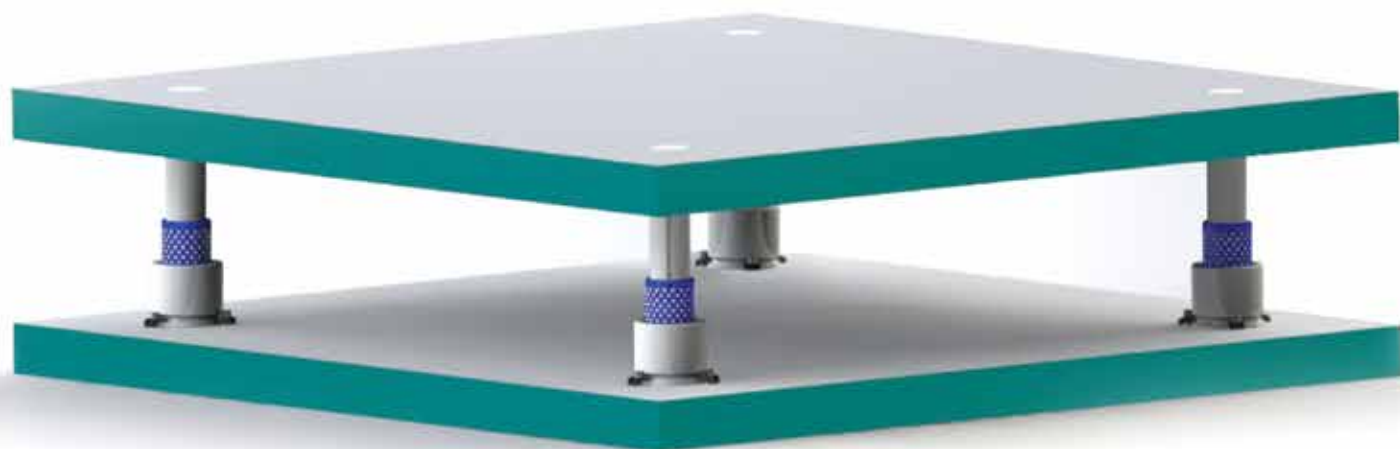




**DIE SETS**





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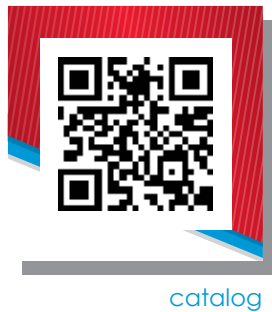


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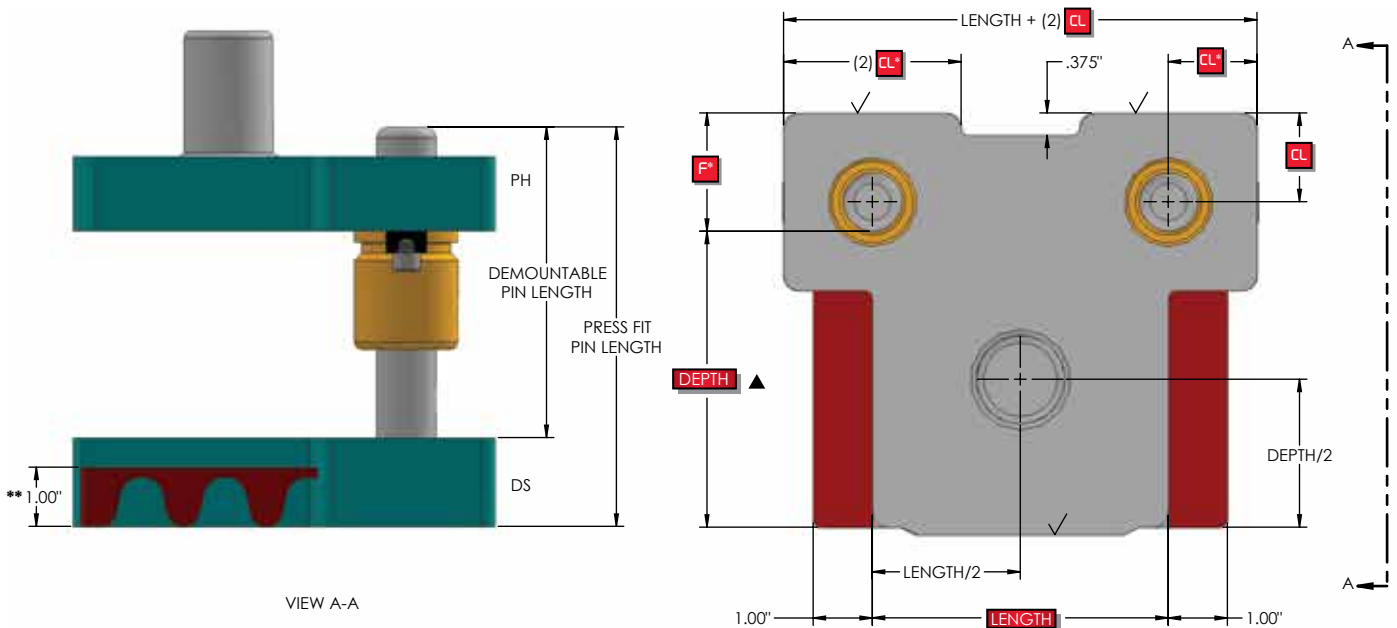
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# STYLE 20 F DIE SET

All Superior Style 20 Die Sets are Two-Pin Back Post design with shape-cut work area with finished front and back edges. They are offered in a wide range of sizes and come standard with a shank that is centered in the work area. Left to Right feed (System LR) bushing clamp locations are standard.

**Style 20 F** - The *Standard Flange* type die set offers you a unique grooved flange welded to the edges of the die shoe. This original Superior design is ideal for hand lifting small sets and is available on die sets weighing 200 lbs or less.



▲ MINIMUM DEPTH = 5"

\*\* MINIMUM DIE SHOE THICKNESS - 1 1/4"

\* SEE BALL BEARING INFORMATION WHEN ORDERING STYLE BB 20

**WHEN ORDERING PLEASE SPECIFY:**

1. Style 20 F, 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  
(1" or 2" Demountable Steel Shoulder Standard)
7. Shank Type and Size (if required)
8. For Ball Bearing Die Set Information,  
See page 1110.

**STANDARD PIN LOCATIONS - FRICTION BEARING**

PIN DIAMETER	3/4"	1"	1 1/4"	1 1/2"	1 3/4"	2"
F	1.750	2.000	2.250	2.500	2.750	3.000
CL	1.375	1.500	1.625	1.750	1.875	2.000
WORK AREA (IN <sup>2</sup> )	Upon Application	= < 36	= < 100	= < 225	= < 578	Upon Application

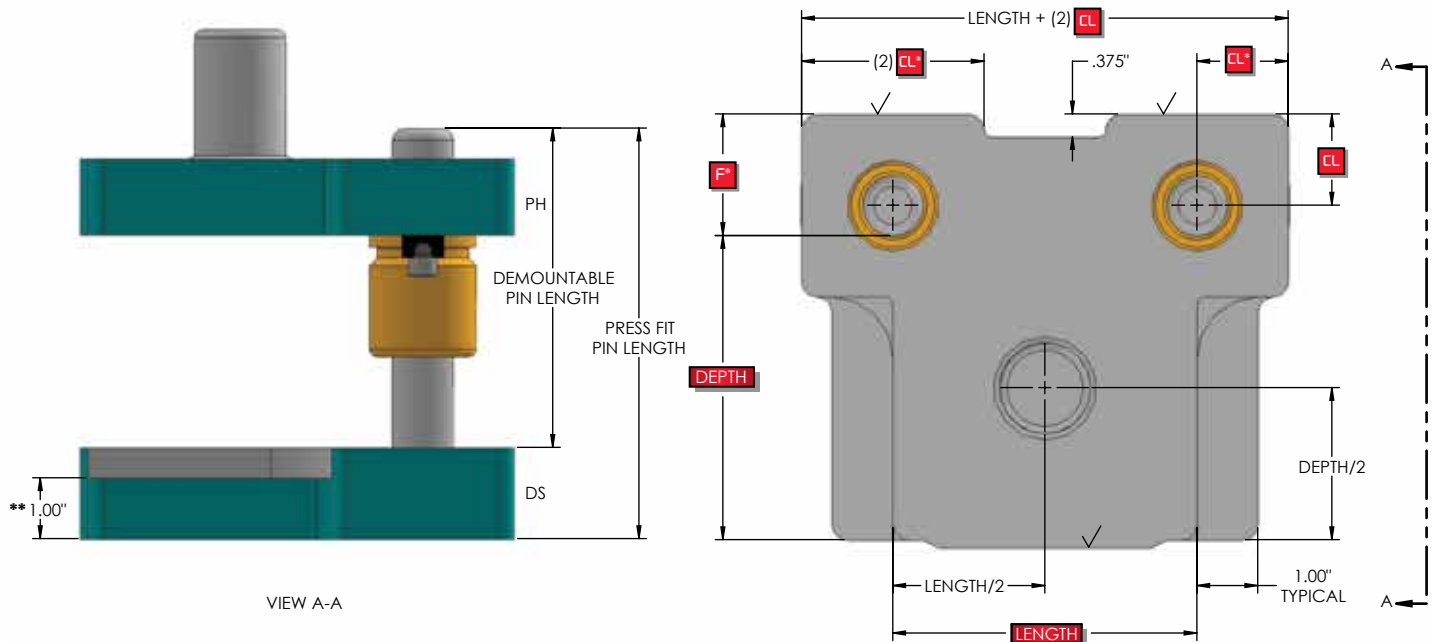
**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110).



# STYLE 20 M DIE SET

All Superior Style 20 Die Sets are Two-Pin Back Post design with shape-cut work area with finished front and back edges. They are offered in a wide range of sizes and come standard with a shank that is centered in the work area. Left to Right feed (System LR) bushing clamp locations are standard.

**Style 20 M** - The *Milled Flange* type die set offers a machined clamping surface on the edges of the die shoe. Although this flange can be used on any sized die set, it is uniquely suited for especially small sets.



\*SEE BALL BEARING INFORMATION WHEN ORDERING STYLE BB 20

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

### WHEN ORDERING PLEASE SPECIFY:

1. Style 20 M, 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  
 (1" or 2" Demountable Steel Shoulder Standard)
7. Shank Type and Size (if required)
8. For Ball Bearing Die Set Information,  
 See page 1110.

### STANDARD PIN LOCATIONS - FRICTION BEARING

PIN DIAMETER	3/4"	1"	1 1/4"	1 1/2"	1 3/4"	2"
F	1.750	2.000	2.250	2.500	2.750	3.000
CL	1.375	1.500	1.625	1.750	1.875	2.000
WORK AREA (IN <sup>2</sup> )	Upon Application	= < 36	= < 100	= < 225	= < 578	Upon Application

**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110).

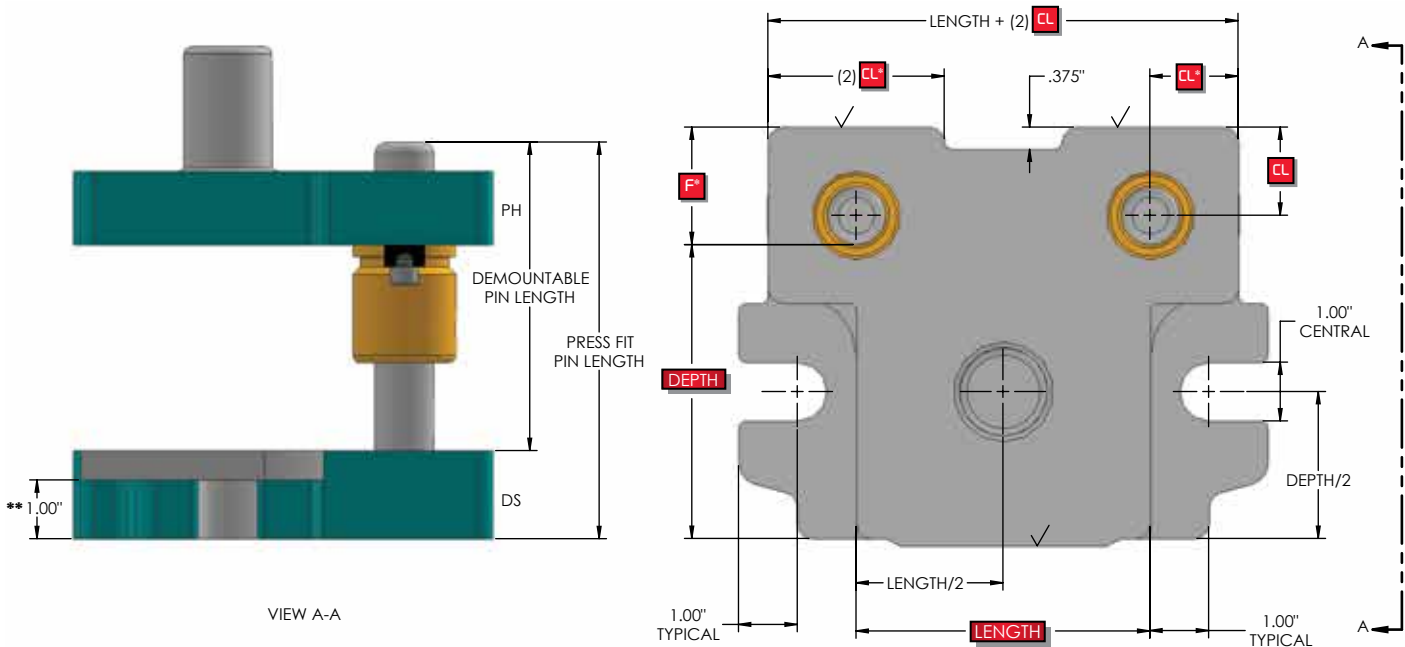




# STYLE 20 B DIE SET

All Superior Style 20 Die Sets are Two-Pin Back Post design with shape-cut work area with finished front and back edges. They are offered in a wide range of sizes and come standard with a shank that is centered in the work area. Left to Right feed (System LR) bushing clamp locations are standard.

**Style 20 B** - The Bolt Slot Flange type die set offers a flame-cut bolt slot along with a machined clamping surface on the edges of the die shoe. This classic design has long been the industry standard with proven effectiveness.



\* SEE BALL BEARING INFORMATION WHEN ORDERING STYLE BB 20B

**Note:** \*\* 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.

### WHEN ORDERING PLEASE SPECIFY:

1. Style 20 B, 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  
 (1" or 2" Demountable Steel Shoulder Standard)
7. Shank Type and Size (if required)
8. For Ball Bearing Die Set Information, See page 1110.

### STANDARD PIN LOCATIONS - FRICTION BEARING

PIN DIAMETER	3/4"	1"	1 1/4"	1 1/2"	1 3/4"	2"
F	1.750	2.000	2.250	2.500	2.750	3.000
CL	1.375	1.500	1.625	1.750	1.875	2.000
WORK AREA (IN <sup>2</sup> )	Upon Application	= < 36	= < 100	= < 225	= < 578	Upon Application

**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110).

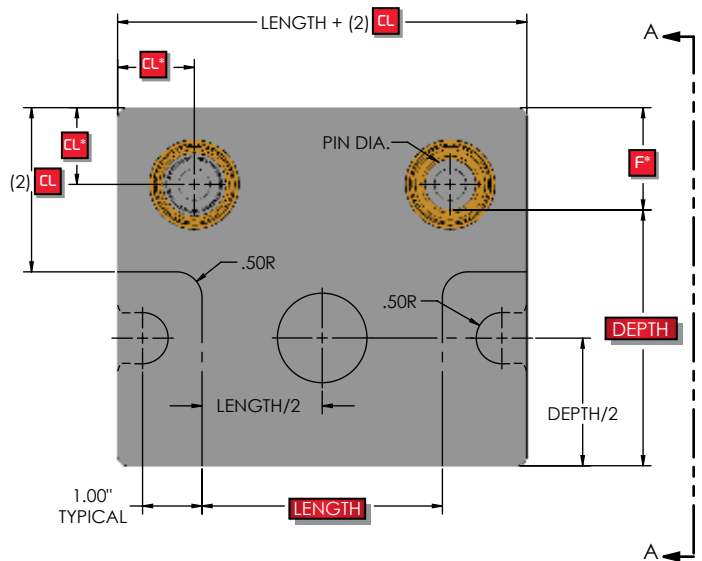
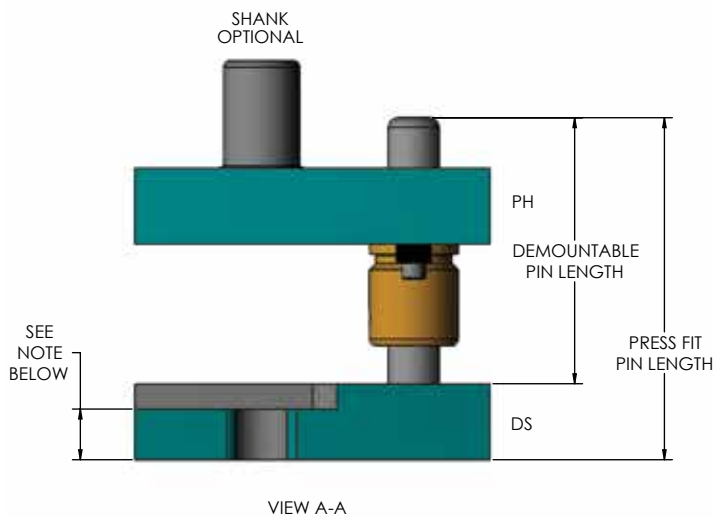


# STYLE 21 DIE SETS

The Style 21 Die Set combines the features of our Style 20 Die Set but in a rectangular design. This helps to maximize the work area in the punch holder yet still offers the clamping features in the die shoe. They are offered in a wide range of sizes and come standard with a shank that is centered in the work area. Left to Right feed (System LR) bushing clamp locations are standard.

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

**Style 21 B** - Bolt slot has a bolt slot and machined clamping surfaces on the edges of the die shoe.



\* SEE BALL BEARING INFORMATION WHEN ORDERING STYLE BB 21B

**NOTE:** All punch holder and die shoes stamped MC "Matched Corner" regardless of pin location.

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

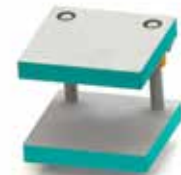
**WHEN ORDERING PLEASE SPECIFY:**

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  
 (1" or 2" Demountable Steel Shoulder Standard)
7. Shank Type and Size (if required)
8. For Ball Bearing Die Set Information, See page 1110.

**STANDARD PIN LOCATIONS - FRICTION BEARING**

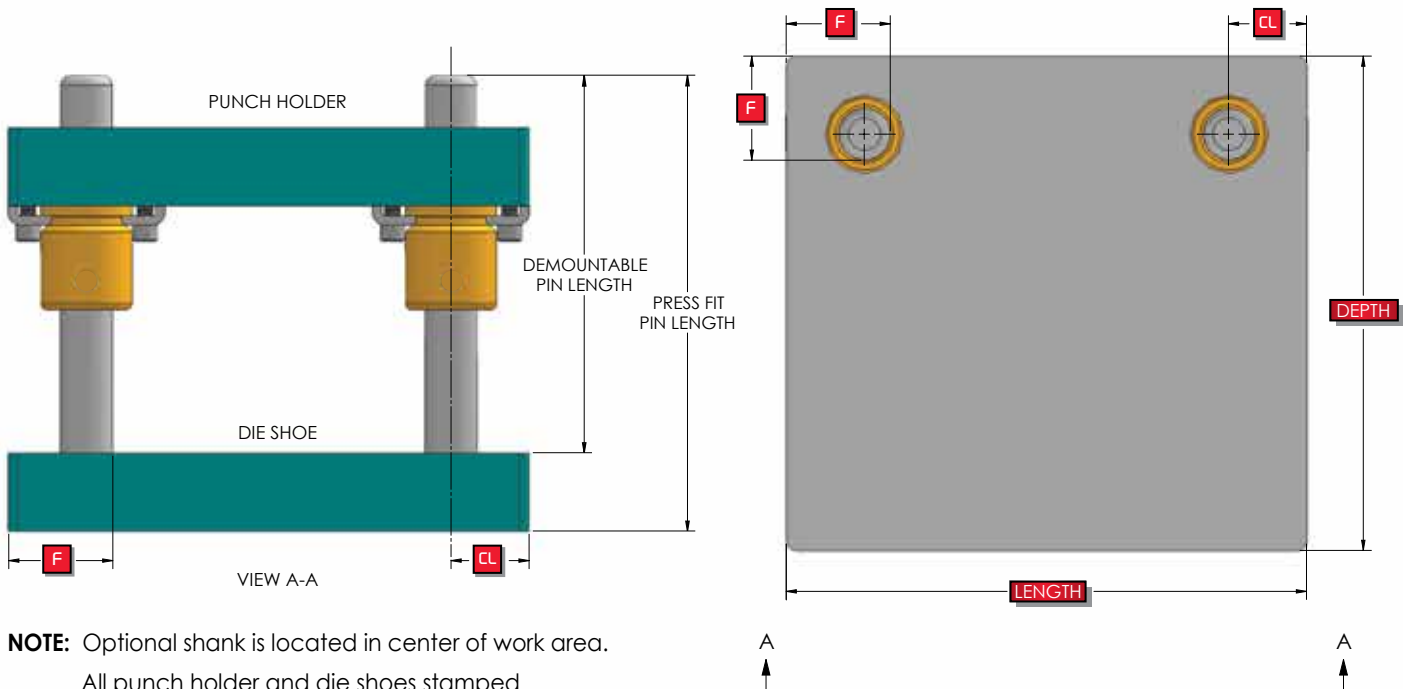
PIN DIAMETER	3/4"	1"	1 1/4"	1 1/2"	1 3/4"	2"
F	1.750	2.000	2.250	2.500	2.750	3.000
CL	1.375	1.500	1.625	1.750	1.875	2.000
WORK AREA (IN <sup>2</sup> )	Upon Application	= < 36	= < 100	= < 225	= < 578	Upon Application

**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110).



# STYLE 25 RECTANGULAR DIE SETS

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. Left to Right feed (System LR) bushing clamp locations are standard. Style 25 Die Sets are available in friction or ball bearing types.



**NOTE:** Optional shank is located in center of work area.  
All punch holder and die shoes stamped MC "Matched Corner" regardless of pin location.

### 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)
8. For Ball Bearing Die Set Information,  
See page 1110.

### STANDARD PIN LOCATIONS - FRICTION BEARING

PIN DIAMETER	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

### STANDARD PIN LOCATIONS - FRICTION BEARING - METRIC

PIN DIAMETER	19	25	32	40	44	50	63	80
F	43,50	50,50	61,00	73,00	77,00	86,00	99,50	119,00
CL	34,00	38,00	45,00	53,00	55,00	61,00	68,00	79,00

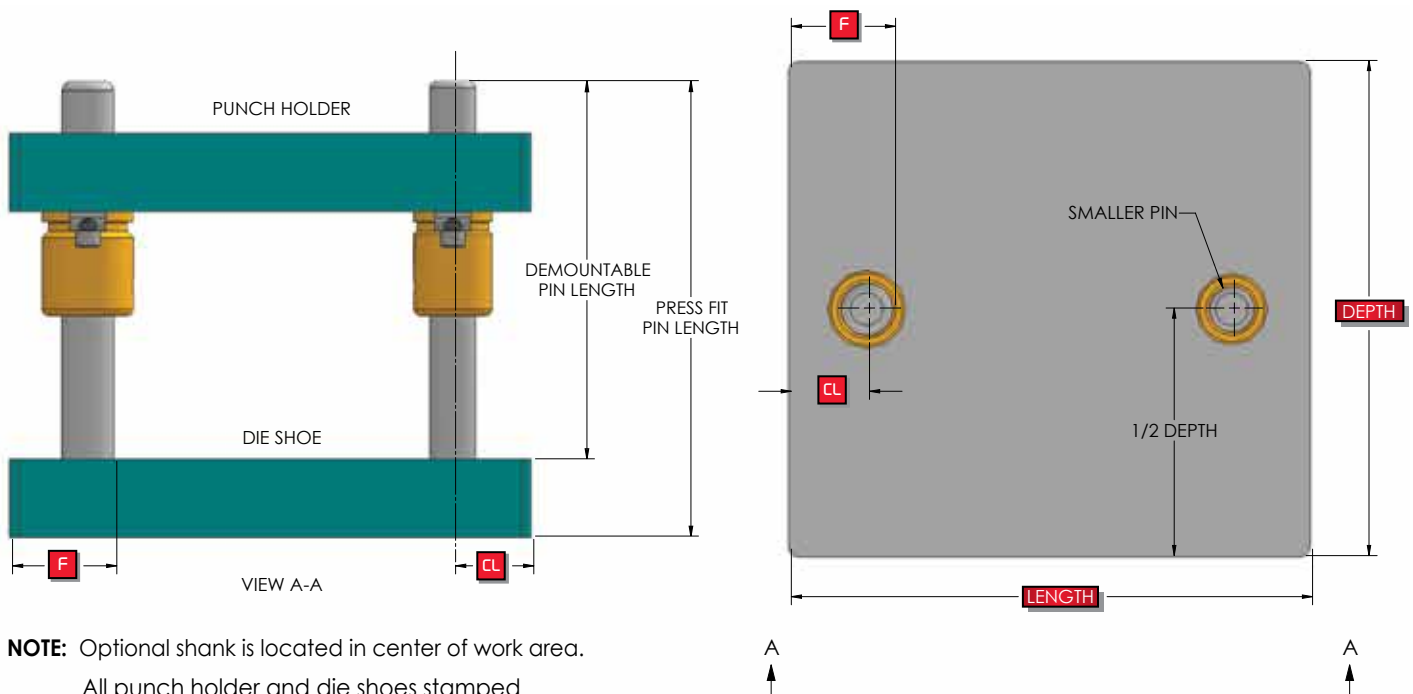
**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110.)





# STYLE 35 RECTANGULAR DIE SETS

Superior Style 35 Two-Pin Rectangular Die Sets have guide pins located to the centerline of the depth dimensions. Work area is centered between the pins and stock flow is usually front to back. Style 35 Die Sets are furnished with guide pins of differing diameters to prevent reversing of the plates during assembly. Front to Back feed (System FB) bushing clamp locations are standard. Style 35 Die Sets are available in friction or ball bearing types.



**NOTE:** Optional shank is located in center of work area.  
All punch holder and die shoes stamped MC "Matched Corner" regardless of pin location.

### 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)
8. For Ball Bearing Die Set Information, See page 1110.

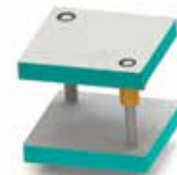
### STANDARD PIN LOCATIONS - FRICTION BEARING

PIN DIAMETER	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
<b>F</b>	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
<b>CL</b>	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

### STANDARD PIN LOCATIONS - FRICTION BEARING - METRIC

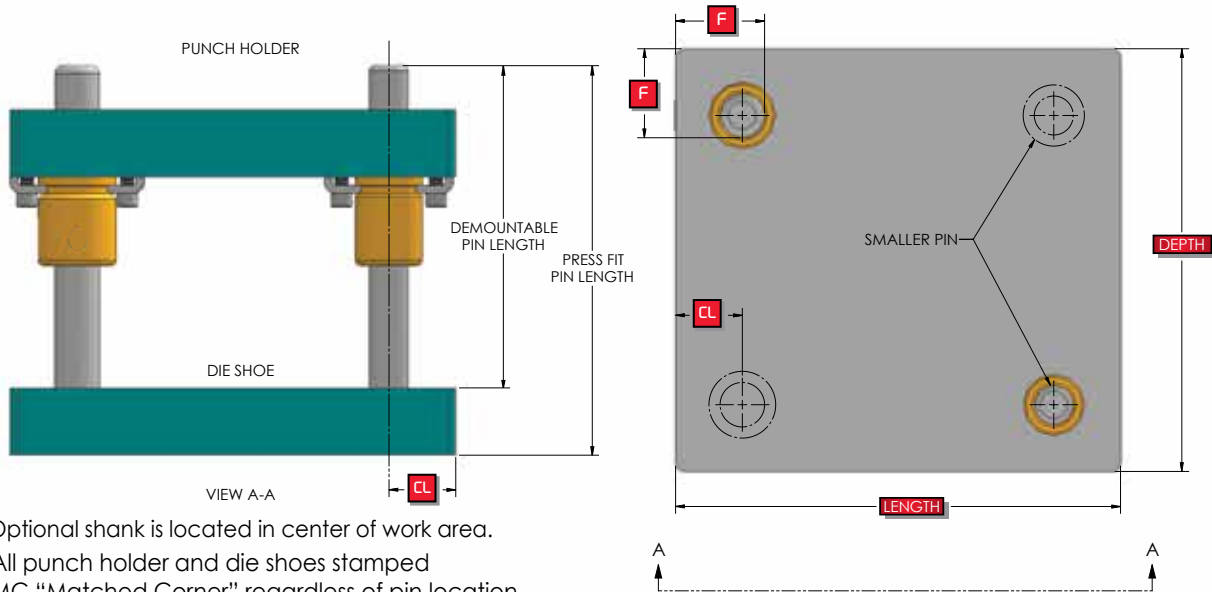
PIN DIAMETER	19	25	32	40	44	50	63	80
<b>F</b>	43,50	50,50	61,00	73,00	77,00	86,00	99,50	119,00
<b>CL</b>	34,00	38,00	45,00	53,00	55,00	61,00	68,00	79,00

**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110.)  
CL Dimension for the smaller pin is the same as the large pin.



# STYLE 45 RECTANGULAR DIE SETS

Superior Style 45 Two-Pin Rectangular Die Sets have guide pins located diagonally opposite at positions "RR" or "LL" (see below). Style 45 Die Sets are furnished with guide pins of differing diameters to prevent reversing of the plates during assembly. Left to Right feed (System LR) bushing clamp locations is standard. Style 45 Die Sets are available in friction or ball bearing types.



**NOTE:** Optional shank is located in center of work area.  
All punch holder and die shoes stamped MC "Matched Corner" regardless of pin location.

**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)
9. For Ball Bearing Die Set Information,  
See page 1110.

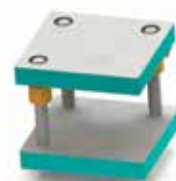
**STANDARD PIN LOCATIONS - FRICTION BEARING**

PIN DIAMETER	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

**STANDARD PIN LOCATIONS - FRICTION BEARING - METRIC**

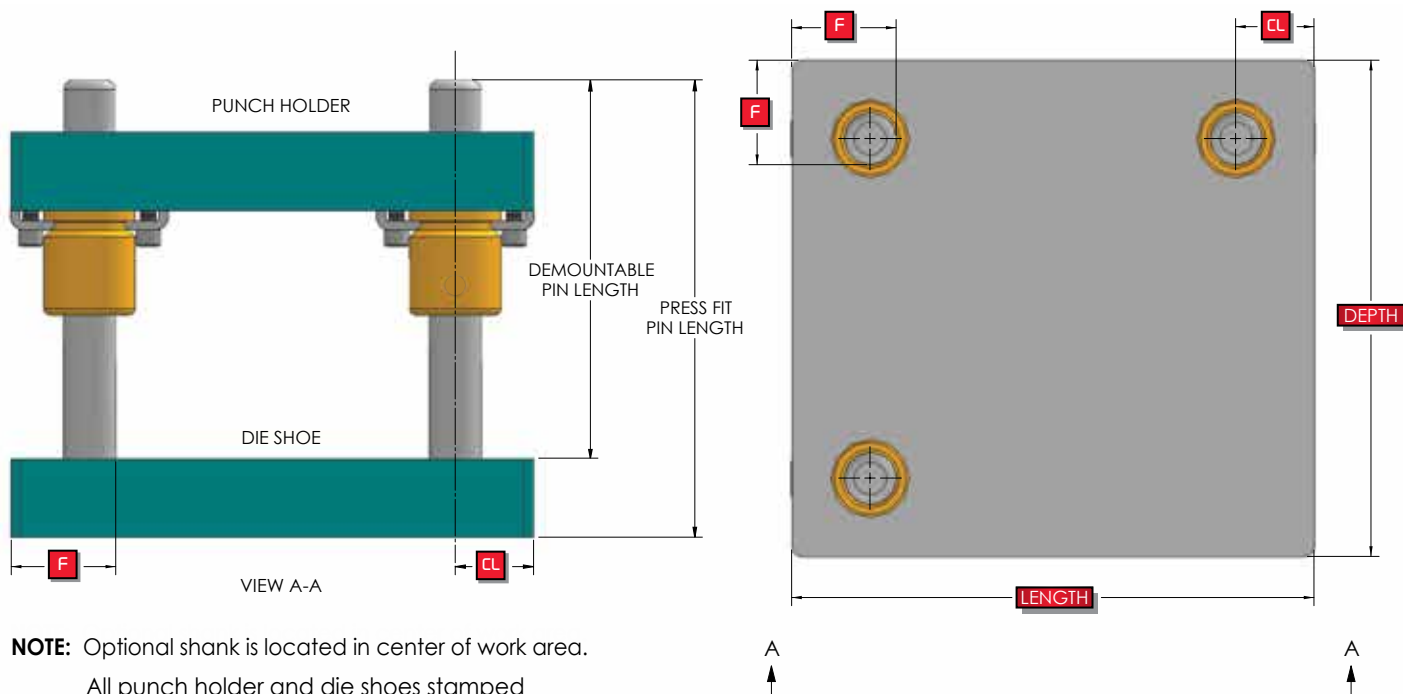
PIN DIAMETER	19	25	32	40	44	50	63	80
F	43,50	50,50	61,00	73,00	77,00	86,00	99,50	119,00
CL	34,00	38,00	45,00	53,00	55,00	61,00	68,00	79,00

**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110.)  
CL Dimension for the smaller pin is the same as the large pin.



# STYLE 50 RECTANGULAR DIE SETS

Superior Style 50 Three-Pin Rectangular Die Sets have guide pins located at any three corners. The three-pin layout allows free movement of stock in the corner area wherever the pin is omitted. There is no offset pin on Style 50 Die Sets. Left to Right feed (System LR) bushing clamp locations is standard. Style 50 Die Sets are available in friction or ball bearing types.



**NOTE:** Optional shank is located in center of work area.  
All punch holder and die shoes stamped MC "Matched Corner" regardless of pin location.

### 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)
9. For Ball Bearing Die Set Information,  
See page 1110

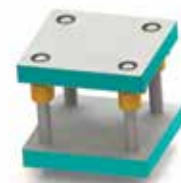
### STANDARD PIN LOCATIONS - FRICTION BEARING

PIN DIAMETER	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

### STANDARD PIN LOCATIONS - FRICTION BEARING - METRIC

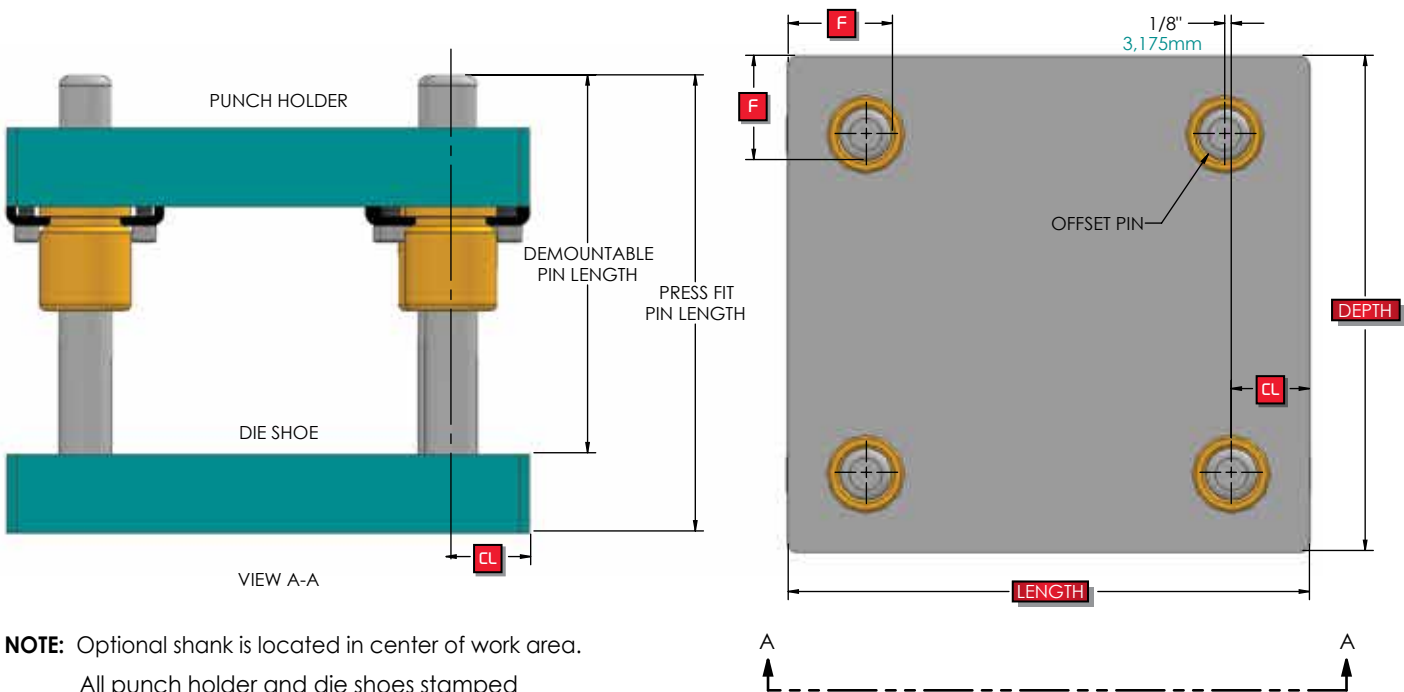
PIN DIAMETER	19	25	32	40	44	50	63	80
F	43,50	50,50	61,00	73,00	77,00	86,00	99,50	119,00
CL	34,00	38,00	45,00	53,00	55,00	61,00	68,00	79,00

**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110.)



# STYLE 75 RECTANGULAR DIE SETS

Superior Style 75 Four-Pin Rectangular Die Sets are designed to provide maximum resistance to side thrust and misalignment. On Style 75 Die Sets, the right rear pin is offset 1/8" to left to prevent reversing of the plates during assembly. On "Inverted" die sets (pins in punch holder of friction sets), the right front pin is offset. Left to Right feed (System LR) bushing clamp locations is standard. Style 75 Die Sets are available in friction or ball bearing types.



**NOTE:** Optional shank is located in center of work area.  
All punch holder and die shoes stamped MC "Matched Corner" regardless of pin location.

**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)
8. For Ball Bearing Die Set Information See page 1110.

**STANDARD PIN LOCATIONS - FRICTION BEARING**

PIN DIAMETER	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
F	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 3/4	4 1/4
CL	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/2	2 3/4

**STANDARD PIN LOCATIONS - FRICTION BEARING - METRIC**

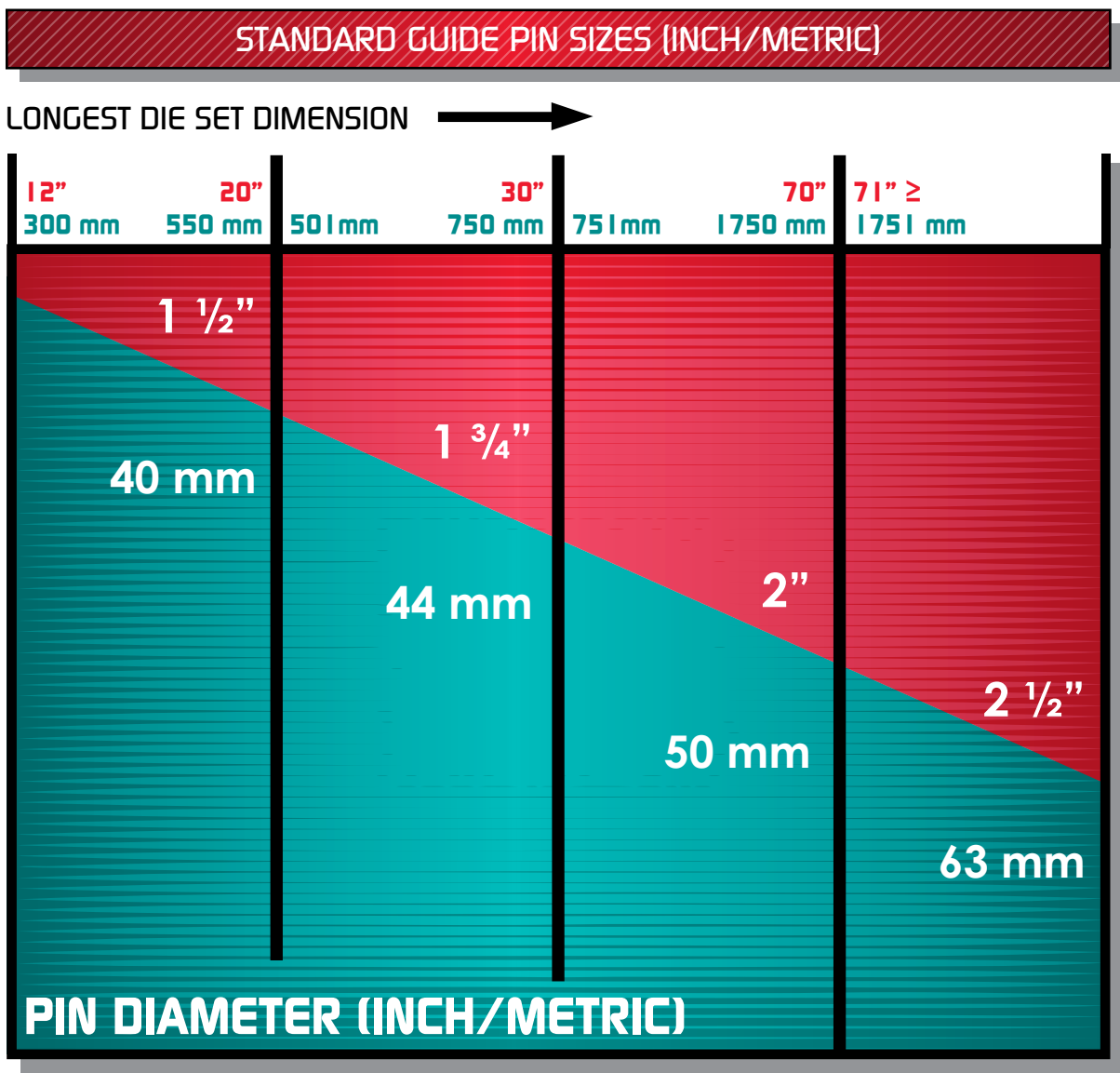
PIN DIAMETER	19	25	32	40	44	50	63	80
F	43,50	50,50	61,00	73,00	77,00	86,00	99,50	119,00
CL	34,00	38,00	45,00	53,00	55,00	61,00	68,00	79,00

**NOTE:** F Dimension refers to distance from edge of die set to inside edge of pin. (Except on ball bearing die sets, See page 1110.)



# STANDARD GUIDE PIN SIZES

Superior Die Set standard guide pin diameters for friction or ball bearing die sets are determined by the longest overall dimension of the die set. The standard guide pin diameter is provided unless otherwise specified when ordering. Charts shown are commonly used guidelines. Specific tooling forces should be calculated when determining die set styles, component types and sizes, and plate thickness. Superior recommends a minimum plate thickness to pin diameter of 1:1.

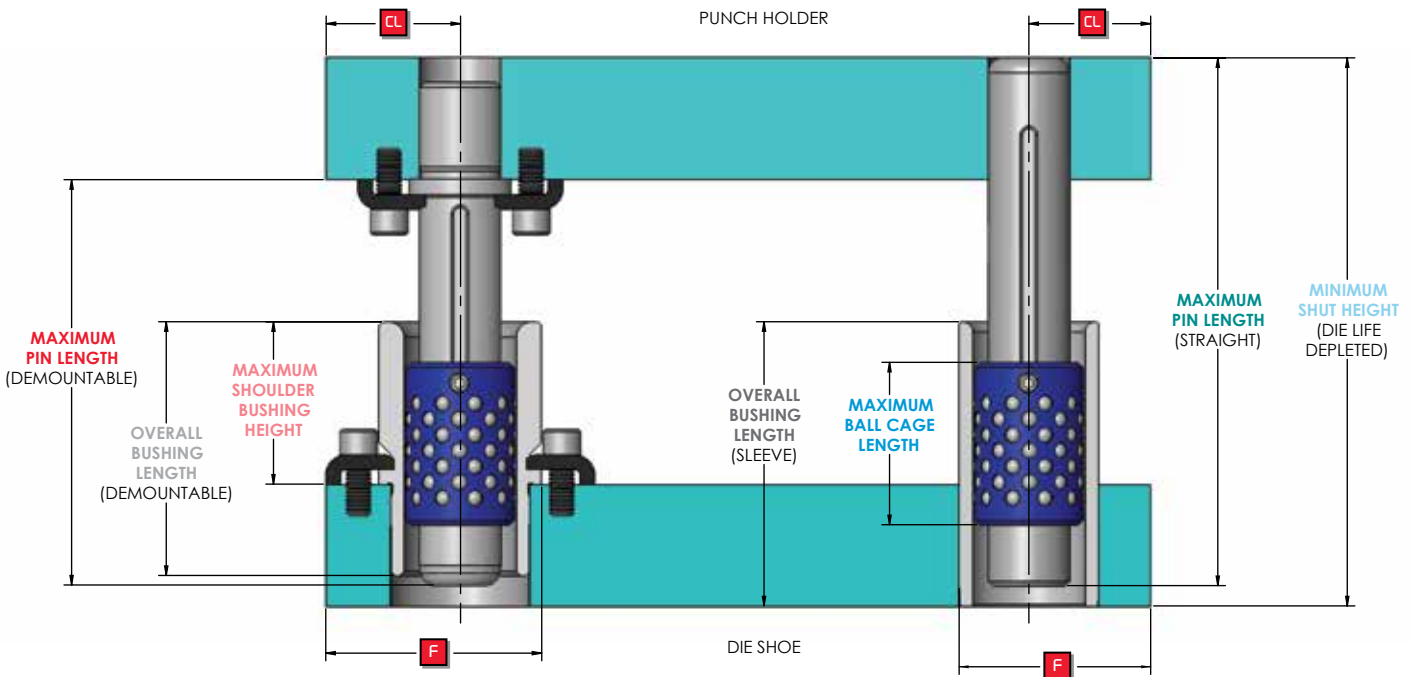






# BALL BEARING DIE SETS - TYPE A

Superior Type A Ball Bearing Die Sets are manufactured with a slotted 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.



### STANDARD PIN LOCATIONS - BALL BEARING

PIN DIAMETER	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
STRAIGHT SLEEVE (F)	2.068	2.358	2.803	3.218	3.498	3.955	4.465	4.965
DEMOUNT. BUSHING (F)	N/A	2.500	2.937	3.343	3.625	4.156	4.656	5.156
CL	1.375	1.500	1.750	2.000	2.125	2.375	2.625	2.875

### STANDARD PIN LOCATIONS - BALL BEARING - METRIC

PIN DIAMETER	19	25	32	40	44	50	63	80
STRAIGHT SLEEVE (F)	57,000	64,000	75,000	85,500	94,000	102,500	116,500	134,000
DEMOUNT. BUSHING (F)	61,500	67,500	78,500	89,000	97,500	107,500	121,500	139,000
CL	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 set to inside edge of bushing.

# BALL BEARING DIE SETS - TYPE A

## MAXIMUM PIN LENGTH



- Straight Guide Pin  $\text{MAXIMUM PIN LENGTH} = \text{MINIMUM SHUT HEIGHT} - \frac{1}{4}" (7\text{mm})$



- Dem't Guide Pin  $\text{MAXIMUM PIN LENGTH} = \text{MINIMUM SHUT HEIGHT} - \text{PUNCH HOLDER THICKNESS} - \frac{1}{4}" (7\text{mm})$

**NOTE:** Select nearest shorter stocked pin length

## MAXIMUM BALL CAGE LENGTH



- $\text{MAXIMUM BALL CAGE LENGTH} = \text{OVERALL BUSHING LENGTH} - \frac{1}{2}" (13\text{mm})$

**NOTE:** Select nearest shorter stocked ball cage length

## MAXIMUM SHOULDER BUSHING HEIGHT



- Straight Guide Pin  $\text{MAXIMUM BUSHING HEIGHT} = \text{MINIMUM SHUT HEIGHT} - \left( \text{PUNCH HOLDER THICKNESS} + \text{DIE SHOE THICKNESS} \right) - \frac{1}{4}" (7\text{mm})$
- Dem't Guide Pin  $\text{MAXIMUM BUSHING HEIGHT} = \text{MINIMUM SHUT HEIGHT} - \left( \text{PUNCH HOLDER THICKNESS} + \text{DIE SHOE THICKNESS} \right) - 1" (26\text{mm})$

**NOTE:** Select nearest shorter stocked shoulder height

## MAXIMUM STRAIGHT SLEEVE BUSHING LENGTH

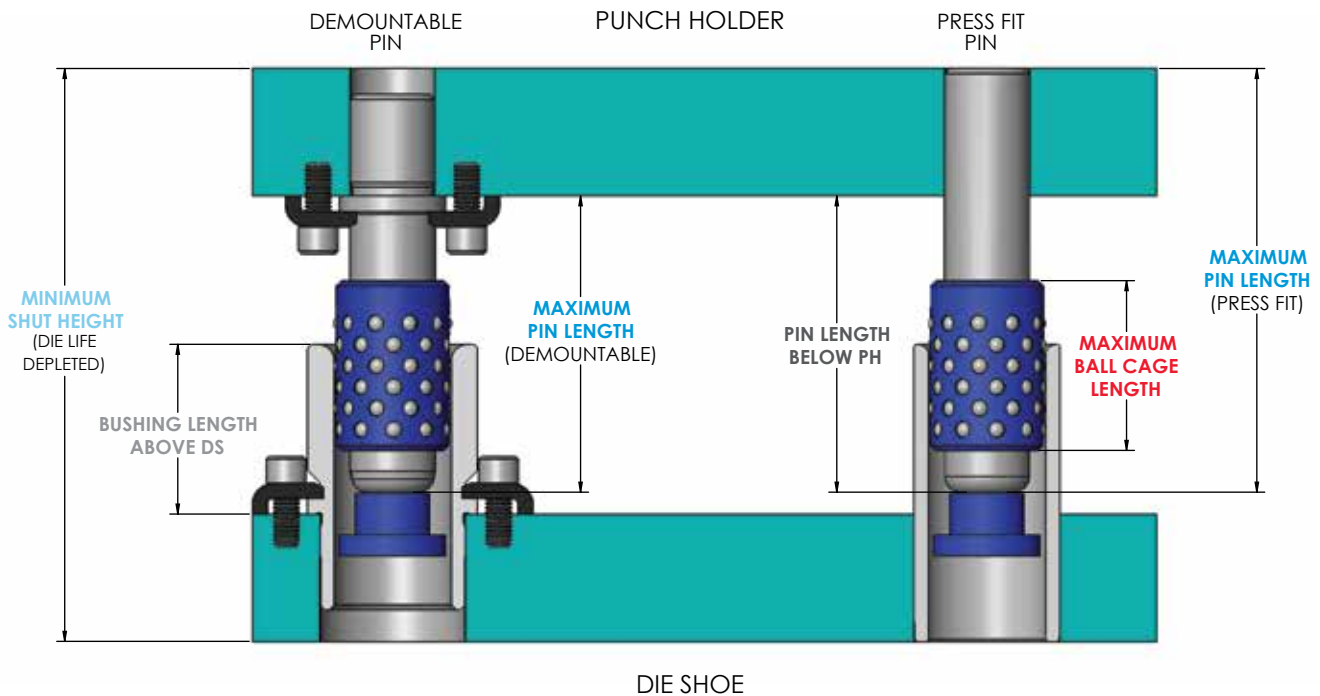


- Straight Guide Pin  $\text{MAXIMUM SLEEVE BUSHING LENGTH} = \text{MINIMUM SHUT HEIGHT} - \text{PUNCH HOLDER THICKNESS} - \frac{1}{4}" (7\text{mm})$
- Dem't Guide Pin  $\text{MAXIMUM SLEEVE BUSHING LENGTH} = \text{MINIMUM SHUT HEIGHT} - \text{PUNCH HOLDER THICKNESS} - 1" (26\text{mm})$

**NOTE:** Select nearest shorter stocked bushing length

# BALL BEARING DIE SETS - MAXICAGE SYSTEM

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

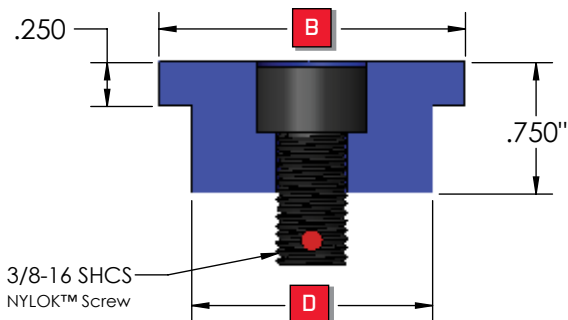


### END CAP DIMENSIONS

PIN DIAMETER	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3
PART NO.	334-0604	334-0804	334-1004	334-1204	334-1404	334-1604	334-2004	334-2404
D	5/8"	7/8"	1 1/8"	1 3/8"	1 5/8"	1 7/8"	2 3/8"	2 7/8"
B	1"	1 1/4"	1 1/2"	1 3/4"	2"	2 3/8"	2 7/8"	3 3/8"

### END CAP DIMENSIONS - METRIC

PIN DIAMETER	19	25	32	40	44	50	63	80
PART NO.	334-0604	334-0804	334-1004	334-1204	334-1404	334-1604	334-2004	334-2404
D	15,88	22,23	28,58	34,93	41,28	47,63	60,33	73,03
B	25,4	31,75	38,10	44,45	50,80	60,33	73,03	85,73



# BALL BEARING DIE SETS - MAXICAGE SYSTEM

## MAXIMUM BUSHING LENGTH

See Type A Ball Bearing



## MAXIMUM BALL CAGE LENGTH

### STEP 1.

$$C = \text{PIN LENGTH BELOW PH} + .375" (9,5\text{mm})$$

### STEP 2.

$$E = \text{PIN LENGTH BELOW PH} + \text{BUSHING LENGTH ABOVE DS} + \text{PH THICKNESS} + \text{DS THICKNESS} + .500" (12,7\text{mm})$$

### STEP 3.

$$A = E - \text{MINIMUM SHUT HEIGHT}$$

**NOTE:** Select nearest shorter stocked ball cage length

### STEP 4.

- Straight Guide Pin

$$\text{MAXIMUM BALL CAGE LENGTH} = C - \frac{A}{2}$$

- Dem't Guide Pin

$$\text{MAXIMUM BALL CAGE LENGTH} = \left( C - \frac{A}{2} \right) - .625" (15,9\text{mm})$$



## MAXIMUM PIN LENGTH



- Straight Guide Pin

$$\text{MAXIMUM PIN LENGTH} = \text{MINIMUM SHUT HEIGHT} - 1" (26\text{mm})$$



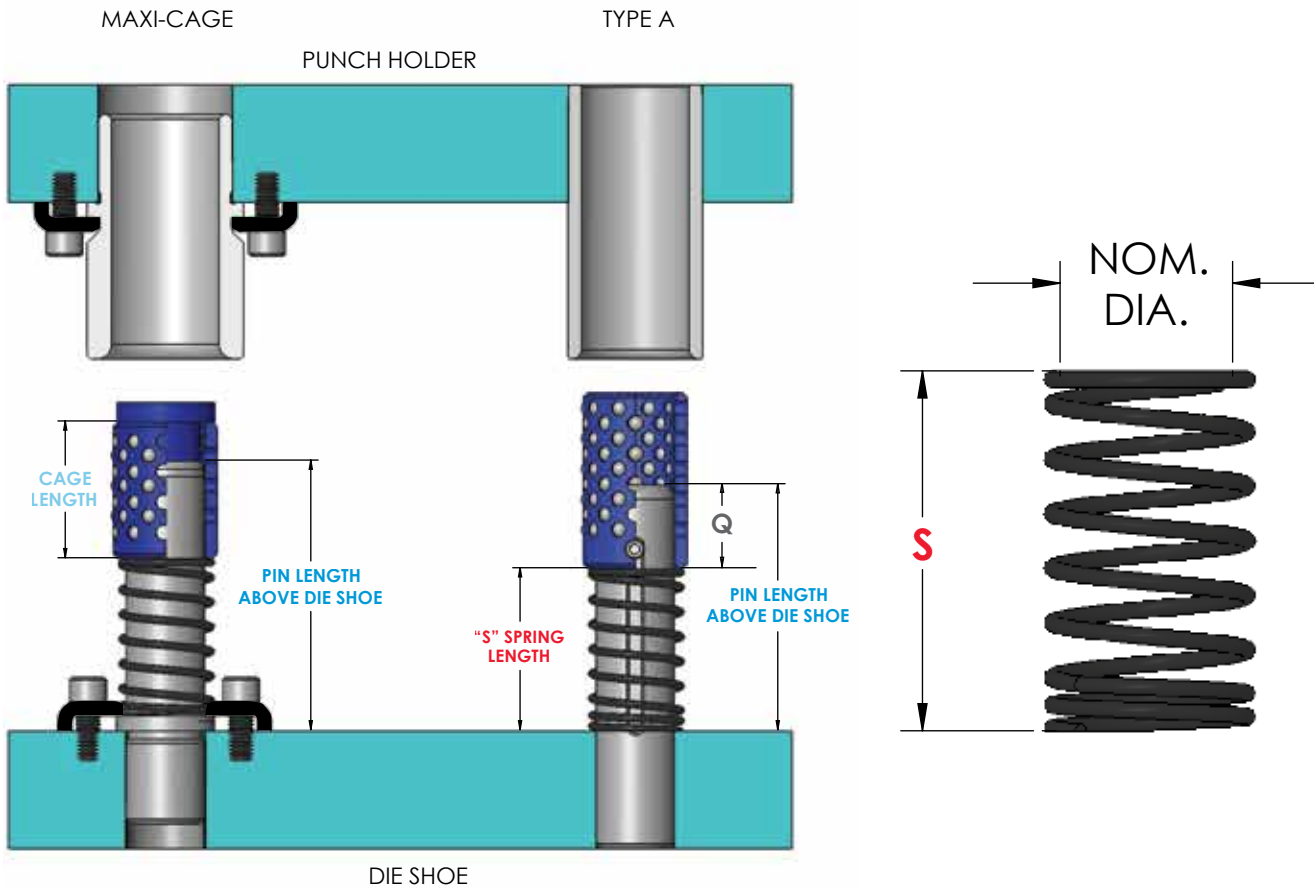
- Dem't Guide Pin

$$\text{MAXIMUM PIN LENGTH} = \text{MINIMUM SHUT HEIGHT} - (\text{PH} + 1" (26\text{mm}))$$

**NOTE:** Select nearest shorter stocked pin length

# “S” SPRING SYSTEM

The Superior “S-Spring” lets you invert your ball bearing die set so the pins are in the die shoe. The “S-Spring” holds the ball cage in position, ready to engage the bushing when not under preload. Once engaged, the spring does not affect the normal operation of the ball bearing engagement. “S-Springs” can be used with any pin or bushing type or any ball bearing style.



## “S-SPRING” LENGTH FOR (TYPE A) DIE SET

$$\text{“S” SPRING LENGTH} = \text{PIN LENGTH ABOVE D.S.} - \text{“Q” LENGTH}$$

Round up to next stocked length.  
\* See chart for proper Q length.

## “S-SPRING” LENGTH FOR (MAXICAGE) DIE SET

$$\text{“S-SPRING” LENGTH} = \text{PIN LENGTH ABOVE D.S.} - \left( \text{CAGE LENGTH} - \frac{1}{2} \right)$$

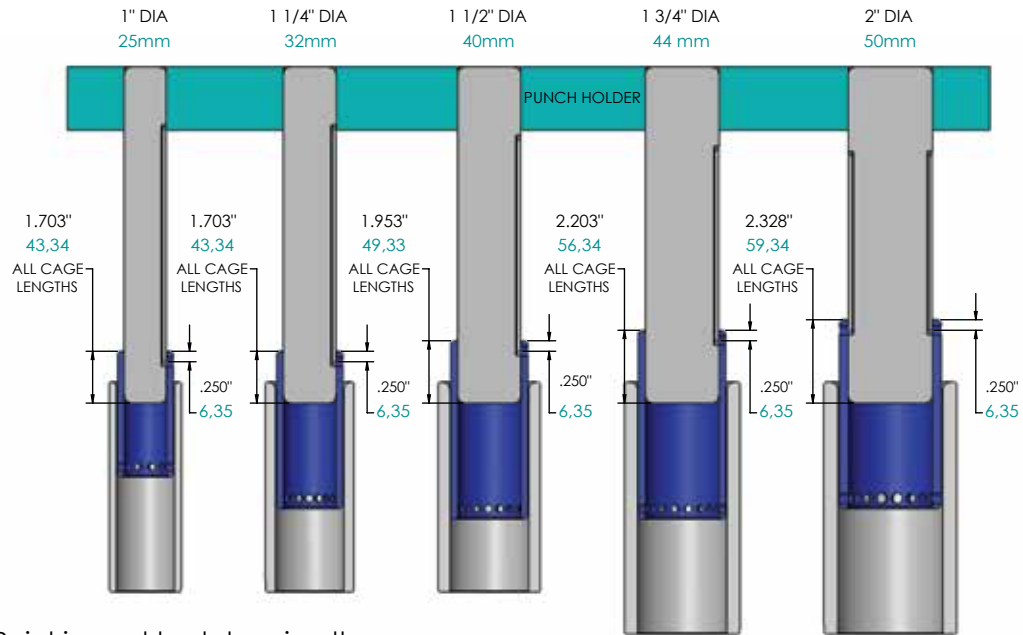
Round up to next stocked length.

GUIDE PIN NOM DIA.	“Q” LENGTH	SPRING FREE LENGTH	PART NUMBER
1	1.703	3"	346S0812
1¼	1.703	2"	346S1008
1¼	1.703	3"	346S1012
1½	1.953	2"	346S1208
1½	1.953	3"	346S1212
1¾	2.203	2"	346S1408
1¾	2.203	3"	346S1412
2	2.328	2"	346S1608
2	2.328	3"	346S1612

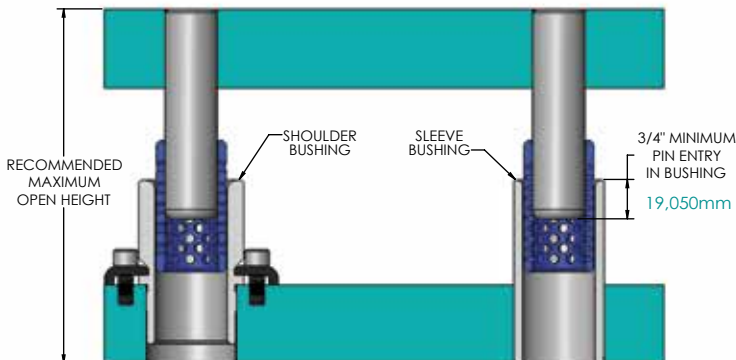
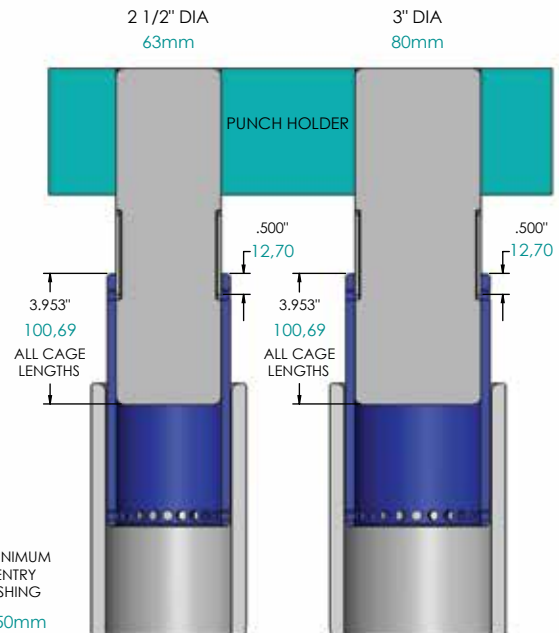
**NOTE:** Stackable for pin lengths longer than 3"



# BALL BEARING ENGAGEMENT POINTS



The Engagement Point is used to determine the cage position at the completion of the press stroke. It begins with the relative distance of the cage top at the point of engagement of the pin-ball-bushing. The cage then travels half the distance of the press stroke. 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.



# PIN AND BUSHING CLAMP LOCATIONS

## CLAMP LOCATION SYSTEMS

Three 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 clamp configurations are available as an option.

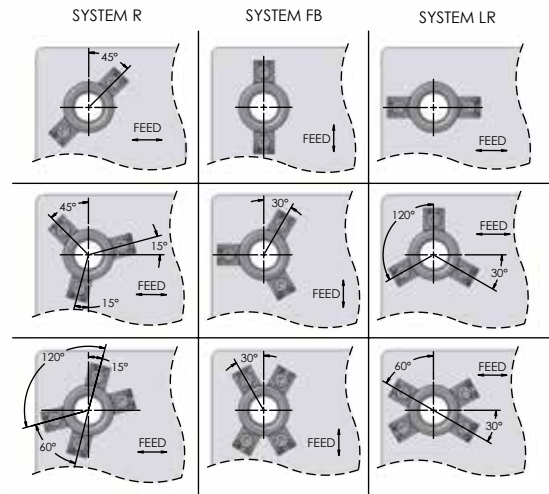
## CLAMPS

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 screws.

## WHEN ORDERING PLEASE SPECIFY:

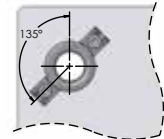
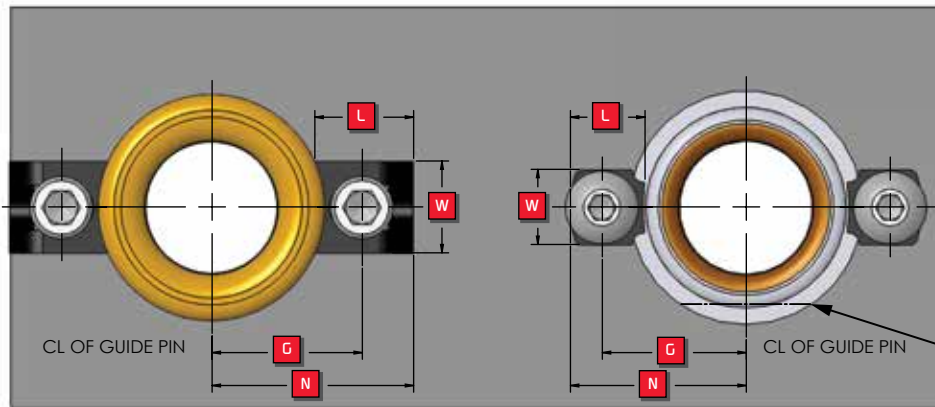
1. Clamp Part Number C-L or C-S
2. Quantity

## PLAIN AND BALL BEARING TYPE



SUPERIOR STANDARD

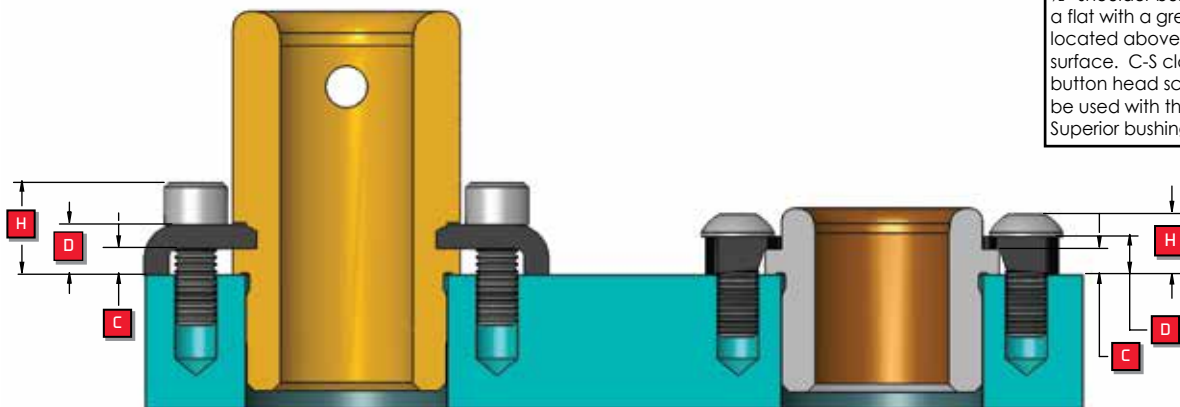
LAMINA™ STANDARD



LOCATION OF CLAMPS FOR 1" BALL BEARING PINS & BUSHINGS

PART NO. C-S

PART NO. C-L



**NOTE:** Superior standard 1/2" shoulder bushings utilizes a flat with a grease fitting located above the plate surface. C-S clamps and button head screws should be used with this type of Superior bushing.



# PIN AND BUSHING CLAMP LOCATIONS

## CLAMP DIMENSIONS

COMPONENT	NOM. DIA. BUSH I.D. PIN O.D.	BUSHING CLAMP DIMENSIONS								CLAMP NO.	QTY.	SCREW SIZE	BORING SIZE FOR PIN OR BUSHING +.0005/-.0000
		LOCATION		SIZE									
		G	N	L	W	C	D	H					
BUSHINGS: DEMOUNTABLE STEEL, SUPERIOR BRONZE-RITE™, BRONZE, SHOULDER	5/8	0.875	1.260	0.745	0.688	0.188	0.370	0.688	C-S	2	5/16 x 3/4	1.0000	
	3/4	0.938	1.322	0.745	0.688	0.188	0.370	0.688	C-S	2	5/16 x 3/4	1.1250	
	7/8	1.062	1.448	0.745	0.688	0.188	0.370	0.688	C-S	2	5/16 x 3/4	1.2500	
	1	1.125	1.510	0.745	0.688	0.188	0.370	0.688	C-S	2	5/16 x 3/4	1.5000	
	1 1/4	1.250	1.635	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	1.7500	
	1 1/2	1.375	1.760	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	2.0000	
	1 3/4	1.500	1.885	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	2.2500	
	2	1.625	2.010	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	2.5000	
	2 1/2	1.938	2.323	0.745	0.688	0.188	0.370	0.688	C-S	4	5/16 x 3/4	3.1250	
3	2.188	2.573	0.745	0.688	0.188	0.370	0.688	C-S	4	5/16 x 3/4	3.6250		
BUSHINGS: DEMOUNTABLE BRONZE-RITE™ LAMINATE™ STANDARD  ALL SHOULDER LENGTHS EXCEPT SHORT	3/4	0.859	1.140	0.547	0.562	0.188	0.281	0.447	C-L	2	5/16 x 3/4	1.1250	
	7/8	0.984	1.265	0.547	0.562	0.188	0.281	0.447	C-L	2	5/16 x 3/4	1.3750	
	1	1.078	1.359	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	1.5000	
	1 1/4	1.250	1.531	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	1.7500	
	1 1/2	1.375	1.656	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	2.0000	
	1 3/4	1.500	1.781	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	2.2500	
	2	1.765	2.046	0.547	0.562	0.188	0.281	0.447	C-L	4*	5/16 x 3/4	2.5000	
2 1/2	2.015	2.296	0.547	0.562	0.188	0.281	0.447	C-L	4	5/16 x 3/4	3.0000		
3	2.390	2.671	0.547	0.562	0.188	0.281	0.447	C-L	4	5/16 x 3/4	3.6250		
BUSHINGS: DEMOUNTABLE BRONZE-RITE™ LAMINATE™ STANDARD  SHORT SHOULDER LENGTHS	3/4	0.859	1.140	0.547	0.562	0.188	0.281	0.447	C-L	2	5/16 x 3/4	1.1250	
	7/8	0.984	1.265	0.547	0.562	0.188	0.281	0.447	C-L	2	5/16 x 3/4	1.3750	
	1	1.078	1.359	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	1.5000	
	1 1/4	1.250	1.531	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	1.7500	
	1 1/2	1.375	1.656	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	2.0000	
	1 3/4	1.500	1.781	0.547	0.562	0.188	0.281	0.447	C-L	3	5/16 x 3/4	2.2500	
	2	1.672	1.953	0.547	0.562	0.188	0.281	0.447	C-L	4	5/16 x 3/4	2.5000	
	2 1/2	1.890	2.171	0.547	0.562	0.188	0.281	0.447	C-L	4	5/16 x 3/4	3.0000	
3	2.140	2.421	0.547	0.562	0.188	0.281	0.447	C-L	4	5/16 x 3/4	3.5000		
BUSHINGS: DEMOUNTABLE BALL BEARING TYPE	1	1.250	1.635	0.745	0.688	0.188	0.370	0.688	C-S	2	5/16 x 3/4	1.7160	
	1 1/4	1.428	1.813	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	2.1060	
	1 1/2	1.593	1.978	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	2.4360	
	1 3/4	1.748	2.133	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	2.7460	
	2	2.045	2.430	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	3.1610	
	2 1/2	2.295	2.680	0.745	0.688	0.188	0.370	0.688	C-S	4	5/16 x 3/4	3.6810	
3	2.500	2.885	0.745	0.688	0.188	0.370	0.688	C-S	4	5/16 x 3/4	4.1810		
GUIDE PINS: DEMOUNTABLE	1	0.875	1.260	0.745	0.688	0.188	0.370	0.688	C-S	2	5/16 x 3/4	1.0000	
	1 1/4	1.000	1.385	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	1.2500	
	1 1/2	1.125	1.510	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	1.5000	
	1 3/4	1.250	1.635	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	1.7500	
	2	1.500	1.885	0.745	0.688	0.188	0.370	0.688	C-S	3	5/16 x 3/4	2.0000	
	2 1/2	1.750	2.135	0.745	0.688	0.188	0.370	0.688	C-S	4	5/16 x 3/4	2.5000	
3	2.000	2.385	0.745	0.688	0.188	0.370	0.688	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 upon request.



# PIN AND BUSHING CLAMP LOCATIONS

## CLAMP DIMENSIONS - METRIC

COMPONENT	NOM. DIA. BUSH I.D. PIN O.D.	BUSHING CLAMP DIMENSIONS							CLAMP NO.	QTY.	SCREW SIZE	BORING SIZE FOR PIN OR BUSHING +0.0127/-0.0000
		LOCATION		SIZE								
		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
80mm	62,30	72,09	18,92	17,46	4,76	9,38	17,32	C-S	4	M8-1.25 X 18	100,00	
BUSHINGS: DEMOUNTABLE BRONZE-RITE™ LAMINA™ STANDARD  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	44,70	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	100,00
BUSHINGS: DEMOUNTABLE BRONZE-RITE™ LAMINA™ STANDARD  SHORT SHOULDER LENGTHS	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	100,00
BUSHINGS: DEMOUNTABLE BALL BEARING TYPE	19mm	29,70	39,49	18,92	17,46	4,76	9,38	17,32	C-S	4	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	112,00	
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 upon request.





# STANDARD STEEL TYPES

## SUPERIOR A36 MOD STEEL

A modified A36 steel with a restricted carbon range that is centered on 1020. It is a hot-rolled mild steel with greater tensile strength than typical low carbon warehouse steels. It has consistent machinability permitting economic stock removal.

### COMPOSITION A36 MOD STEEL

C .....	.15/.25
Mn .....	.60/.90
P .....	.04 Max.
S .....	.05 Max.

## SUPERIOR FORTAL® ALUMINUM



This exclusive 7000 series aluminum alloy offers high strength, light weight, and exceptional machinability. Low residual stress and modulus of elasticity prevents premature deformation. Its uniform cross-section is harder than mild steel. The thermal conductivity being greater than steel along with excellent polishing characteristics, makes Fortal a good choice for plastic mold use.

### COMPOSITION FORTAL®

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

### OTHER METALS

Superior supplies products in other metals on special order with a variety of machining options. Non-stock materials may require extra lead time.

## SUPERIOR 4130 STEEL

An AISI 4130 alloy steel that is supplied heat treated to 300 Bhn (262-321). This holder block quality type of steel has an optimum balance between machinability and hardness while possessing excellent qualities for retainer and back up plate applications.

### COMPOSITION 4130 STEEL

C .....	.27/.33 (.29 Typ.)
Mn .....	.901/1.30 (1.15 Typ.)
P .....	.035 Max.
S .....	.040 Max.
Cr .....	.60/.90 (.75 Typ.)
Moly .....	.15/.25 (.20 Typ.)
Si .....	.15/.40 (.28 Typ.)
V .....	.02Min. (.04 Typ.)

## SUPERIOR FORGE-RITE™ 4340 STEEL

This hot-rolled 4340 alloy steel is a proprietary material specially formulated for the manufacture of forging equipment and tooling. It is a tough, shock resistant nickel-chrome-moly steel with optimum grain flow characteristics. It is supplied "stress relieved" at 215-255 Bhn with improved machinability. Typical applications include those with severe impact, heat, wear, and stress.

### COMPOSITION FORGE-RITE™

C .....	.35/.35
Mn .....	.60/.90
Cr .....	.60/.90
Moly .....	.25/.35
Si .....	.40/.60
Ni .....	1.65/2.00

## SUPERIOR P-20 STEEL

A premium AISI 4130 alloy steel with reduced sulfur for cleanliness and excellent polishing ability. Supplied at 300 Bhn (262-321), this P20 type steel offers consistent machinability while maintaining superb mechanical properties.

### COMPOSITION P-20 STEEL

C .....	.24/.35 (.29 Typ.)
Mn .....	.75/1.00 (.90 Typ.)
P .....	.025 Max.
S .....	.010 Max.
Cr .....	.90/1.20 (1.05 Typ.)
Moly .....	.45/.65 (.55 Typ.)
Si .....	.15/.40 (.28 Typ.)
V .....	.04Min. (.06 Typ.)

## TOOLOX® 44



A low carbon premium alloy steel designed to have high impact strength (Charpy tested @ 20 ft lbs) and low residual stresses and therefore good dimensional stability. At 45 Hrc, this steel can be readily machined compared to steels of like hardness. Toolox 44 is formulated to ERS properties and can be polished to a LENS quality finish.

### COMPOSITION TOOLOX® 44

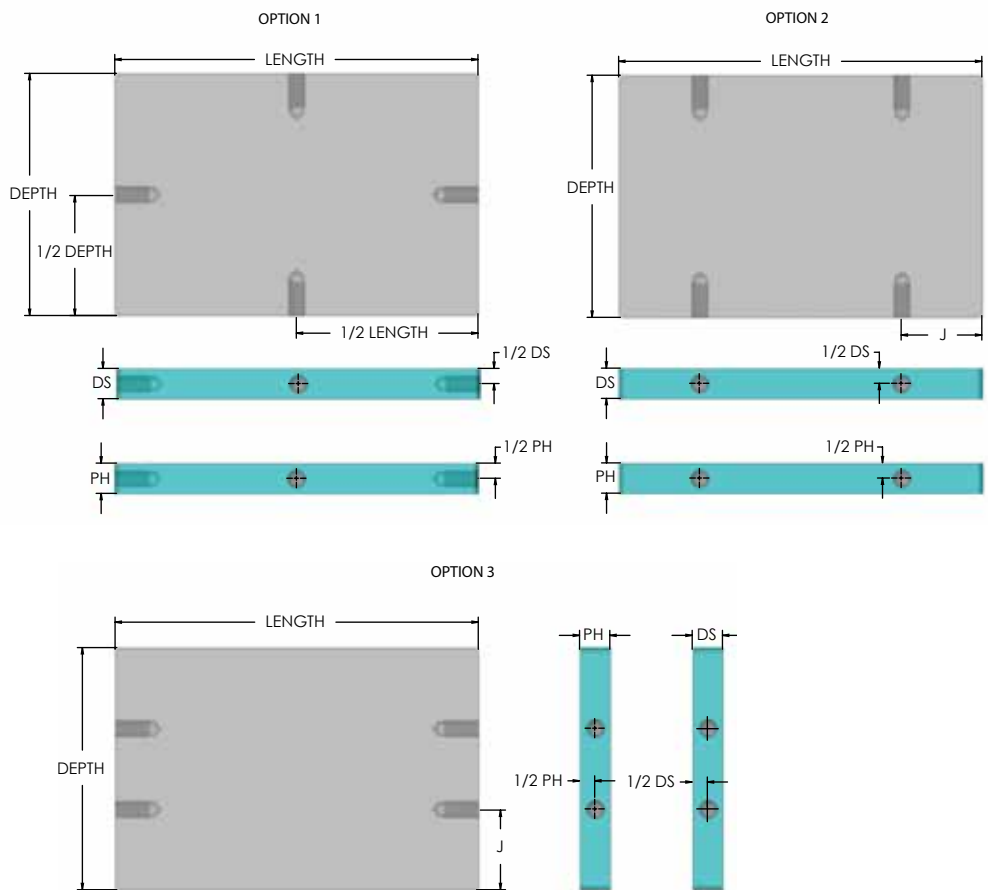
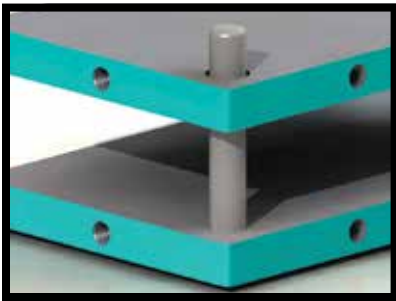
C .....	0.31
Mn .....	0.90
S, max .....	.003
Cr .....	1.35
Moly .....	.80
Si .....	.60
V .....	.145
Ni .....	.70



# 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 eyebolts.

Optional Handling (eyebolt) 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 configurations may be requested.



## OPTION 1

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

## OPTION 2 AND 3

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

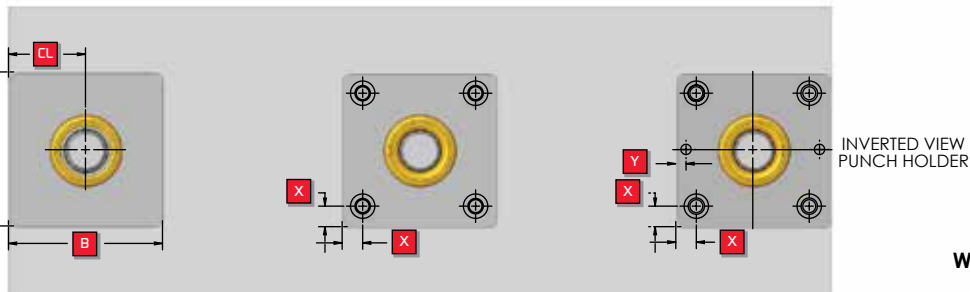
**NOTE: 2.** J Dimension equals 3 time guide pin diameter, on die sets over 29 inch length to and including 57 inch length or depth.

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



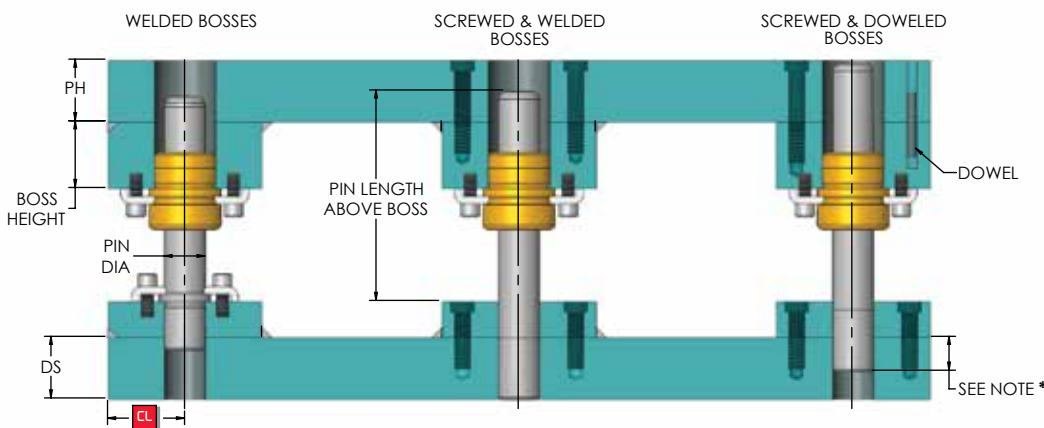
# BOSS DIE SETS

Superior Bosses are available on all friction or ball bearing die sets and can be applied to the punch holder or die shoe. Bosses help to support the guide pin to reduce deflection, and are commonly used when the pin diameter is greater than the plate thickness or when long guide pins are required. Specific tooling forces should be taken into account when ordering boss size, guide pin size, and plate thicknesses. Special Bosses can be ordered in almost any height, size, and type.



**WHEN ORDERING PLEASE SPECIFY:**

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



**NOTE:** \* Dowels are not used when component extends past the Boss by a minimum of 1". The tap hole will be in the thicker of plate or Boss with c'bore in opposite. If equal thickness, then tap hole will be in Boss.

Bosses over 7" in height are Screwed and Welded as standard

Overall pin length = Pin above Boss (+) Pin 'S' dimension (select nearest longer standard size)

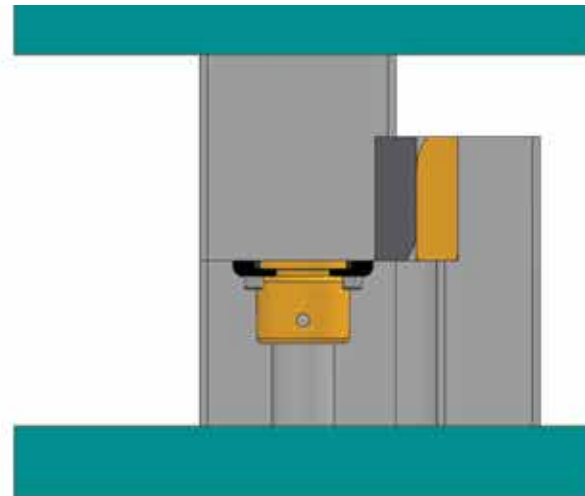
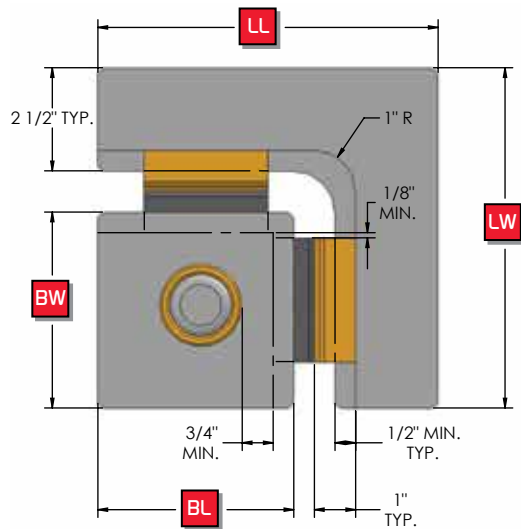
When punch holder or die shoe thickness is 1.25" or less Screwed & Doweled Bosses are standard.

Nominal Dia.	FRICTION DIE SET				BALL BEARING DIE SET				SCREW SIZE	DOWEL PIN SIZE
	B	CL	X	Y	B	CL	X	Y		
1"	3.00	1.500	0.563	0.375	3.00	1.500	0.500	0.313	1/2"-13	.375"
1.25"	3.25	1.625	0.563	0.375	3.50	1.750	0.563	0.375	1/2"-13	.375"
1.5"	3.50	1.750	0.625	0.375	4.00	2.000	0.625	0.375	1/2"-13	.375"
1.75"	3.75	1.875	0.625	0.375	4.25	2.125	0.625	0.375	1/2"-13	.375"
2"	4.00	2.000	0.625	0.375	4.75	2.375	0.625	0.375	1/2"-13	.375"
2.5"	5.00	2.500	0.750	0.500	5.25	2.625	0.750	0.375	5/8"-11	.500"
3"	5.50	2.750	0.750	0.500	5.75	2.875	0.750	0.375	5/8"-11	.500"



# WEAR PLATE DIE SET - L SYSTEM

Three typical boss and heel block wear plate systems (U, L, and V) are available from Superior. Proper wear plate design substantially reduces wear on the die blocks, punches, and other die components. The L system utilizes four right angle blocks located on each corner of the die set. This allows multiple feed directions and maximum work area inside the blocks and offers the most rigidity considering the 8 wear plate intersections. The 'L' block can be mounted inside or outside the boss that typically contains the bushings. Ball bearing components or friction type (as shown here) can be used in any of our wear plate designs.



WEAR PLATE BOSS AND "L" BLOCK

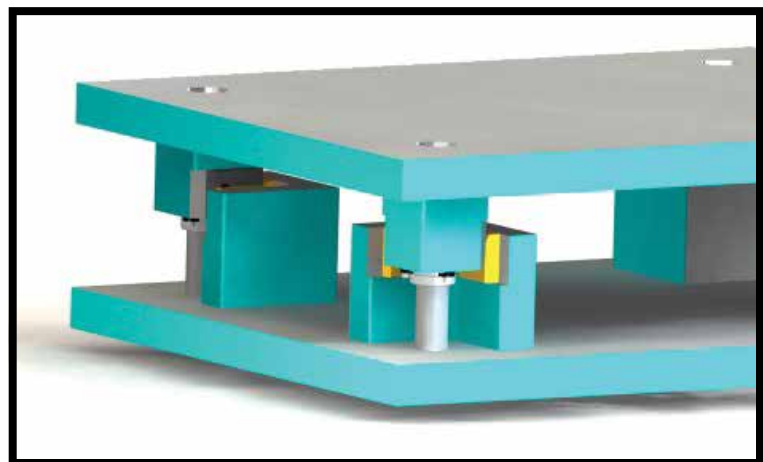
**NOTE:** Each wear plate is custom fit to ensure mating accuracy. Proper re-installation is required if ever removed.

### L SYSTEM DIMENSION

* TYPICAL BLOCK AND 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 AND BOSS SIZES BALL BEARING				
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

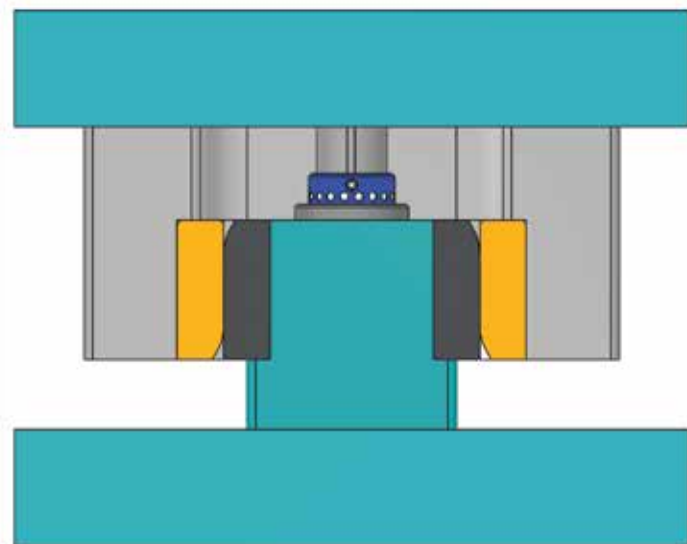
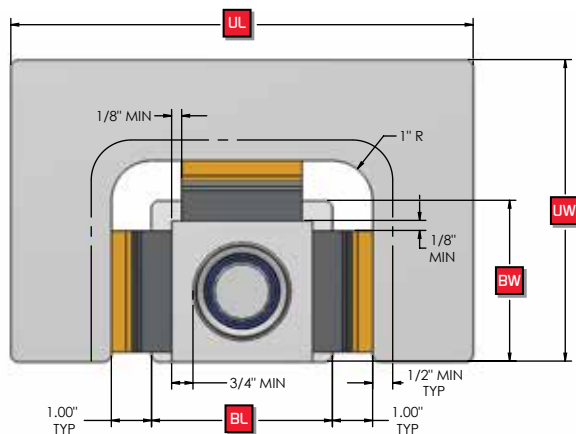


Wear plates are available in hardened steel, solid bronze, or self-lubricating types.



# WEAR PLATE DIE SET - U SYSTEM

Three typically used boss and heel block wear plate systems (U, L and V) are available from Superior. These approaches to die set construction allow the designer to build rigidity at any given point in the press stroke. The U system is generally used on front to back feed designs or narrow dies that require maximum stiffness. The unique opposing 'U' shaped bosses guide the die set in all directions. Ball bearing components (as shown here) or friction type can be used in any of our wear plate designs. The bushing is typically installed in the boss in either component systems.



WEAR PLATE BOSS AND "U" SHAPE HEEL BLOCK

**NOTE:** Each wear plate is custom fit to ensure mating accuracy. Proper re-installation is required if ever removed.

## U SYSTEM DIMENSION

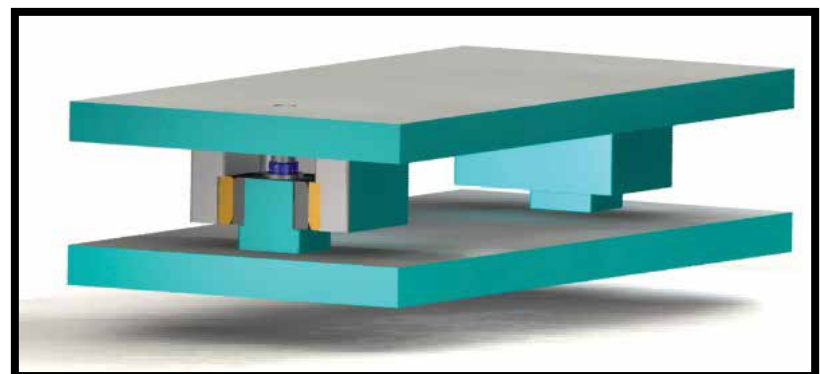
### \* TYPICAL BLOCK AND BOSS SIZES FRICTION BEARING PINS/BUSHINGS

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 AND BOSS SIZES BALL BEARING

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

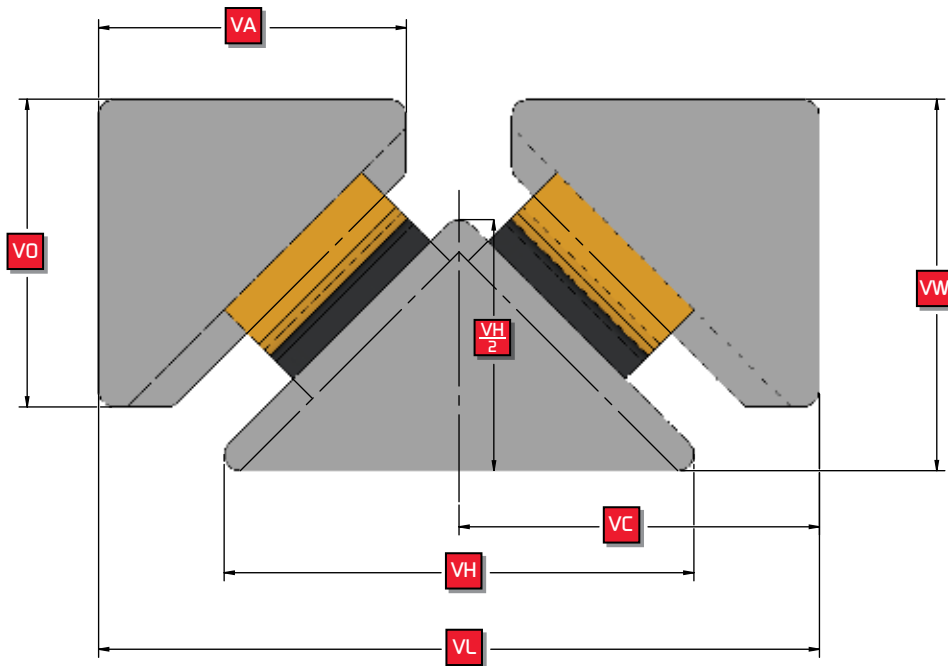


Wear plates are available in hardened steel, solid bronze, or self-lubricating types.



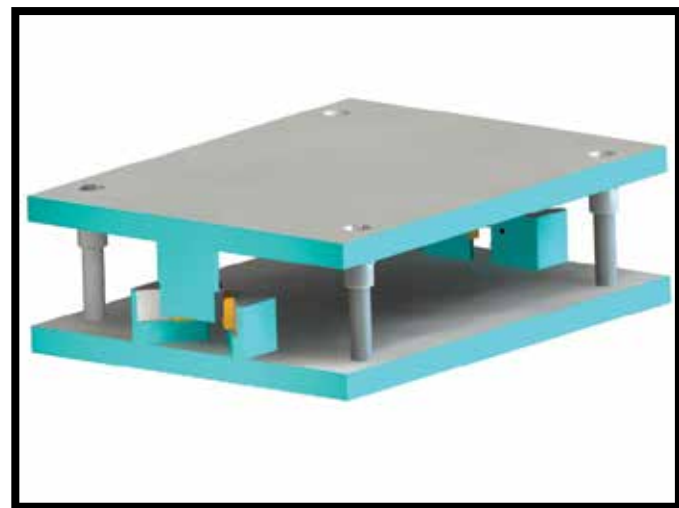
# WEAR PLATE DIE SET - V SYSTEM

Three typically used boss and heel block wear plate systems (U,L,V) are available from Superior. Wear plates are uniquely positioned to offset die forces and help to maintain die life even though the press-ram may be poorly aligned. The V system is often used on standard pin and bushing type die sets where extra rigidity is needed at an economical choice. The V blocks, with 45° angles, are positioned between the components similar to a thrust block to aid in die alignment. This system is also excellent in retrofitting existing dies by adding the V system where space permits.



V SYSTEM DIMENSION						
	VL	VW	VO	VA	VC	VH
V1	11 1/8	5 3/4	4 3/4	4 3/4	5 5/16	7 1/4
V2	13	4 3/4	4 3/4	5 3/4	6 1/2	7 1/4

Maximum recommended height = 6"



Wear plates are available in hardened steel, solid bronze, or self-lubricating types.





# TOLERANCES

## FRICITION PIN & BUSHING CLEARANCE

PIN DIAMETER	CLEARANCE (IN)
¾"	0.0001 to 0.0006
1"	0.0001 to 0.0006
1¼"	0.0002 to 0.0007
1½"	0.0003 to 0.0008
1¾"	0.0004 to 0.0009
2"	0.0005 to 0.0010
2½"	0.0006 to 0.0011
3"	0.0008 to 0.0013

## FLAT & PARALLEL

		DIE SET TYPE	
		STANDARD	BOSS
PUNCH HOLDER OR DIE SHOE	FLATNESS (PER 12")	.001"	.002"
	PARALLELISM (PER 12")	.001"	.002"
ASSEMBLED DIE SET	PARALLELISM (PER 12")	.0015"	.002"

To calculate flatness/parallelism, divide diagonal of die set by 12". Then multiply by values indicated above.  
 (example: 48" diagonal ÷ 12" = (4). (4) x .001" = .004" TIR (flat or parallel).  
**NOTE:** plates greater than 120" diagonal or less than 1.25" thick calculated upon application.

## PIN SQUARENESS

.001" IN 6" OF PIN LENGTH

## OVERALL TOLERANCES FOR GAS CUT STEEL PLATE EXTERNAL AND INTERNAL SHAPES - MEASURED AT PLATE SURFACE

PLATE THICKNESS	SIZE B/O or PLATE	TOLERANCE		MINIMUM PIERCE AREA		MINIMUM INTERNAL RADIUS	MINIMUM B/O WIDTH	CLEARANCE PER SIDE	SQUARENESS TO SURFACE OF PLT	MINIMUM DIST BETWEEN B/O'S
		PLATE	BURNOUT	WIDTH x LENGTH	DIAMETER					
1/4" to 2"	≤ 30"	+/- .030	+ .060/- .000	0.312 x 0.750	0.750	0.160	0.125	0.060	0.030 TIR	.125*
	>30" ≤ 60"	+/- .060	+ .120/- .000							
	>60" ≤ 100"	+/- .090	+ .180/- .000							
> 2" to 3"	≤ 30"	+/- .030	+ .060/- .000	0.375 x 0.875	0.875	0.160	0.125	0.060	0.030 TIR	.188*
	>30" ≤ 60"	+/- .060	+ .120/- .000							
	>60" ≤ 100"	+/- .090	+ .180/- .000							
> 3" to 4 1/2"	≤ 30"	+/- .045	+ .090/- .000	0.500 x 1.000	1.125	0.190	0.180	0.090	0.045 TIR	.250*
	>30" ≤ 60"	+/- .090	+ .180/- .000							
	>60" ≤ 100"	+/- .125	+ .250/- .000							
> 4 1/2" to 6"	≤ 30"	+/- .060	+ .120/- .000	0.625 x 1.250	1.250	0.190	0.250	0.125	0.060 TIR	.312*
	>30" ≤ 60"	+/- .090	+ .180/- .000							
	>60" ≤ 100"	+/- .125	+ .250/- .000							
> 6" to 7 1/2"	≤ 30"	+/- .090	+ .180/- .000	1.000 x 1.750	1.750	0.250	0.375	0.188	0.075 TIR	.438*
	>30" ≤ 60"	+/- .125	+ .250/- .000							
	>60" ≤ 100"	+/- .160	+ .320/- .000							
> 7 1/2" to 10"	≤ 30"	+/- .100	+ .200/- .000	1.750 x 2.500	2.500	0.250	0.500	0.250	0.100 TIR	.625*
	>30" ≤ 60"	+/- .160	+ .320/- .000							
	>60" ≤ 100"	+/- .190	+ .380/- .000							
> 10" THICK OR OVER 100" LENGTH				UPON APPLICATION				0.010/INCH	.875*	

**NOTE:** \* These dimensions are a guide because of the many variables involved.



## GLOSSARY OF TERMS

**AIR VENTS** – slots cut in the plate surface near the bushings to relieve pressure caused by compression of the pin in the bushing.

**BURN-OUT** – an interior torch-cut opening of any shape. See our "Torch-cut Tolerance Chart" (see page 1260) for minimum burn-out sizes.

**CLEAN-UP GRIND (MILL)** – plate thickness is ground (milled) to a tolerance of  $+.062/-0.125$ " and no raw stock is visible.

**DECIMAL GRIND (MILL)** – plate thickness is ground (milled) to a tolerance other than a clean-up grind.

**FINISHED EDGES** – an edge of a plate that is machined (milled or ground). A torch-cut (or saw-cut) edge is standard unless otherwise specified to be finished.

**GRINDING STANDARD** – Superior has numerous Blanchard grinders (rotary) with a maximum capacity of 160" diagonal and a standard micro-finish of 125 maximum. Also, Superior can surface grind (reciprocating) plates up to 60 x 80" and a standard micro-finish of 63 maximum.

**INVERTED DIE SET** – a die set with the pins and bushings installed in opposite plates. On friction die sets, the pins are installed in the punch holder (top). On ball bearing die sets, the pins are installed in the die shoe (bottom). On 'Inverted' 4-pin die sets, the offset pin is the right front. It is also recommended to use the "S" springs with ball bearing components (see page 1150).

**OPEN DIE SET** – a die set without the pin and bushing holes drilled & bored. The components are shipped loose with the plates. **Note:** pin diameter must be equal or less than plate thicknesses.

**REVERSE DIE SET** – a die set where the die shoe plate depth (front to back) is greater than the length (left to right).

**SHAPE-CUT PLATE** – a plate with a torch-cut exterior that is neither a perfect rectangle or circle. See our "Torch-cut Tolerance Chart" (page 1260) for minimum shape-cut sizes.

**Note:** a rectangle with torch-cut bolt slots or radiuses on corners is still considered shape-cut.

**STRESS RELIEVING (THERMAL)** – performed to all A36 torch-cut plates under the following circumstances: customer request, ground plate  $< 1 \frac{1}{4}$ " thick, ground plate with length to depth ratio  $> 3:1$ , welded bosses, severe torch-cutting application, special machining applied. Also, all 4340 and 1045 material plates are stress relieved after torch-cutting.

**SLUG CHUTE** – an angled surface on the edge of a plate that can be supplied torch-cut (standard) or machined. Torch-cut slug chutes must have a minimum angle of 28 degrees.



# STOCK & SURPLUS DIE SETS

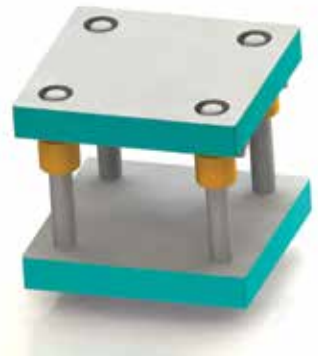
Superior inventories a variety of stock die sets that are available for immediate delivery. Choose from three style types in a wide range of work area dimensions and offered in both steel and Fortal aluminum plates. Select your choice of pin and bushing types and sizes.

Surplus die sets give you fast deliveries with big cost savings of these 'never before used' sets. Frequently browse from our on-line listing to find small to large sizes that can be fitted with your component choices.

**S1**

**S2**

**S4**



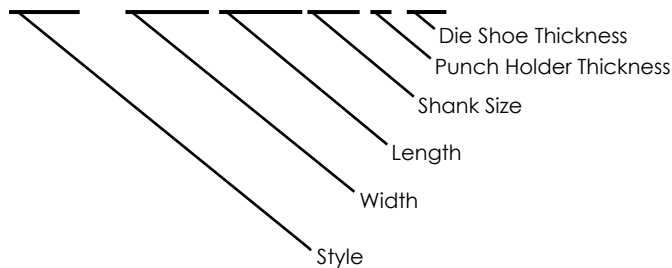
**STYLE 20B STOCK**

**STYLE 25 STOCK**

**STYLE 75 STOCK**

## CATALOG NUMBER EXAMPLE

**S1-0404A12**



### WHEN ORDERING PLEASE SPECIFY:

1. Style 20B, 25 or 75
2. Quantity
3. Catalog Number
4. Pin Length
5. Bushing Length (1", 2", 3")  
Bushing Material (steel, bronze, or Bronze-Rite™)
6. Shank Type and Size (S1 only)

### CURRENT STOCK

For current stock plate inventory,  
see website: [www.shopsupdie.com](http://www.shopsupdie.com)



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