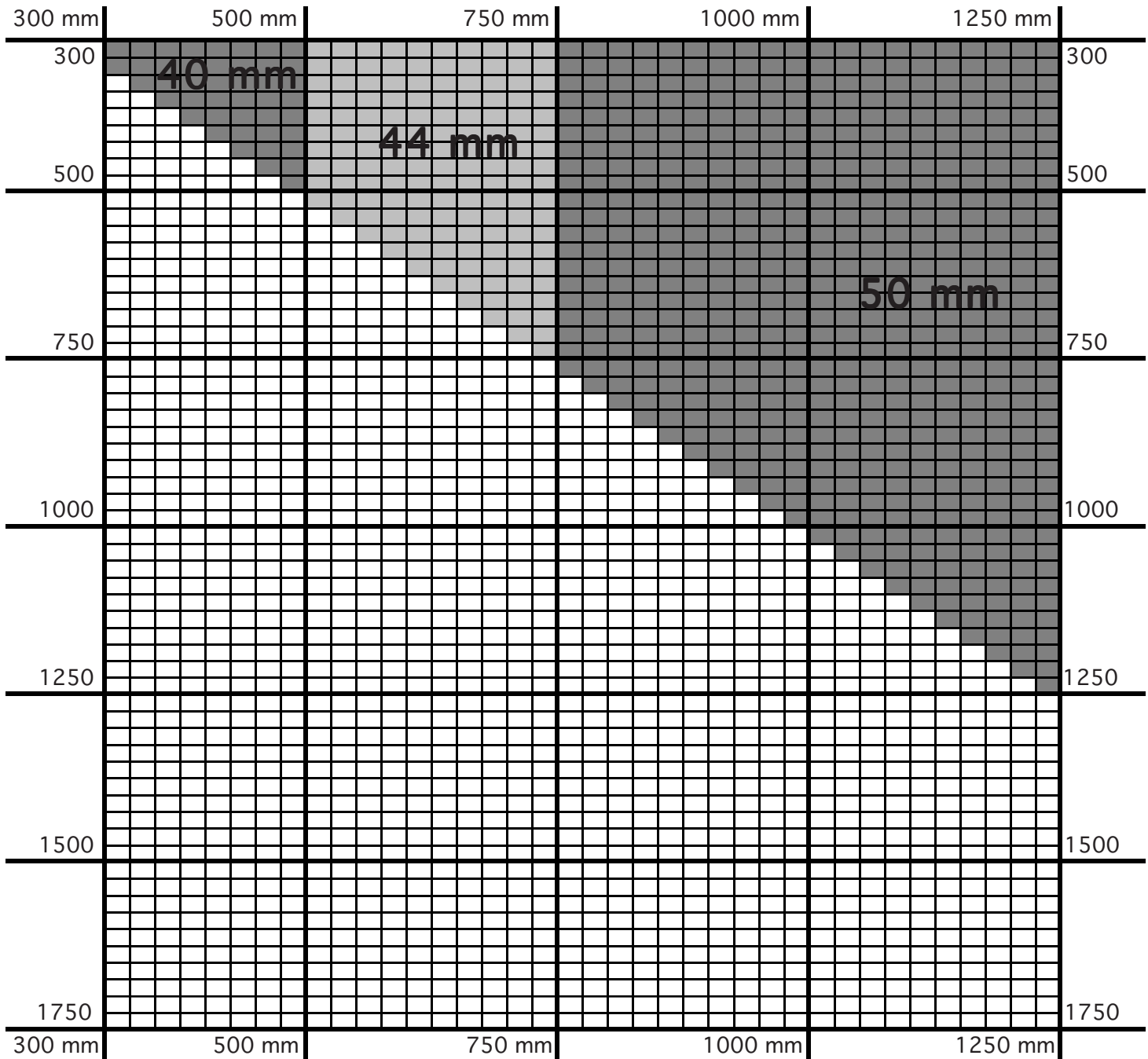
REMARKS:
INSPECTOR: _____

DATE: _____

Standard Guide Pin diameters for Superior Friction or Ball Bearing die sets are determined by the overall width and length dimensions of the die set. The standard guide pin diameter is provided unless a smaller or larger diameter guide pin is specified when ordering. Charts shown are commonly used guidelines. Specific tooling forces should be taken into account when ordering die set style, pin size, punch holder and die shoe thickness.

When using the chart below to determine standard guide pin diameter, use the following procedure:

- 1) Determine overall length and depth dimensions of die set.
- 2) On fractional sizes for overall length or depth, round up fraction to next largest 25mm when using chart.
- 3) The **longest** dimension determines the guide pin diameter. On standard sets the length dimension is greater than the depth, so the chart can be used exactly as it is set up.



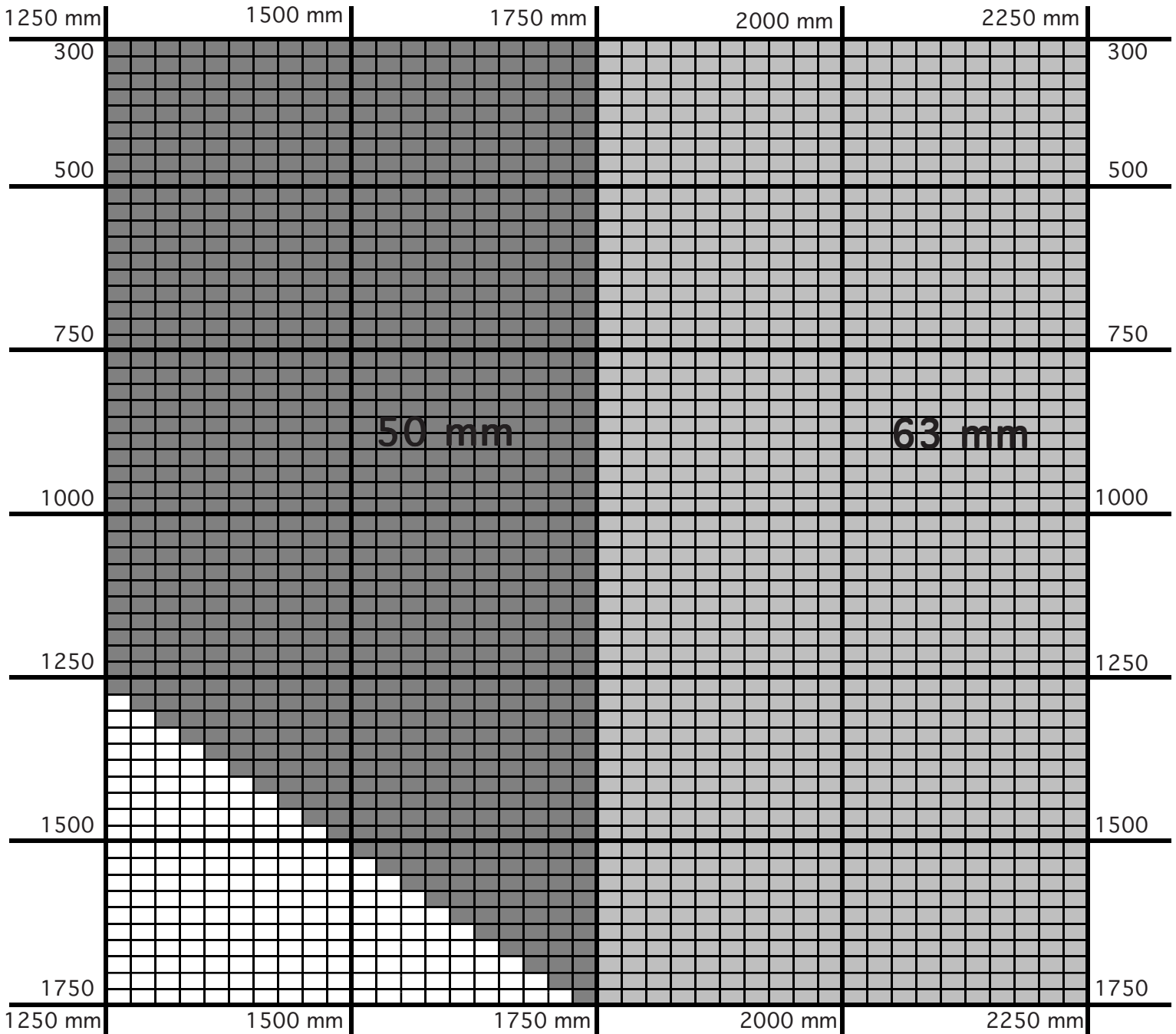
Common Example: Style 25 die set length 600mm, depth 300mm. From the chart we determine that the standard pin diameter is 44mm.

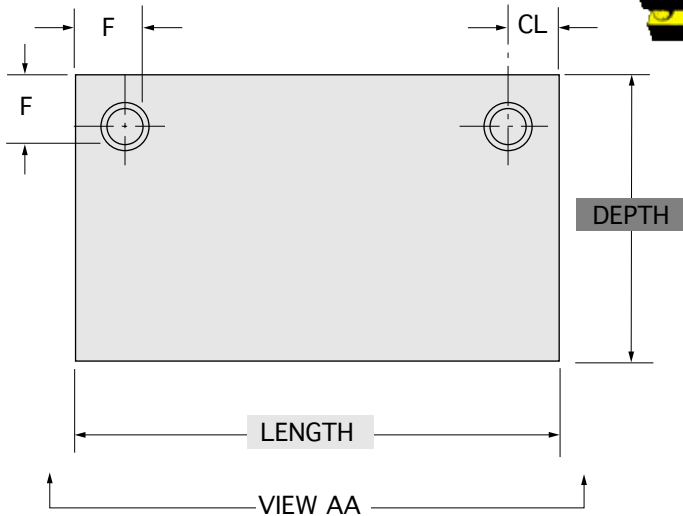
When a **Reverse** set is specified, the depth dimension is greater than the length. Therefore, the depth determines the standard pin diameter since it is the longest dimension.



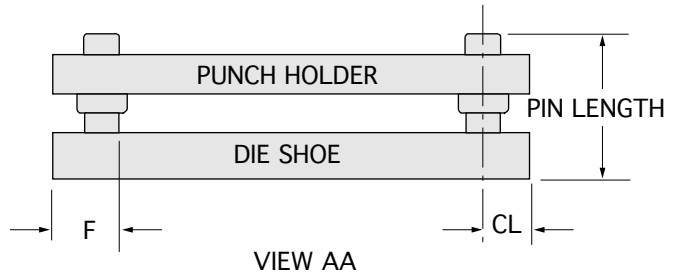
Common Example: Style 25 Reverse die set length 300mm, depth 600mm. The standard pin diameter is 44mm.

The standard guide pin diameters are suggested by Superior, based on those selections most commonly used. Smaller or larger guide pins other than standard guide pins can be provided. Refer to Die Set Product Line, Section II for specific die set style, pin and bushing locations.

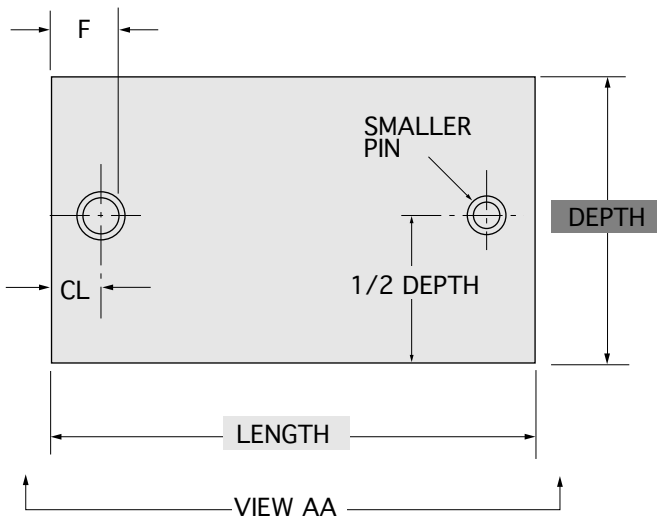




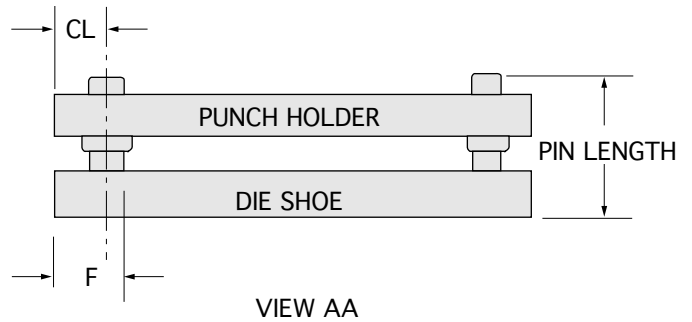
STYLE 25 DIE SET



VIEW AA



STYLE 35 DIE SET



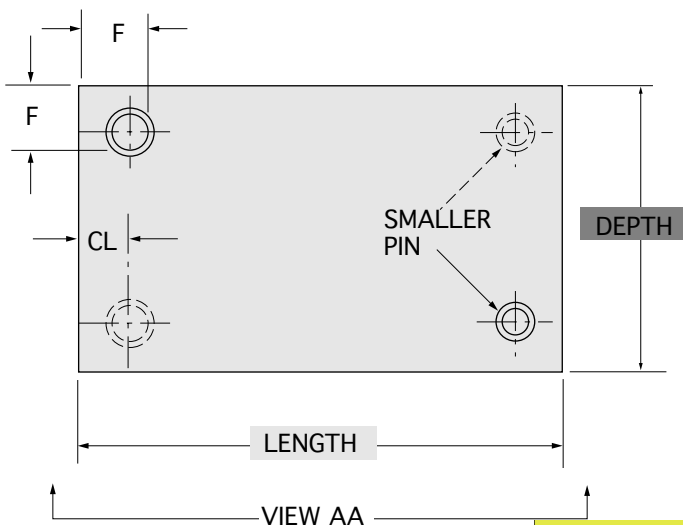
VIEW AA



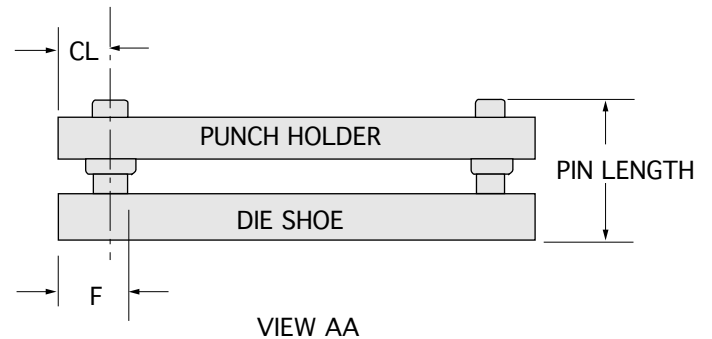
Small Dia. Pin



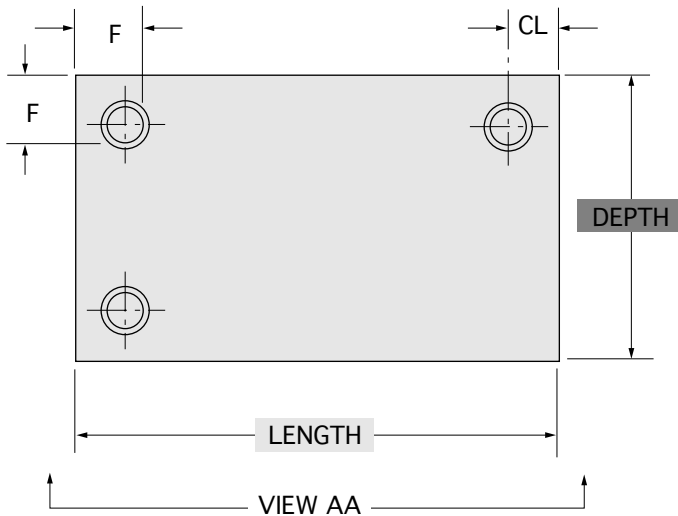
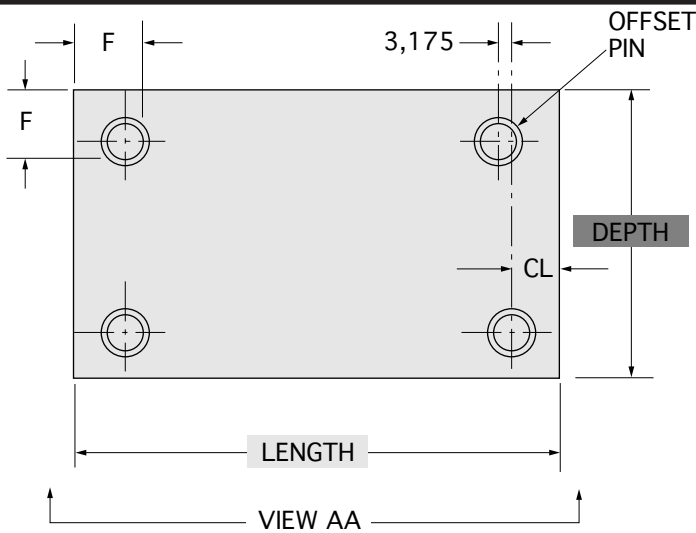
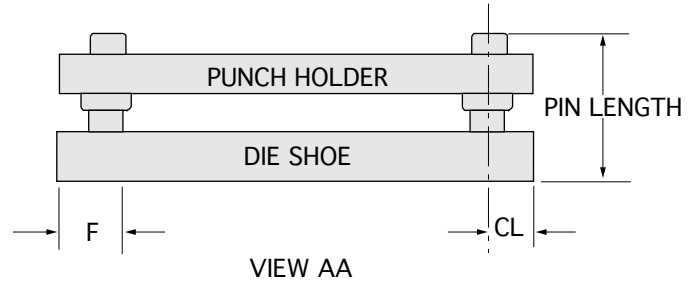
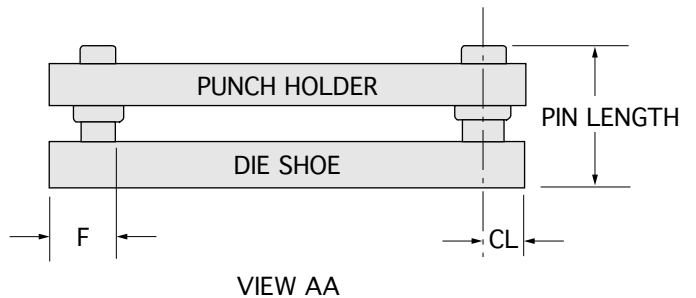
Small Dia. Pin



STYLE 45 DIE SET



VIEW AA

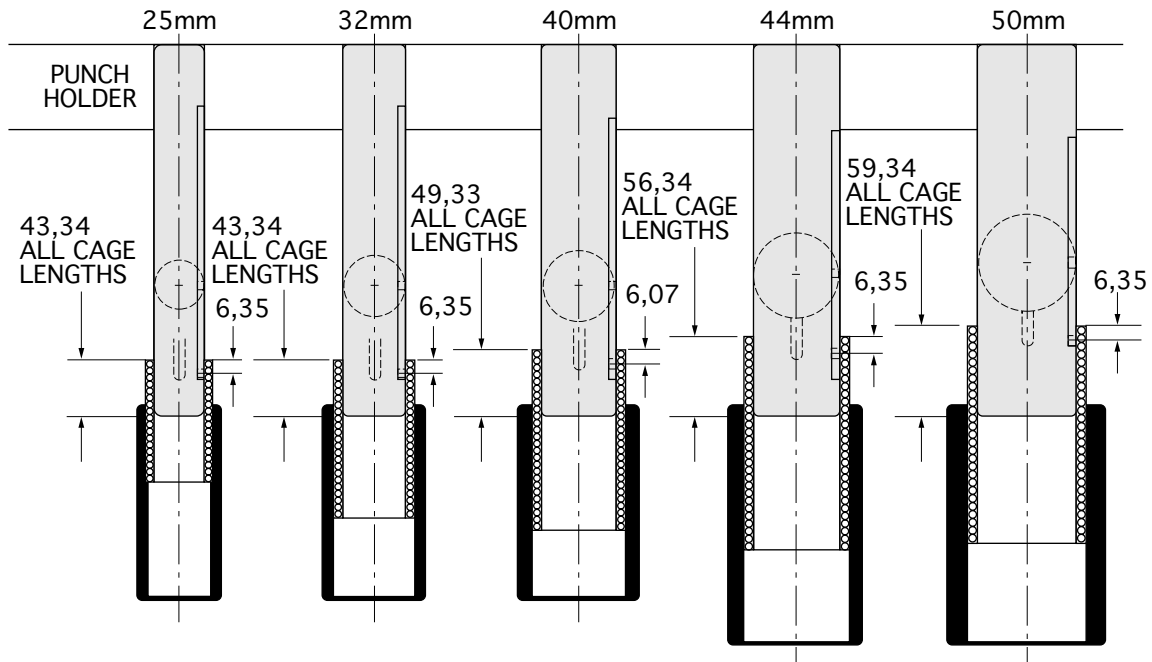

STYLE 50 DIE SET

STYLE 75 DIE SET


Standard Pin Locations - Ball Bearing (mm)								
Guide Pin Diameter	19	25	32	40	44	50	63	80
F Dimension	43,50	50,50	61,00	73,00	77,00	86,00	99,50	119,00
CL Dimension	34,00	38,00	45,00	53,00	55,00	61,00	68,00	79,00

NOTE: F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets.)



BALL BEARING ENGAGEMENT POINTS

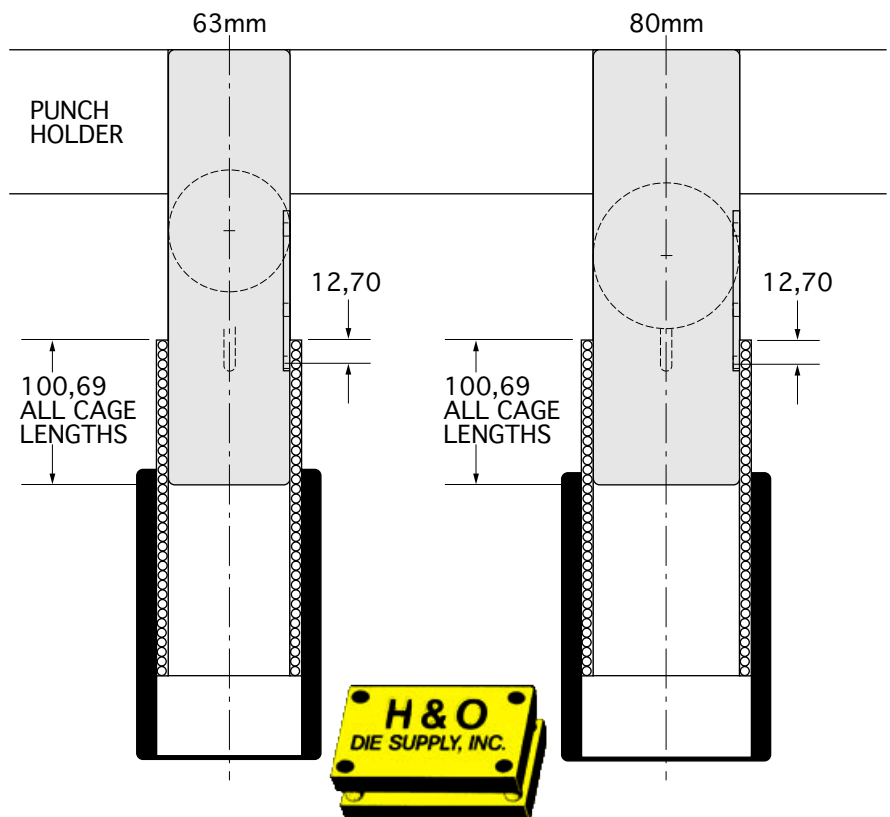
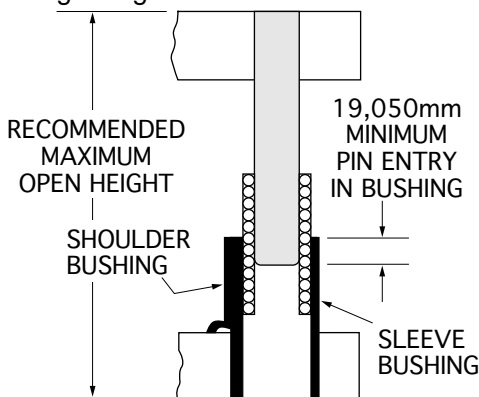


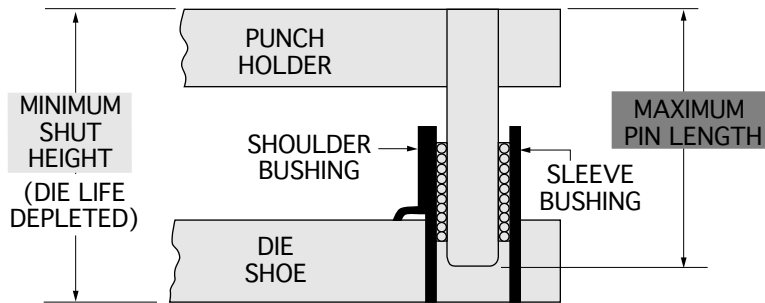
MAXIMUM OPENING HEIGHT

Superior recommends that for maximum ball bearing component life, the pin should remain in the bushing **at least 19,050 mm** at the maximum open height during die set operation.

The guide pin should be engaged in the bushing by at least 1 1/2 times the pin diameter at the point in the press stroke where the punch is 6,350mm above the material.

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 and gib alignment.





MAXIMUM PIN LENGTH

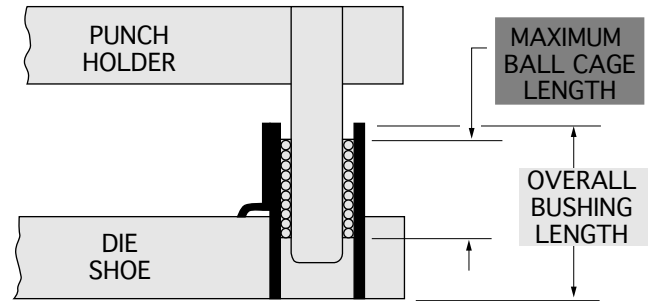


Straight Guide Pin **Maximum Pin Length** = Minimum Shut Height - 7mm

Demountable Guide Pin **Maximum Pin Length** = Minimum Shut Height - Punch Holder Thickness - 7mm

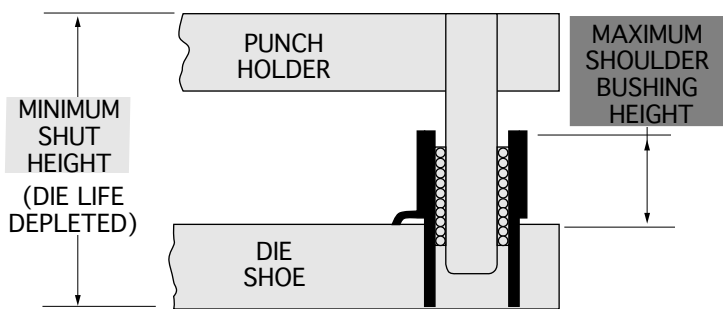
NOTE: Select nearest shorter standard pin length.

MAXIMUM BALL CAGE LENGTH



Maximum Ball Cage Length = Overall Bushing Length - 13mm

NOTE: Select nearest shorter standard cage length.



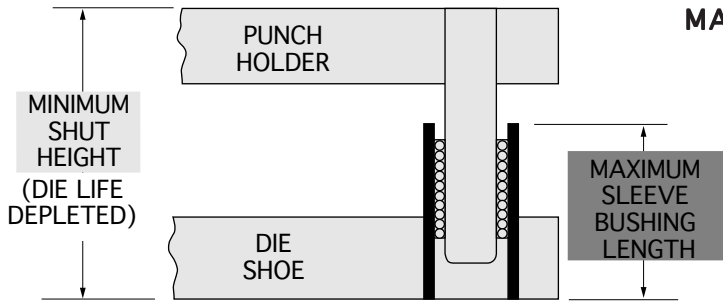
MAXIMUM SHOULDER BUSHING HEIGHT ABOVE DIE SHOE

Straight Guide Pin **Maximum Bushing Height** = Minimum Shut Height - (Punch Holder Thickness + Die Shoe Thickness) - 7mm

Demountable Guide Pin **Maximum Bushing Height** = Minimum Shut Height - (Punch Holder Thickness + Die Shoe Thickness) - 26mm

NOTE: Select nearest shorter standard bushing height.

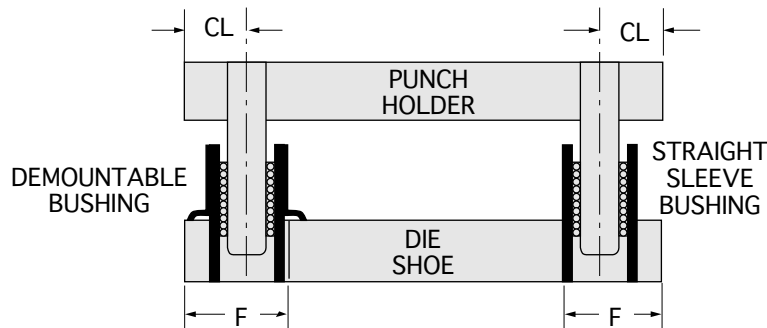
MAXIMUM STRAIGHT SLEEVE BUSHING LENGTH



Straight Guide Pin **Maximum Sleeve Bushing Length** = **Minimum Shut Height** - Punch Holder - 7mm Thickness
 Demountable Guide Pin **Maximum Sleeve Bushing Length** = **Minimum Shut Height** - Punch Holder - 26mm Thickness

NOTE: Select nearest shorter standard bushing length.

BALL BEARING STANDARD PIN LOCATIONS



Commonly used pin diameter locations are shown in the chart. However, specific tooling forces should be taken into account when ordering ball bearing die set style, pin size, punch holder and die shoe thicknesses.

Standard Pin Locations - Ball Bearing (mm)								
Guide Pin Diameter	19	25	32	40	44	50	63	80
Straight Sleeve F Dim.	57,000	64,000	75,000	85,500	94,000	102,500	116,500	134,000
Demount. Bushing F Dim.	61,500	67,500	78,500	89,000	97,500	107,500	121,500	139,000
CL Dimension	39,000	42,000	48,000	53,000	57,000	62,000	69,000	78,000

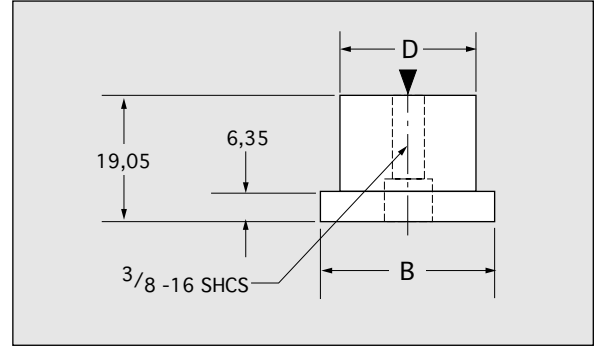
NOTE: F Dimension refers to distance from edge of die shoe to inside edge of bushing in die shoe.

FORTAL® end cap is secured to ball bearing die set pins with a recessed socket head cap screw. The Superior MaxiCage System is typically used when there is partial or full disengagement of the guide pin and bushing. While under this no-preload condition, the end cap permits the ball cage to rotate freely about the guide pin.

The Superior MaxiCage System maximizes Type A ball cage surface bearing efficiency -- with complete ball coverage throughout the cage.

For retrofitting existing die sets with the Superior MaxiCage System, contact Superior. Please supply us with your present die set specifications.

MaxiCage system permits ball cage to rotate about guide pin while not under preload.



WHEN ORDERING PLEASE SPECIFY:

1. Part Number
2. Quantity

- NOTE:**
1. ► Indicates CAD Merge Point.
 2. Select nearest shorter standard ball cage length.
 3. Select nearest shorter standard pin length.

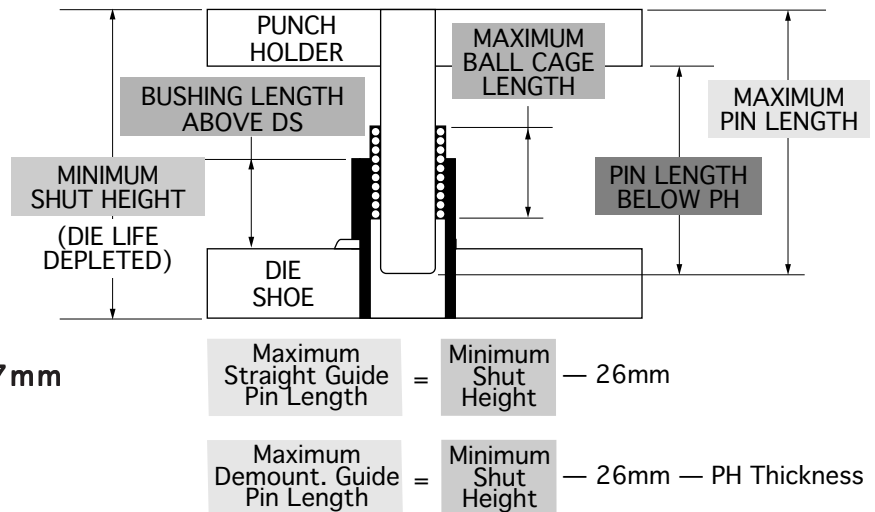
Determining Maximum Ball Cage Length for MaxiCage System

Step 1 $C = \text{Pin Length Below PH} + 9,5\text{mm}$

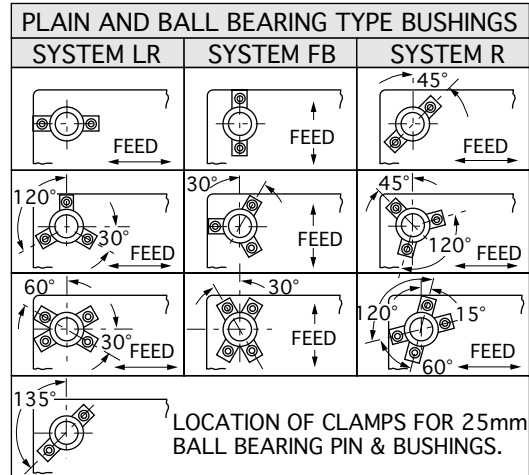
Step 2 $E = \text{Pin Length Below PH} + \text{Bushing Length Above DS} + \text{PH Thickness} + \text{DS Thickness} + 12,7\text{mm}$

Step 3 $A = E - \text{Minimum Shut Height}$

Step 4 Straight Guide Pin Maximum Ball Cage Length = $C - \frac{A}{2}$
 Demountable Guide Pin Maximum Ball Cage Length = $(C - \frac{A}{2}) - 15,9\text{mm}$

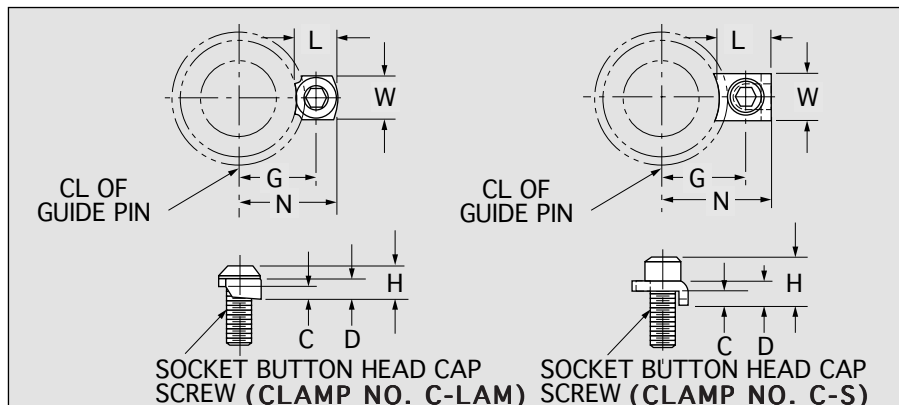


END CAP DIMENSIONS (mm)							
Guide Pin Diameter	25	32	40	44	50	63	80
PART NO.	434-2512	434-3212	434-4012	434-4412	434-5012	434-6312	434-8012
D Dimension	22,23	28,58	34,93	41,28	47,63	60,33	73,03
B Dimension	31,75	38,10	44,45	50,80	60,33	73,03	85,73



BUSHING CLAMP LOCATION SYSTEMS

Three bushing clamp location systems are available for Superior die sets. The LR, FB, and R Systems allow for various material feeding directions and should be considered when ordering any die set. Special bushing clamp configurations are available as an option.



BUSHING CLAMPS

Bushing clamps are available in **two styles**. See chart for specific die set component application. All slip fit demountable guide pins or bushings are supplied with clamps and socket head cap screws.

WHEN ORDERING PLEASE SPECIFY:

1. Bushing Clamp Part Number C-LAM or C-S
2. Quantity



COMPONENT	BUSHING CLAMP DIMENSIONS										BORING SIZE FOR PIN OR BUSHING TOLERANCE +,0127/-,0000	
	NOM DIA.	LOCATION		SIZE					PART NO.	QTY.		SCREW SIZE
	BUSH I.D. PIN O.D.	G	N	L	W	C	D	H				
BUSHINGS: DEMOUNTABLE STEEL, BRONZE, SHOULDER	19mm	23,60	33,39	18,92	17,46	4,76	9,38	17,32	C-S	2	M8-1.25 X 18	28,000
	25mm	28,60	38,39	18,92	17,46	4,76	9,38	17,32	C-S	2	M8-1.25 X 18	38,000
	32mm	32,10	41,89	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	45,000
	40mm	36,60	46,39	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	54,000
	44mm	39,70	49,49	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	58,000
	50mm	44,70	54,49	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	65,000
	63mm	52,80	62,59	18,92	17,46	4,76	9,38	17,32	C-S	4	M8-1.25 X 18	81,000
"SUPERIOR" BRONZE-RITE	80mm	62,30	72,09	18,92	17,46	4,76	9,38	17,32	C-S	4	M8-1.25 X 18	100,000
BUSHINGS: DEMOUNTABLE BRONZE PLATED ALL SHOULDER LENGTHS EXCEPT SHORT	19mm	22,50	29,64	13,89	14,29	4,76	7,14	11,35	C-LAM	2	M8-1.25 X 18	28,000
	25mm	27,50	34,64	13,89	14,29	4,76	7,14	11,35	C-LAM	3	M8-1.25 X 18	38,000
	32mm	32,00	39,14	13,89	14,29	4,76	7,14	11,35	C-LAM	3	M8-1.25 X 18	45,000
	40mm	37,00	44,14	13,89	14,29	4,76	7,14	11,35	C-LAM	3	M8-1.25 X 18	54,000
	50mm	45,00	52,14	13,89	14,29	4,76	7,14	11,35	C-LAM	4	M8-1.25 X 18	65,000
	63mm	51,50	58,64	13,89	14,29	4,76	7,14	11,35	C-LAM	4	M8-1.25 X 18	81,000
	80mm	61,00	68,14	13,89	14,29	4,76	7,14	11,35	C-LAM	4*	M8-1.25 X 18	100,000
BUSHINGS: DEMOUNTABLE BRONZE PLATED SHORT SHOULDER LENGTH	19mm	22,50	29,64	13,89	14,29	4,76	7,14	11,35	C-LAM	2	M8-1.25 X 18	28,000
	25mm	27,50	34,64	13,89	14,29	4,76	7,14	11,35	C-LAM	3	M8-1.25 X 18	38,000
	32mm	32,00	39,14	13,89	14,29	4,76	7,14	11,35	C-LAM	3	M8-1.25 X 18	45,000
	40mm	37,00	44,14	13,89	14,29	4,76	7,14	11,35	C-LAM	3	M8-1.25 X 18	54,000
	50mm	45,00	52,14	13,89	14,29	4,76	7,14	11,35	C-LAM	4	M8-1.25 X 18	65,000
	63mm	51,50	58,64	13,89	14,29	4,76	7,14	11,35	C-LAM	4	M8-1.25 X 18	81,000
	80mm	61,00	68,14	13,89	14,29	4,76	7,14	11,35	C-LAM	4	M8-1.25 X 18	100,000
BUSHINGS: DEMOUNTABLE BALL BEARING TYPE	19mm	29,70	39,49	18,92	17,46	4,76	9,38	17,32	C-S	2	M8-1.25 X 18	36,000
	25mm	32,70	42,49	18,92	17,46	4,76	9,38	17,32	C-S	2	M8-1.25 X 18	44,000
	32mm	37,70	47,49	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	54,000
	40mm	43,20	52,99	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	65,000
	44mm	47,70	57,49	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	74,000
	50mm	52,70	62,49	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	81,000
	63mm	59,70	69,49	18,92	17,46	4,76	9,38	17,32	C-S	4	M8-1.25 X 18	95,000
80mm	68,20	77,99	18,92	17,46	4,76	9,38	17,32	C-S	4	M8-1.25 X 18	112,000	
GUIDE PINS: DEMOUNTABLE	19mm	19,50	29,29	18,92	17,46	4,76	9,38	17,32	C-S	2	M8-1.25 X 18	19,000
	25mm	22,50	32,29	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	25,000
	32mm	26,00	35,79	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	32,000
	40mm	30,00	39,79	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	40,000
	44mm	33,00	42,79	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	44,000
	50mm	36,00	45,79	18,92	17,46	4,76	9,38	17,32	C-S	3	M8-1.25 X 18	50,000
	63mm	44,00	53,79	18,92	17,46	4,76	9,38	17,32	C-S	4	M8-1.25 X 18	63,000
80mm	51,00	60,79	18,92	17,46	4,76	9,38	17,32	C-S	4	M8-1.25 X 18	80,000	

NOTE: 1. * This bushing requires the 3 clamp arrangement whenever the SYSTEM R configuration is chosen.
2. Bushing clamp configurations other than those shown are available as an option.



BILL TO INFORMATION

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SHIP TO INFORMATION

NAME
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 STATE
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 SHIP VIA
 F.O.B. POINT
 DATE

STYLE 20 21 FLANGE 35 50 : OMIT 45R 45L 75

SPECIAL PIN LOCATION
 PIN QTY.

PUNCH HOLDER

QTY STOCK THICK. X WIDTH X LENGTH

TORCH-CUT SHAPE STRESS RELIEVE BURN-OUT QUANTITY

HANDLING HOLES: QTY SIZE LOCATIONS

GRIND (2) SIDES TO

COMMENTS

1020 4130 1045
 FORTAL P-20 4340

DIE SHOE

QTY STOCK THICK. X WIDTH X LENGTH

TORCH-CUT SHAPE STRESS RELIEVE BURN-OUT QUANTITY

HANDLING HOLES: QTY SIZE LOCATIONS

GRIND (2) SIDES TO

COMMENTS

1020 4130 1045
 FORTAL P-20 4340

COMPONENTS FRICTION BALL BEARING - MIN. SHUT HEIGHT

PINS STRAIGHT DEMOUNTABLE SHOULDER

PART NO. DIAMETER LENGTH

BUSHINGS STEEL BRONZE-RITE™ SLEEVE SOLID BRONZE DEMOUNTABLE

PART NO.

NOTES

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