

# MOELLER

PRECISION TOOL

YOUR GLOBAL PARTNER FOR STANDARD & SPECIAL DIE COMPONENTS

- PUNCHES
- DIE BUTTONS
- RETAINERS



CERTIFIED  
**ISO**  
9001:2008



METRIC CATALOG

VALUE • QUALITY & SERVICE • TECHNOLOGY





*Our commitment to continuous improvement is reflected in true innovation in our management, processes, equipment and facilities. We take pride in our reputation of excellent service, quality performance, value and the understanding that our own interests are best served when we best service our customers.*



**CONVENIENCE** - Fast, courteous, personalized attention to accommodate your special or emergency requirements.

**CONFIDENCE** - Performance guaranteed products, SPC controlled and ISO audited to exceed the industry's highest standards.

**VALUE** - The latest technology and innovative processes provide the world's highest performance tools priced to help your bottom line.



**YOUR GLOBAL PARTNER FOR STANDARD & SPECIAL DIE COMPONENTS**



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## PERFORMANCE ENHANCERS .....

# POLICIES, TERMS AND CONDITIONS



## Moeller's "Purchase With Confidence" Guarantee!

- Customer satisfaction is Moeller's ultimate goal.
- Moeller was the first domestic punch manufacturer to receive its ISO certification. Moeller products are manufactured to NAPMA, NAAMS or other recognized industrial standards and are 100% interchangeable with all competing brands.
- Moeller uses only the highest commercially available grades of high speed and tool steels. The products are heat treated to exacting specifications then processed on some of the best equipment in the industry.
- Moeller products are warranted to meet or exceed the performance of like products from competing brands. If a customer is unsatisfied, Moeller will replace or allow the customer to return the product for full credit.

## Over Shipments/Under Shipments:

Because of normal part losses due to machining set-up, Moeller requires that an over or undershipment of  $\pm 10\%$  be allowed on quantities of 13 pieces or more.

## Partial Shipments:

Standard line items are batched and shipped according to the latest line item due. Specials are shipped according to line item due dates.

Note: Moeller will accommodate any partial shipment as requested by the customer.

## Returns:

1. Catalog items that are custom ground to customer specifications are often non reusable; Moeller will apply discretion for a 15% credit for reusable items.
2. Unused, off the shelf items such as punch blanks and standard retainers can be returned for a 15% restocking charge. The item must be in the original packaging in resalable condition.
3. Special "make-to-print" items are not returnable.
4. Moeller reserves the discretion for all returns exceeding one year from invoice date.

## Method of Shipment:

Moeller ships UPS or Federal Express whenever possible, unless weight requirements dictate truck delivery, or as specifically requested by the customer.

## Cancellation:

If labor or material has been applied to a cancelled job, a prorated charge will be billed.

## Prices/Standards:

See current price supplement in effect.

## Prices/Specials:

Per factory quotation good for 90 days or as specified.

## Terms:

Net 30 days, F.O.B. our plant, 1½% per month late payment charge. U.S. dollars.

## Moeller "Customer Service Stock" Program:

Moeller is pleased to offer an exclusive Service Stock Program to select customers. The "Customer Service Stock" program offers many benefits to our valued customers, including product cost reduction, immediate "on hand" availability, and reduced customer inventory costs. Moeller will manufacture your annual or semi-annual requirements for Pierce Tooling and Die Components and make them available for immediate shipment. The parts are billed only as shipped. A written purchase order is required with inventory set-up and parts must be released in the subsequent year. Please contact your Moeller Sales Representative for more details.

- Moeller reserves the right to modify, correct or improve this literature or products without notice.

# DELIVERY SCHEDULE/ EXPEDITED SERVICES



## STANDARD DELIVERY

### SAME DAY / 1 DAY:

- Punch and Button Blanks, Standard Retainers and All Other Stocked Products

### 3 WORKING DAYS:

- Standard In-Range Punches and Die Buttons Includes one Standard Alteration
- Quantities of 23 Pieces or Less

### 5 WORKING DAYS:

- Nose Large Punches & Ultra Life Extended Range Buttons. Includes one Standard Alteration
- Quantities of 7 Pieces or Less

### 8 WORKING DAYS:

- Counter Bore Relief Extended Range Buttons
- Slip Fit Counterbore Relief Buttons Over 40mm Diameter

### 10 WORKING DAYS:

- Universal Shaped Punches and Die Buttons, Quill Punches & Closed End Strippers

### PERFORMANCE ENHANCER:

- TiN, TiCN, MOST, CDF, MSP, TiAlN, Alcrona
- NOTE: 2-10 Additional Work Days to the Standard Delivery Date

ORDERS MUST BE RECEIVED BEFORE 11:00AM EST (OR AS APPROVED BY A CUSTOMER SERVICE REPRESENTATIVE) TO BE CONSIDERED A WORK DAY.

QUANTITIES LARGER THAN 23 PIECES MAY REQUIRE ADDITIONAL LEAD TIME. CUSTOMER SERVICE REPRESENTATIVE MUST CONSULT FACTORY.

## E.D.S. EXPEDITED DELIVERY SERVICE Products Shipped Earlier Than Standard Delivery

### LEAD TIME:

- As Negotiated with a Customer Service Representative

### QUALIFYING PRODUCTS:

- All Standard Catalog Items

### COST:

- List Price + 25% Net
- Minimum Order = \$25.00

## N.D.S. NEXT DAY SERVICE Standard Products Received by 5:30 p.m. EST Will Ship Next Day

### QUALIFYING PRODUCTS:

- Round Piercing Products (excluding Ultra Life)

### REQUIRED SPECIFICATIONS:

1. N.D.S. Items MUST be on an Independent Order (i.e. they must be separate from other delivery items)
2. Service Limited to Quantities of 1-20 Pieces
3. MUST be within Standard Catalog Range
4. Customer MUST Specify Next Day Service
5. Customer SHOULD Specify Method of Shipment (e.g. UPS, UPS Next Day Air, Pick Up, etc.)

### COST:

- No Additional Charge

REQUIRED SPECIFICATIONS MUST BE CLEARLY STATED ON INDEPENDENT PURCHASE ORDER(S) TO GUARANTEE NEXT DAY SERVICE.

## S.D.S. SAME DAY SERVICE

### LEAD TIME:

- Orders MUST be received before 11:00 a.m. EST or as approved by a Customer Service Representative

### QUALIFYING PRODUCTS:

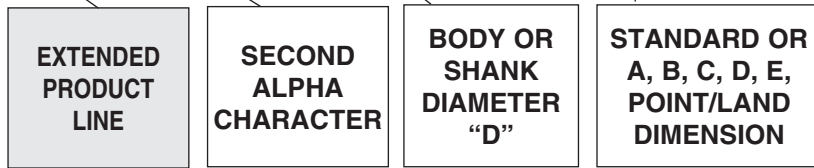
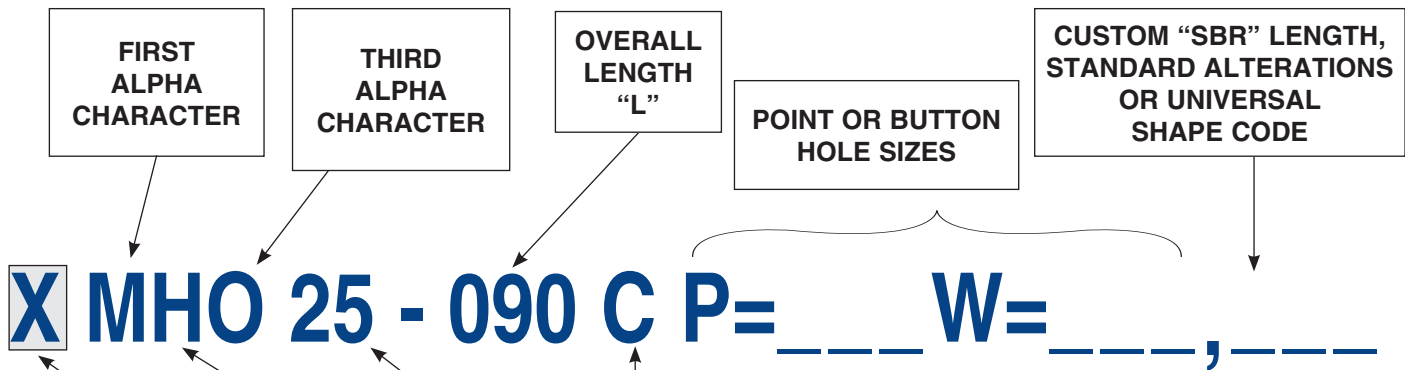
1. Catalog Standard Products with Only One Standard Alteration
2. Round Products - 20 Piece Maximum  
Shaped Products - 10 Piece Maximum
3. Coating Excluded
4. Excluded Products:
  - Nose Large Punches, Large Buttons, Urethane, Close Space or Quill Punches
  - Some Descriptive Shaped Products

### COST:

- List Price + 50% Net
- Minimum Order = \$50.00

CUSTOMER SERVICE REPRESENTATIVE MUST RECEIVE APPROVAL FROM EITHER PRODUCTION CONTROL MANAGER OR PLANT SUPERINTENDENT.

# CATALOG NOMENCLATURE



**FIRST CHARACTER MEASUREMENT SYSTEM**  
 I = Inch Products  
 M = Metric Products

**SECOND CHARACTER**

**Basic Body Type**

- A Accessories
- B Ball Lock Buttons Counter Bore Relief
- C Shoulder Punch Ejector
- D Press Fit Button Counter Bore Relief
- E Ball Lock Punch Heavy Duty/Ejector
- F Ball Lock Button Ultra Life/Taper Relief
- G Guide Bushing
- H Ball Lock Punch Heavy Duty/Solid
- I Shoulder Button Counter Bore Relief
- J Ball Lock Punch Light Duty/Ejector
- K Slip Fit Button/Counter Bore
- L Ball Lock Punch Light Duty/Solid
- M Shoulder Button Press Fit Ultra Life/Taper Relief
- N Nose Large Punch Heavy Duty/Solid
- O Nose Large Punch Light Duty/Solid
- Q Quill Punch Square/Bevel Head
- R Retainers
- S Shoulder Punch Solid
- T Strippers
- U Press Fit Button Ultra Life/Taper Relief
- V Nose Large Punch Light Duty/Ejector
- W Nose Large Punch Heavy Duty/Ejector

**THIRD CHARACTER**

<p><b>Punches or Buttons</b></p> <ul style="list-style-type: none"> <li>A Pilot - Long Lead</li> <li>B Blank - Punch &amp; Button</li> <li>C Circular</li> <li>D Dee</li> <li>F Flatted Round</li> <li>H Hexagon</li> <li>K Key Flat</li> <li>O Oblong</li> <li>P Pilot Bullet Nose</li> <li>Q Thread Form</li> <li>R Rectangle</li> <li>S Square</li> <li>T Pilot Standard</li> <li>U Universal Shapes</li> <li>V Straight Compact Long Lead Pilot</li> <li>W Pointed Compact Long Lead Pilot</li> <li>X Reduced Body</li> </ul>	<p><b>True Strip Units for Shoulder Retainers</b></p> <ul style="list-style-type: none"> <li>G True Strip Unit - Economy Round Shoulder</li> <li>H True Strip Unit - Economy Shape Shoulder</li> <li>I True Strip Unit - Economy Blank Shoulder</li> <li>V True Strip Unit - Blank Shoulder</li> <li>W True Strip Unit - Shape Shoulder</li> <li>X True Strip Unit - Round Shoulder</li> </ul>
<p><b>Punch Retainers</b></p> <p><b>Ball Lock</b></p> <ul style="list-style-type: none"> <li>A Retractable B/L</li> <li>H True Set Heavy Duty</li> <li>L True Set Light Duty</li> <li>M Mini True Set</li> <li>R True Set Economy Round Heavy Duty</li> </ul>	<p><b>Urethane Strippers</b></p> <ul style="list-style-type: none"> <li>C Closed End Strippers</li> <li>O Open End Strippers</li> <li>S Strippers - True Set</li> </ul>
<p><b>Shoulder</b></p> <ul style="list-style-type: none"> <li>B Retractable Shoulder Shaped</li> <li>C Retractable Shoulder Round</li> <li>N Shoulder Style - Round</li> <li>O Shoulder Style - Shaped</li> <li>P Shoulder Retainer - 3 Dowel - Round</li> <li>Q Shoulder Retainer - 3 Dowel - Shaped</li> </ul>	<p><b>Urethane Stripper Retainers</b></p> <ul style="list-style-type: none"> <li>B Nose Large</li> <li>M Mini True Set Stripper Retainer (Snap in)</li> <li>N Naams Stripper Retainer (2 Piece)</li> <li>P Economy (Snap in)</li> <li>R True Set Stripper Retainer (Snap in)</li> </ul>
<p><b>Strippers</b></p> <p><b>True Strip Units for Ball Lock Retainers</b></p> <ul style="list-style-type: none"> <li>J True Strip Unit - Economy Round Ball Lock</li> <li>K True Strip Unit - Economy Shape Ball Lock</li> <li>L True Strip Unit - Economy Blank Ball Lock</li> <li>T True Strip Unit - Round Ball Lock</li> <li>U True Strip Unit - Blank Ball Lock</li> <li>Z True Strip Unit - Shape Ball Lock</li> </ul>	<p><b>Accessories</b></p> <ul style="list-style-type: none"> <li>A True Strip Assembly Tool</li> <li>B Balls</li> <li>C Cap Screws, Ball Release Screws</li> <li>D Dowels</li> <li>E Ejector Component Assembly</li> <li>K Button Retention Key</li> <li>L Ejector Pin Lockout Kit</li> <li>M Mini True Set Retainer Shim Plates</li> <li>N Retainer Angle Hole Set Screw</li> <li>O Retainer Angle Hole Hex Wrench</li> <li>P Pins Ejectors</li> <li>R Relocation Bushings</li> <li>S Springs</li> <li>T Ball Release Tools</li> <li>W Shoulder Retainer Backing Plate</li> <li>X True Set Retainer Shim Plates</li> <li>Y Round Retainer Shim Plates</li> </ul>

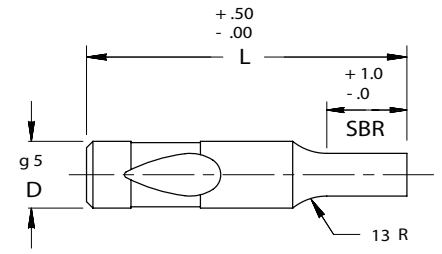
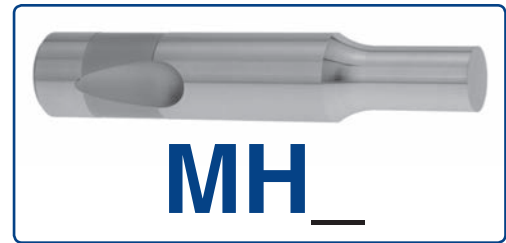
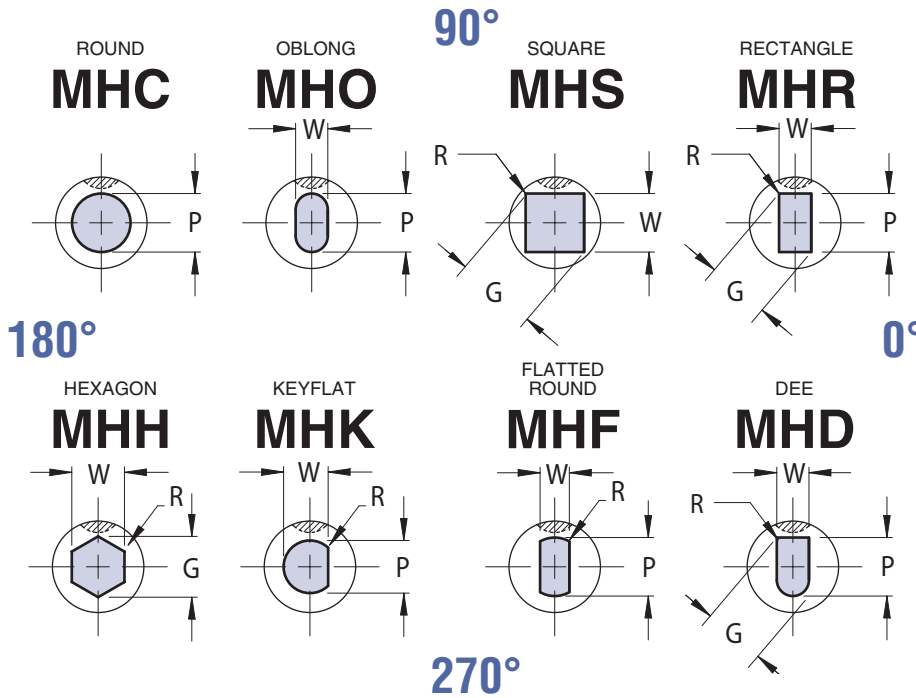
**ORDER EXAMPLE:** Ball lock punch heavy duty with oblong point and SBR Length of 25, standard alteration of ballseat rotated to 45° degrees

MHO 25-090 C P=22.0 W=15.3, BS@45°

**Note:** When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

# BALL LOCK PUNCHES

## HEAVY DUTY/SOLID



**ORDER EXAMPLE:**  
 (Reference page 4)  
**SPECIFY:** QTY: TYPE "D" "L" POINT LENGTH P(OR P&W) DIMENSIONS  
 EXAMPLE: 6 MHC 13 90 C 8.0  
 EXAMPLE: 6 MHO 16 80 STD 14.0 x 7.0  
 Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"					
		RANGE P	MIN W	MAX G/P	71	80	90	100	110	125
MH_10	10	2.50 - 9.98	2.50	10.00	X	X	X	X	X	X
MH_13	13	5.00 - 12.98	4.50	13.00	X	X	X	X	X	X
MH_16	16	8.00 - 15.98	6.00	16.00	X	X	X	X	X	X
MH_20	20	12.00 - 19.98	8.00	20.00	X	X	X	X	X	X
MH_25	25	16.00 - 24.98	10.00	25.00		X	X	X	X	X
MH_32	32	24.00 - 31.98	12.00	32.00		X	X	X	X	X
MH_40	40	30.00 - 39.98	14.00	40.00		X	X	X	X	X

**Material**  
 Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D  
 Shape P, W  $\pm .01$  .02 P to D

When P = D Shank Tolerances Apply

CATALOG TYPE	SHANK D	SBR		
		NAPMA STD	ALTERNATES	
			B	C
MH_10	10	19	10	—
MH_13	13	19	13	25
MH_16	16	19	13	25
MH_20	20	19	13	25
MH_25	25	19	13	25
MH_32	32	19	13	25
MH_40	40	25	19	30

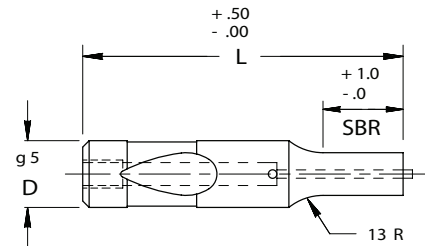
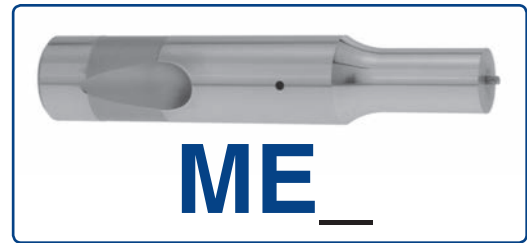
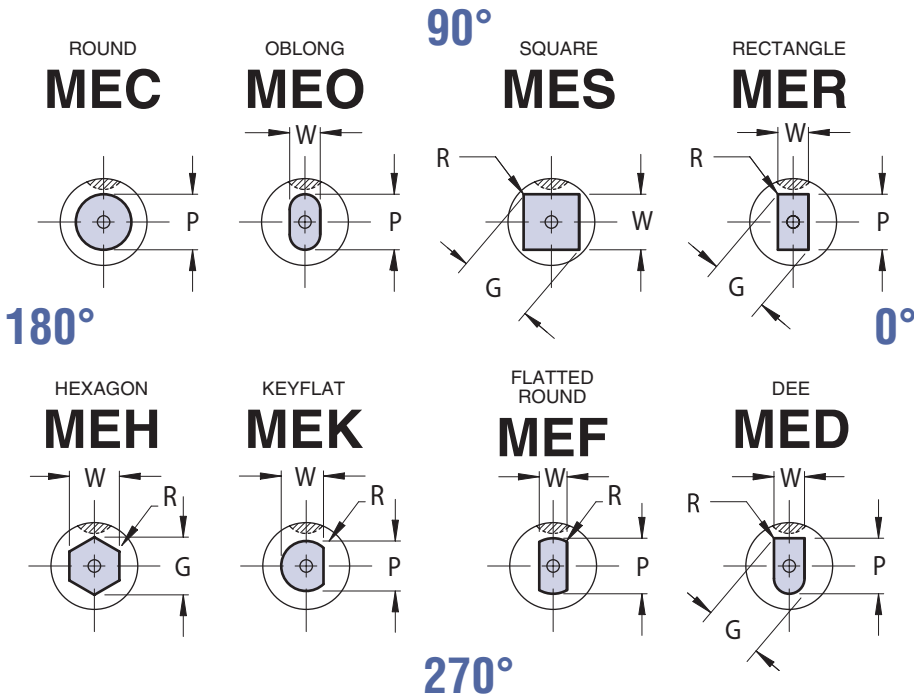
L=71 SBR MAX=19

STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.

# BALL LOCK PUNCHES



## HEAVY DUTY/EJECTOR



### ORDER EXAMPLE:

(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P(OR P&W) DIMENSIONS
EXAMPLE:	6	MEC	10	90	B	5.0
EXAMPLE:	6	MEO	16	80	STD	14.0 x 8.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

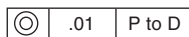
CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"						
		RANGE P	MIN W	MAX G/P	63	71	80	90	100	110	125
ME_10	10	2.50 - 9.98	2.50	10.00	X	X	X	X	X	X	
ME_13	13	5.00 - 12.98	4.50	13.00	X	X	X	X	X	X	X
ME_16	16	8.00 - 15.98	6.00	16.00	X	X	X	X	X	X	X
ME_20	20	12.00 - 19.98	8.00	20.00	X	X	X	X	X	X	X
ME_25	25	16.00 - 24.98	10.00	25.00			X	X	X	X	X
ME_32	32	24.00 - 31.98	12.00	32.00			X	X	X	X	X
ME_40	40	30.00 - 39.98	14.00	40.00			X	X	X	X	X

### Material

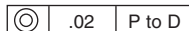
Steel: M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$



Shape P, W  $\pm .01$



When P = D Shank Tolerances Apply

CATALOG TYPE	SHANK D	SBR			EJECTOR SIZE
		NAPMA STD	ALTERNATES		
			B	C	
ME_10	10	19	10	—	MAE 4
ME_13	13	19	13	25	MAE 5
ME_16	16	19	13	25	MAE 5
ME_20	20	19	13	25	MAE 6
ME_25	25	19	13	25	MAE 6
ME_32	32	19	13	25	MAE 6
ME_40	40	25	19	30	MAE 6

L=63 SBR MAX=19

L=71 SBR MAX=19

XP ALTERATION NOT AVAILABLE

IF L=63 AND SBR=19

STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.



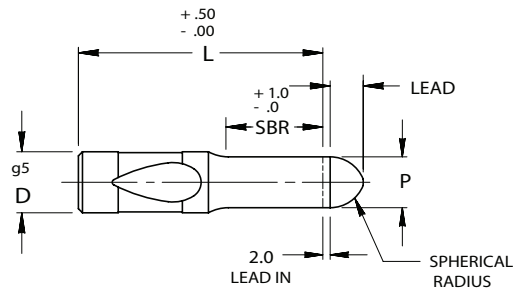
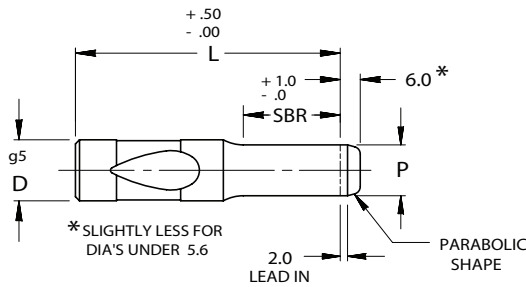
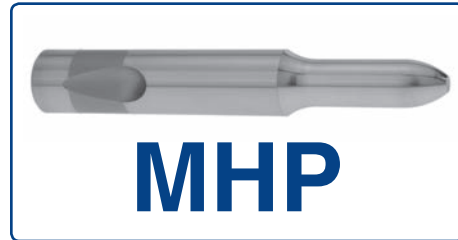
# BALL LOCK PILOTS

## HEAVY DUTY

STANDARD STYLE



BULLET NOSE STYLE



**ORDER EXAMPLE:**

(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	"P" DIMENSION
EXAMPLE:	6	MHT	20	80	B	16.0
EXAMPLE:	6	MHP	13	90	STD	9.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

**MHP STYLE LEAD**

P DIM	LEAD
1.50-9.50	4
9.51-up	10

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

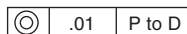
CATALOG TYPE	SHANK DIA D	RANGE P	LENGTH "L"					
			71	80	90	100	110	125
MH_10	10	2.50 - 10.00	X	X	X	X	X	X
MH_13	13	5.00 - 13.00	X	X	X	X	X	X
MH_16	16	8.00 - 16.00	X	X	X	X	X	X
MH_20	20	12.00 - 20.00	X	X	X	X	X	X
MH_25	25	16.00 - 25.00		X	X	X	X	X
MH_32	32	24.00 - 32.00		X	X	X	X	X
MH_40	40	30.00 - 40.00		X	X	X	X	X

**Material**

Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$



When P = D Shank Tolerances Apply

CATALOG TYPE	SHANK D	SBR		
		NAPMA STD	ALTERNATES	
			B	C
MH_10	10	19	10	—
MH_13	13	19	13	25
MH_16	16	19	13	25
MH_20	20	19	13	25
MH_25	25	19	13	25
MH_32	32	19	13	25
MH_40	40	25	19	30

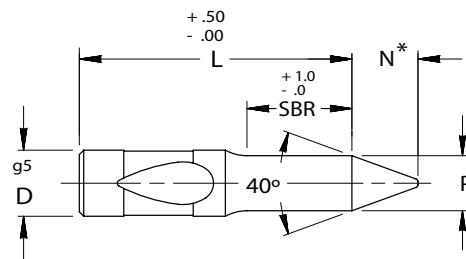
L=71 SBR MAX=19

# BALL LOCK PILOTS



## HEAVY DUTY

LONG LEAD STYLE



\* N BECOMES 1.2 X P MIN WHEN P IS BELOW (SEE CHART)

**ORDER EXAMPLE:**

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L" POINT LENGTH "P" DIMENSION  
 EXAMPLE: 6 MHA 25 100 B 20.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	RANGE P	LEAD N	P BELOW SEE NOTE*	LENGTH "L"						
					80	90	100	110	125	140	150
MHA 10	10	5.90 - 10.00	8	5.64	X	X	X	X	X		
MHA 13	13	9.90 - 13.00	10	7.11	X	X	X	X	X	X	
MHA 16	16	12.90 - 16.00	15	10.74	X	X	X	X	X	X	X
MHA 20	20	15.90 - 20.00	20	14.38	X	X	X	X	X	X	X
MHA 25	25	19.90 - 25.00	25	18.00	X	X	X	X	X	X	X
MHA 32	32	24.90 - 32.00	30	21.67	X	X	X	X	X	X	X
MHA 40	40	31.90 - 40.00	40	28.96	X	X	X	X	X	X	X

**Material**  
 Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$

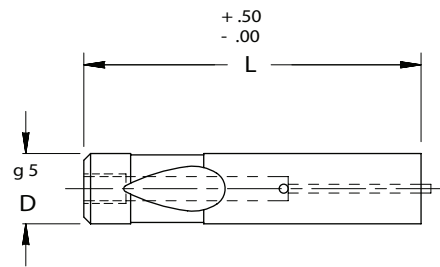
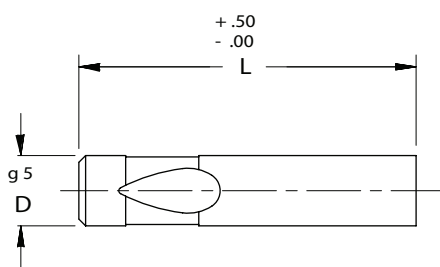
When P = D Shank Tolerances Apply

CATALOG TYPE	SHANK D	SBR	
		NAPMA	ALTERNATES
		STD	B
MHA 10	10	19	32
MHA 13	13	19	32
MHA 16	16	25	38
MHA 20	20	25	38
MHA 25	25	25	38
MHA 32	32	25	38
MHA 40	40	30	45

# BALL LOCK PUNCH BLANKS **MOELLER**

PRECISION TOOL

## HEAVY DUTY/SOLID/EJECTOR



**Material**  
Steel: M2, HRC 60-63

**ORDER EXAMPLE:**  
(Reference page 4)  
**SPECIFY:** QTY: TYPE "D" "L"  
EXAMPLE: 6 MHB 20 110  
EXAMPLE: 6 MEB 16 90

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG NUMBER SOLID	SHANK DIA D	OVERALL LENGTH "L"											
		71	80	90	100	110	125	150	165	170	175	180	190
MHB 10	10	X	X	X	X	X	X	X					
MHB 13	13	X	X	X	X	X	X	X					
MHB 16	16	X	X	X	X	X	X	X	X				
MHB 20	20	X	X	X	X	X	X	X		X			
MHB 25	25		X	X	X	X	X	X			X		
MHB 32	32		X	X	X	X	X	X				X	
MHB 40	40		X	X	X	X	X	X					X

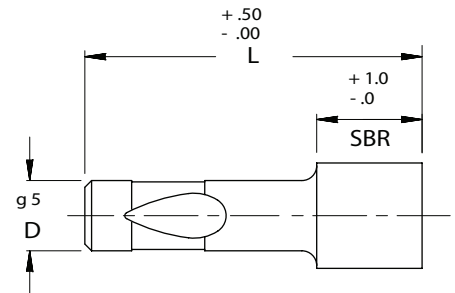
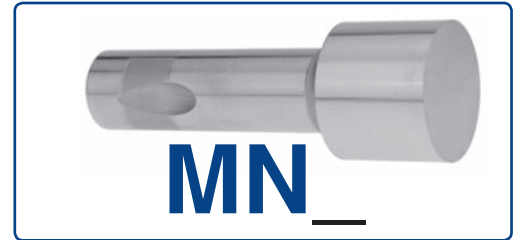
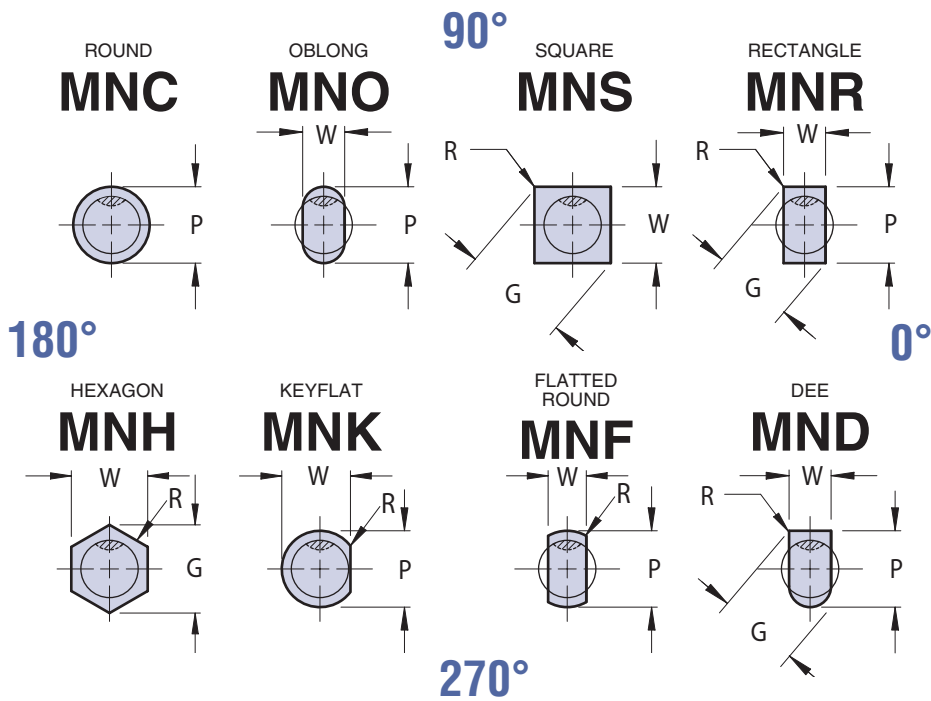
CATALOG NUMBER EJECTOR	SHANK DIA D	OVERALL LENGTH "L"							EJECTOR SIZE
		63	71	80	90	100	110	125	
MEB 10	10	X	X	X	X	X	X		MAE 4
MEB 13	13	X	X	X	X	X	X	X	MAE 5
MEB 16	16	X	X	X	X	X	X	X	MAE 5
MEB 20	20	X	X	X	X	X	X	X	MAE 6
MEB 25	25			X	X	X	X	X	MAE 6
MEB 32	32			X	X	X	X	X	MAE 6
MEB 40	40			X	X	X	X	X	MAE 6



# NOSE LARGE PUNCHES



## HEAVY DUTY/SOLID



VIEWES ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L" P(OR P&W) DIMENSIONS

EXAMPLE: 6 MNR 20 90 22.0 x 12.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	POINT LENGTH "S.B.R."	ROUND	SHAPE		LENGTH "L"		
			RANGE P	MIN W	MAX G/P	80	90	100
MN_10	10	16	10.10 - 25.00	3.00	25.00	X	X	X
MN_13	13	20	13.10 - 32.00	5.00	32.00	X	X	X
MN_16	16	25	16.10 - 38.00	6.00	38.00	X	X	X
MN_20	20	25	20.10 - 40.00	8.00	40.00	X	X	X
MN_25	25	25	25.10 - 47.00	10.00	47.00	X	X	X
MN_32	32	32	32.10 - 63.00	11.50	63.00	X	X	X
MN_40	40	32	40.10 - 63.00	14.00	63.00	X	X	X

### Material

Steel: M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$

$\text{⊙}$  .01 P to D

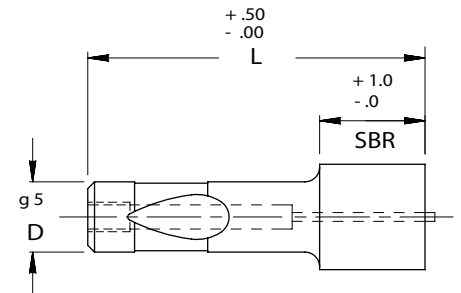
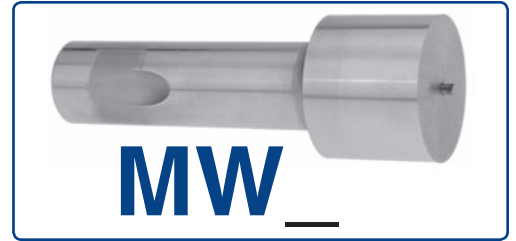
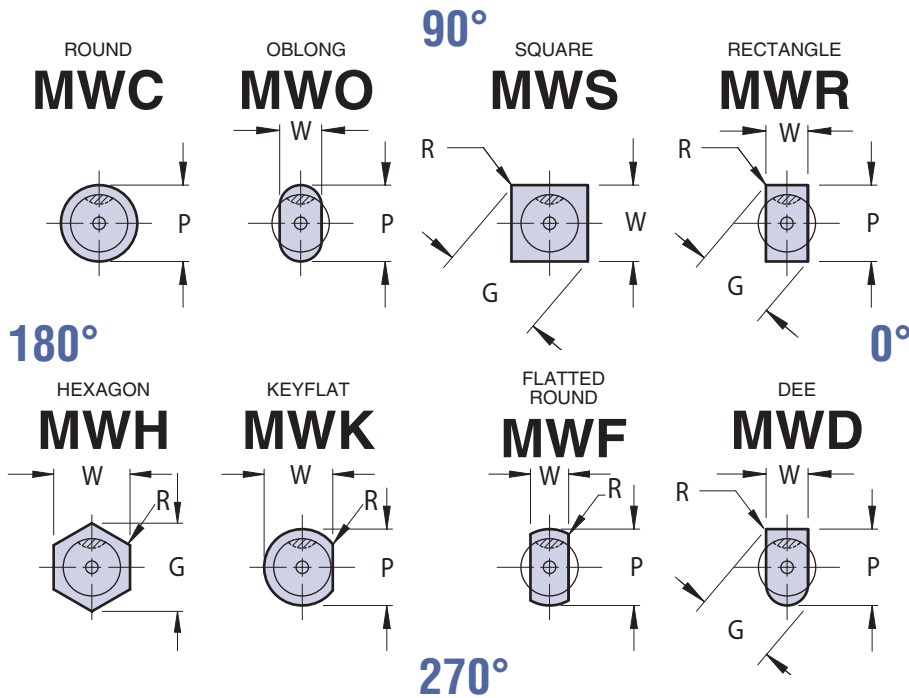
Shape P, W  $\pm .01$

$\text{⊙}$  .02 P to D

STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.

# NOSE LARGE PUNCHES

## HEAVY DUTY/EJECTOR



VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

**ORDER EXAMPLE:**

(Reference page 4)

**SPECIFY:** QTY: TYPE "D" "L" DIMENSIONS P(OR P&W)

EXAMPLE: 6 MWO 16 90 19.0 x 13.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

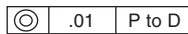
CATALOG TYPE	SHANK DIA D	POINT LENGTH "S.B.R."	ROUND	SHAPE		OVERALL LENGTH "L"			EJECTOR SIZE
			RANGE P	MIN W	MAX G/P	80	90	100	
MW_10	10	16	10.10 - 25.00	3.00	25.00	X	X	X	MAE 4
MW_13	13	20	13.10 - 32.00	5.00	32.00	X	X	X	MAE 5
MW_16	16	25	16.10 - 38.00	6.00	38.00	X	X	X	MAE 5
MW_20	20	25	20.10 - 40.00	8.00	40.00	X	X	X	MAE 6
MW_25	25	25	25.10 - 47.00	10.00	47.00	X	X	X	MAE 6
MW_32	32	32	32.10 - 63.00	11.50	63.00	X	X	X	MAE 6
MW_40	40	32	40.10 - 63.00	14.00	63.00	X	X	X	MAE 6

**Material**

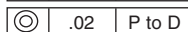
Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$



Shape P, W  $\pm .01$

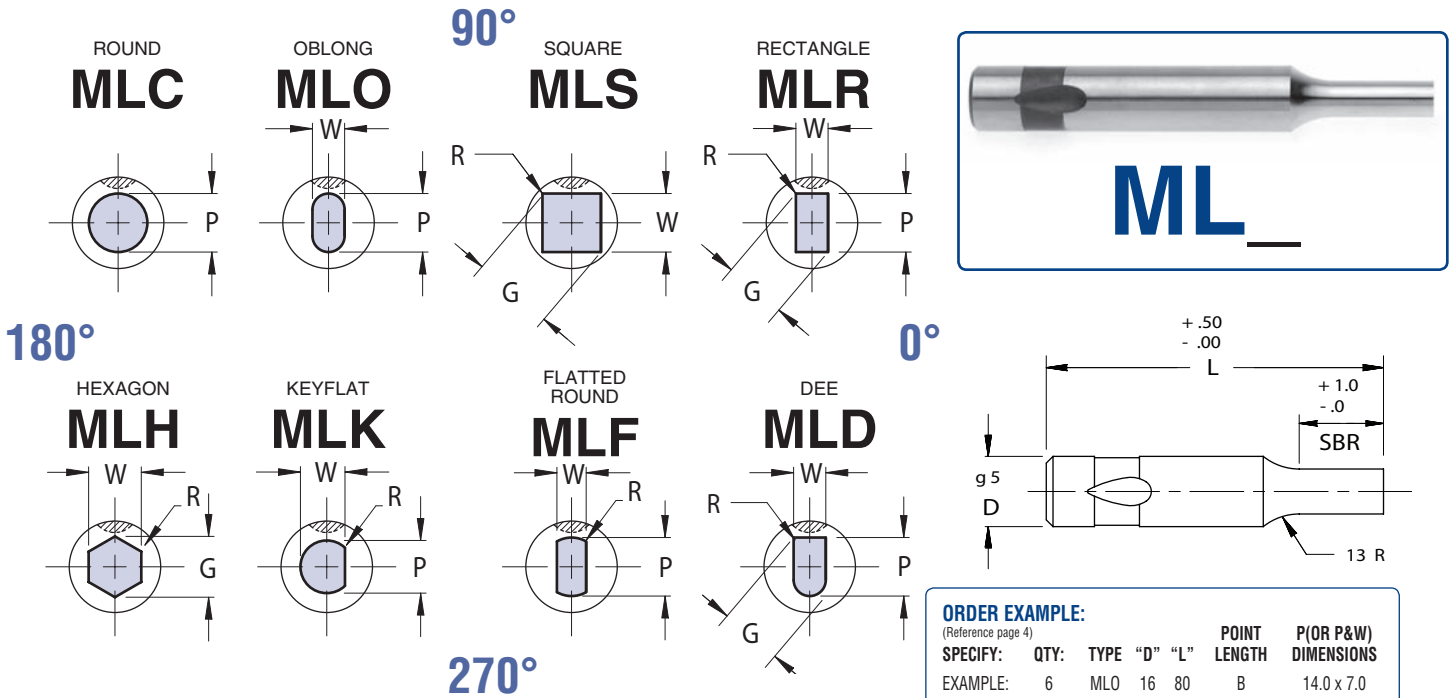


STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.

# BALL LOCK PUNCHES



## LIGHT DUTY/SOLID



**ORDER EXAMPLE:**  
 (Reference page 4)  
**SPECIFY:** QTY: TYPE "D" "L" POINT LENGTH P(OR P&W) DIMENSIONS  
 EXAMPLE: 6 MLO 16 80 B 14.0 x 7.0  
 EXAMPLE: 6 MLC 10 90 STD 8.0  
 Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"				
		RANGE P	MIN W	MAX G/P	63	71	80	90	100
ML_06	6	2.20 - 5.98	2.20	6.00	X	X	X	X	X
ML_10	10	2.50 - 9.98	2.50	10.00	X	X	X	X	X
ML_13	13	5.00 - 12.98	4.50	13.00	X	X	X	X	X
ML_16	16	8.00 - 15.98	6.00	16.00	X	X	X	X	X
ML_20	20	12.00 - 19.98	8.00	20.00	X	X	X	X	X
ML_25	25	16.00 - 24.98	10.00	25.00	X	X	X	X	X

**Material**  
 Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$      $\text{⊙}$  .01 P to D

Shape P, W  $\pm .01$      $\text{⊙}$  .02 P to D

When P = D Shank Tolerances Apply

CATALOG TYPE	SHANK D	SBR		
		NAPMA	ALTERNATES	
		STD	B	C
ML_06	6	13	10	—
ML_10	10	19	10	—
ML_13	13	19	13	25
ML_16	16	19	13	25
ML_20	20	19	13	25
ML_25	25	19	13	25

L=63 SBR MAX=19

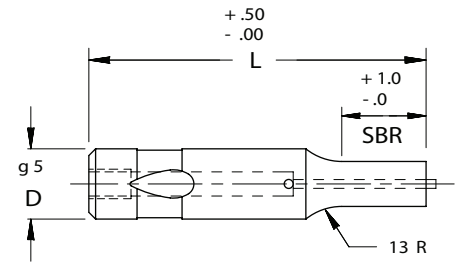
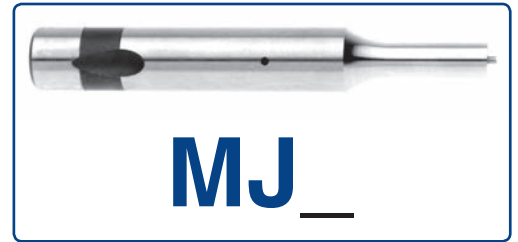
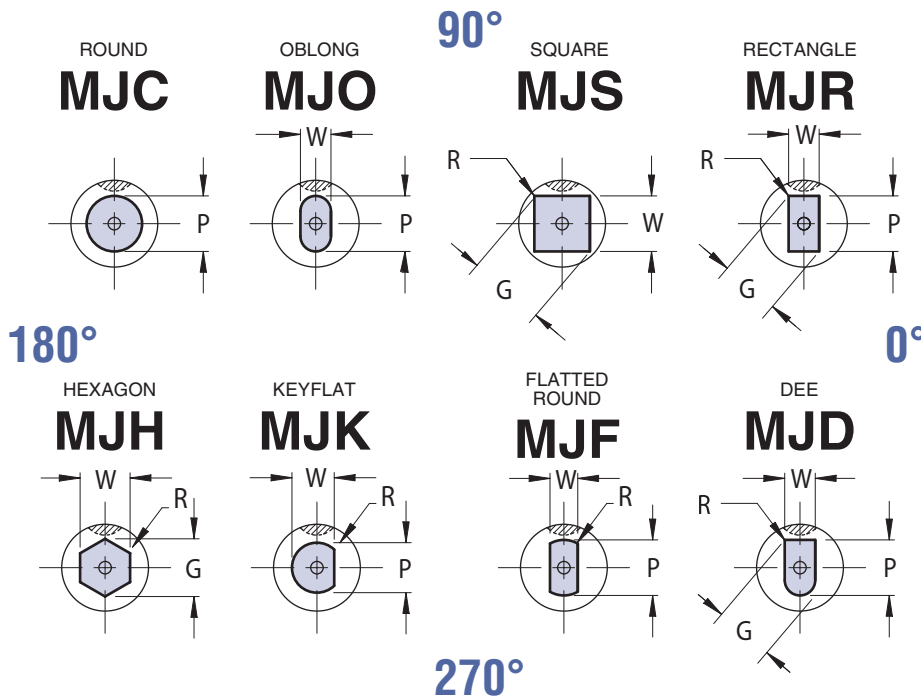
STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.



# BALL LOCK PUNCHES



## LIGHT DUTY/EJECTOR



**ORDER EXAMPLE:**  
(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P(OR P&W) DIMENSIONS
EXAMPLE:	6	MJC	16	90	STD	10.0
EXAMPLE:	6	MJO	13	80	B	10.0 x 7.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

IEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"				
		RANGE P	MIN W	MAX G/P	63	71	80	90	100
MJ_06	6	2.20 - 5.98	2.20	6.00	X	X	X	X	X
MJ_10	10	2.50 - 9.98	2.50	10.00	X	X	X	X	X
MJ_13	13	5.00 - 12.98	4.50	13.00	X	X	X	X	X
MJ_16	16	8.00 - 15.98	6.00	16.00	X	X	X	X	X
MJ_20	20	12.00 - 19.98	8.00	20.00	X	X	X	X	X
MJ_25	25	16.00 - 24.98	10.00	25.00	X	X	X	X	X

**Material**  
Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$      $\text{⊙}$  .01 P to D

Shape P, W  $\pm .01$      $\text{⊙}$  .02 P to D

When P = D Shank Tolerances Apply

CATALOG TYPE	SHANK D	SBR			EJECTOR SIZE
		NAPMA	ALTERNATES		
		STD	B	C	
MJ_06	6	13	10	—	MAE 3
MJ_10	10	19	10	—	MAE 4
MJ_13	13	19	13	25	MAE 5
MJ_16	16	19	13	25	MAE 5
MJ_20	20	19	13	25	MAE 6
MJ_25	25	19	13	25	MAE 6

L=63 SBR MAX=19  
L=71 SBR MAX=19

STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.

# BALL LOCK PILOTS



## LIGHT DUTY

STANDARD STYLE



**MLT**

BULLET NOSE STYLE

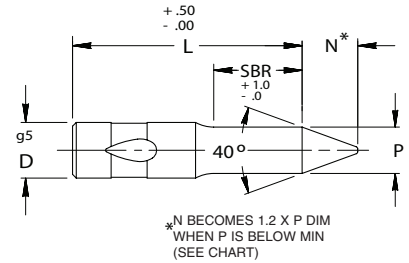
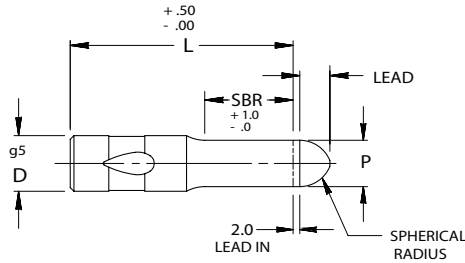
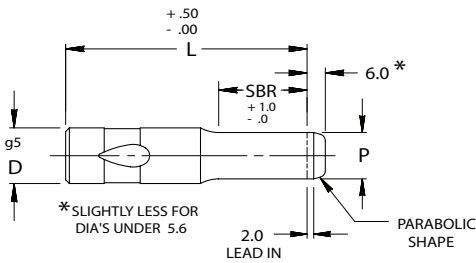


**MLP**

LONG LEAD STYLE



**MLA**



**ORDER EXAMPLE:**

(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	"P" DIMENSIONS
EXAMPLE:	6	MLT	10	80	B	7.0
EXAMPLE:	6	MLA	13	90	STD	10.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

MLP STYLE LEAD	
P DIM	LEAD
1.50-9.50	4
9.51-up	10

SHANK DIA DIM	MLA STYLE N DIM
10	8
13	10
16	15
20	20
25	25

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	SHANK DIA D	RANGE	P BELOW SEE NOTE*	LENGTH "L"				
				63	71	80	90	100
ML_06	6	2.20 - 6.00	—	X	X	X	X	X
ML_10	10	2.50 - 10.00	5.64	X	X	X	X	X
ML_13	13	5.00 - 13.00	7.11	X	X	X	X	X
ML_16	16	8.00 - 16.00	10.74	X	X	X	X	X
ML_20	20	12.00 - 20.00	14.38	X	X	X	X	X
ML_25	25	16.00 - 25.00	18.00	X	X	X	X	X

**Material**  
Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$

.01 P to D

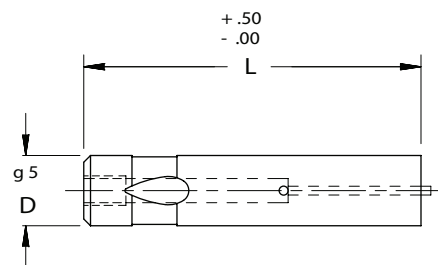
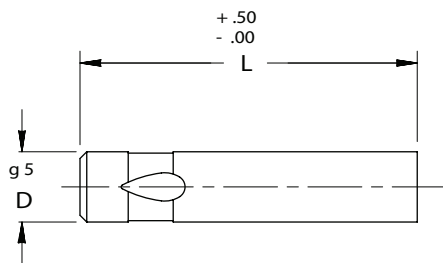
When P = D Shank Tolerances Apply

CATALOG TYPE	SHANK D	SBR		
		NAPMA	ALTERNATES	
		STD	B	C
ML_06	6	13	10	—
ML_10	10	19	10	—
ML_13	13	19	13	25
ML_16	16	19	13	25
ML_20	20	19	13	25
ML_25	25	19	13	25

L=63 SBR MAX=19

# BALL LOCK PUNCH BLANKS **MOELLER** PRECISION TOOL

## LIGHT DUTY/SOLID/EJECTOR



**Material**  
Steel: M2, HRC 60-63

**ORDER EXAMPLE:**  
(Reference page 4)  
SPECIFY: QTY: TYPE "D" "L"  
EXAMPLE: 6 MLB 20 90  
EXAMPLE: 6 MJB 16 80

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER SOLID	SHANK DIA D	OVERALL LENGTH "L"					
		63	71	80	90	100	125
MLB 06	6	X	X	X	X	X	X
MLB 10	10	X	X	X	X	X	X
MLB 13	13	X	X	X	X	X	X
MLB 16	16	X	X	X	X	X	X
MLB 20	20	X	X	X	X	X	X
MLB 25	25	X	X	X	X	X	X

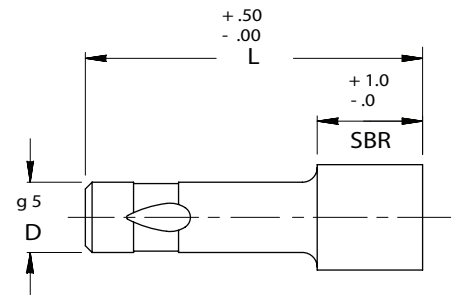
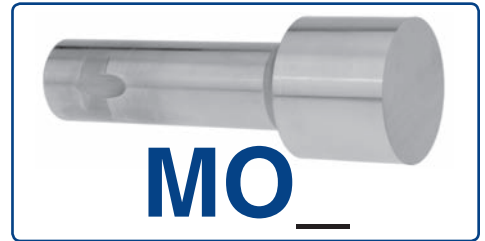
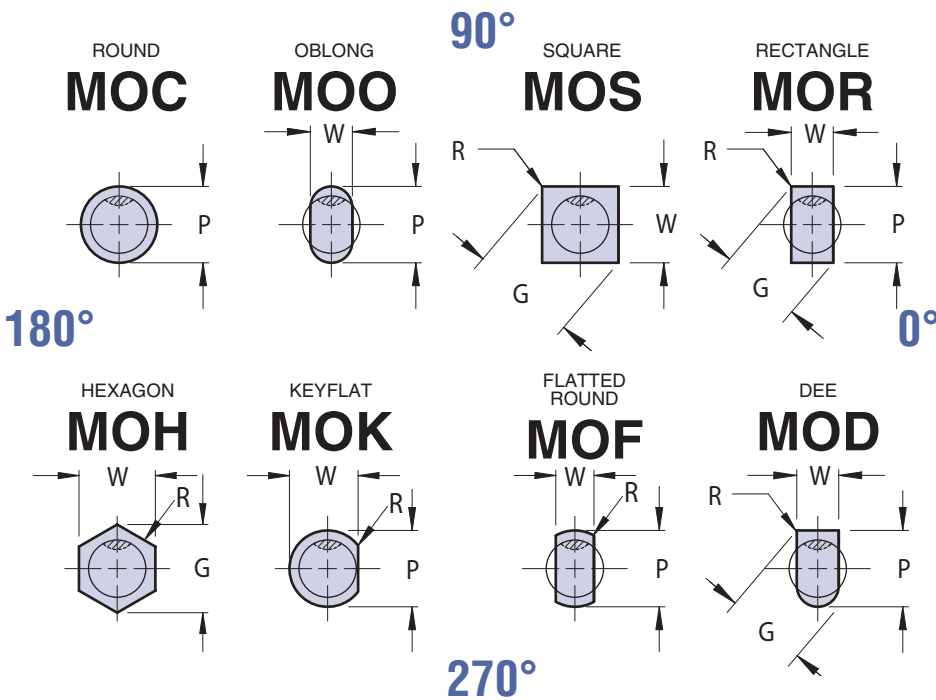
CATALOG NUMBER EJECTOR	SHANK DIA D	OVERALL LENGTH "L"					EJECTOR SIZE
		63	71	80	90	100	
MJB 06	6	X	X	X	X	X	MAE 3
MJB 10	10	X	X	X	X	X	MAE 4
MJB 13	13	X	X	X	X	X	MAE 5
MJB 16	16	X	X	X	X	X	MAE 5
MJB 20	20	X	X	X	X	X	MAE 6
MJB 25	25	X	X	X	X	X	MAE 6



# NOSE LARGE PUNCHES



## LIGHT DUTY/SOLID



### ORDER EXAMPLE:

(Reference page 4)  
 SPECIFY: QTY: TYPE "D" "L" P(OR P&W) DIMENSIONS  
 EXAMPLE: 6 MOO 16 90 22.0 x 11.0

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	POINT LENGTH "S.B.R."	ROUND	SHAPE		LENGTH "L"		
			RANGE P	MIN W	MAX G/P	80	90	100
MO_10	10	16	10.10 - 25.00	3.00	25.00	X	X	X
MO_13	13	20	13.10 - 32.00	5.00	32.00	X	X	X
MO_16	16	25	16.10 - 38.00	6.00	38.00	X	X	X
MO_20	20	25	20.10 - 40.00	8.00	40.00	X	X	X
MO_25	25	25	25.10 - 45.00	10.00	45.00	X	X	X
MO_32	32	32	32.10 - 63.00	11.50	63.00	X	X	X

### Material

Steel: M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$

	.01	P to D
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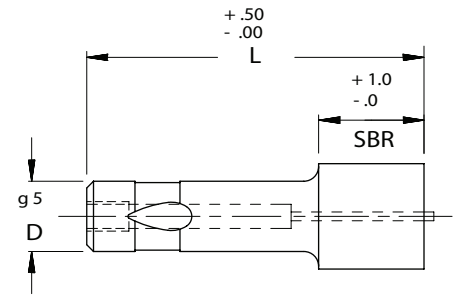
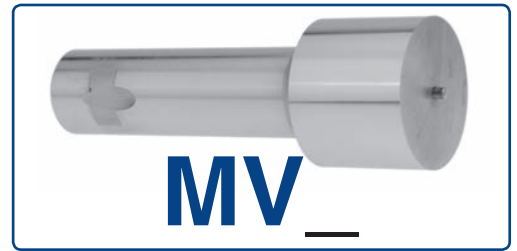
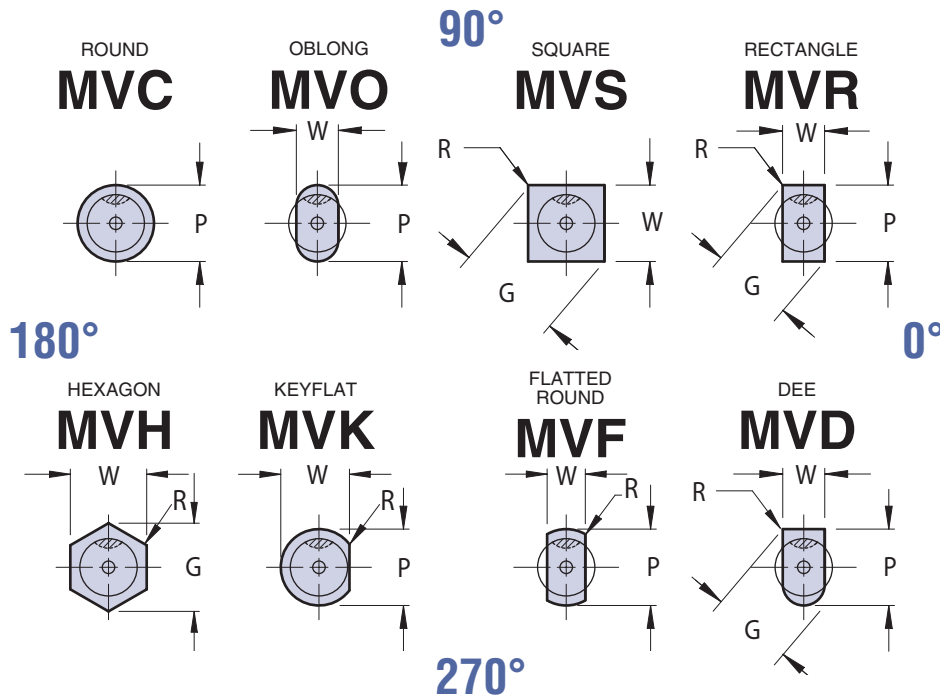
Shape P, W  $\pm .01$

	.02	P to D
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STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.

# NOSE LARGE PUNCHES

## LIGHT DUTY/EJECTOR



**ORDER EXAMPLE:**  
 (Reference page 4)  
**SPECIFY:** QTY: TYPE "D" "L" DIMENSIONS P(OR P&W)  
 EXAMPLE: 6 MVR 16 90 21.0 x 7.0  
 Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

VIEWES ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	POINT LENGTH "S.B.R."	ROUND	SHAPE		LENGTH "L"			EJECTOR SIZE
			RANGE P	MIN W	MAX G/P	80	90	100	
MV_10	10	16	10.10 - 25.00	3.00	25.00	X	X	X	MAE 4
MV_13	13	20	13.10 - 32.00	5.00	32.00	X	X	X	MAE 5
MV_16	16	25	16.10 - 38.00	6.00	38.00	X	X	X	MAE 5
MV_20	20	25	20.10 - 40.00	8.00	40.00	X	X	X	MAE 6
MV_25	25	25	25.10 - 45.00	10.00	45.00	X	X	X	MAE 6
MV_32	32	32	32.10 - 63.00	11.50	63.00	X	X	X	MAE 6

**Material**  
Steel: M2, HRC 60-63

---

**Standard Point Tolerance**

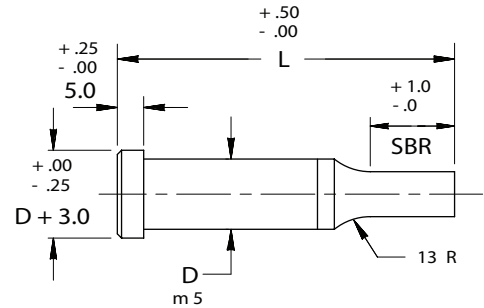
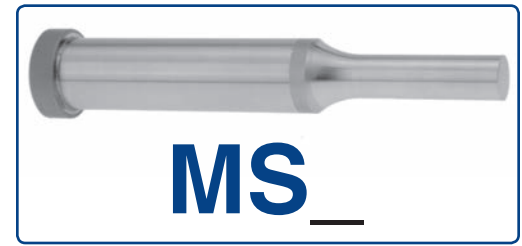
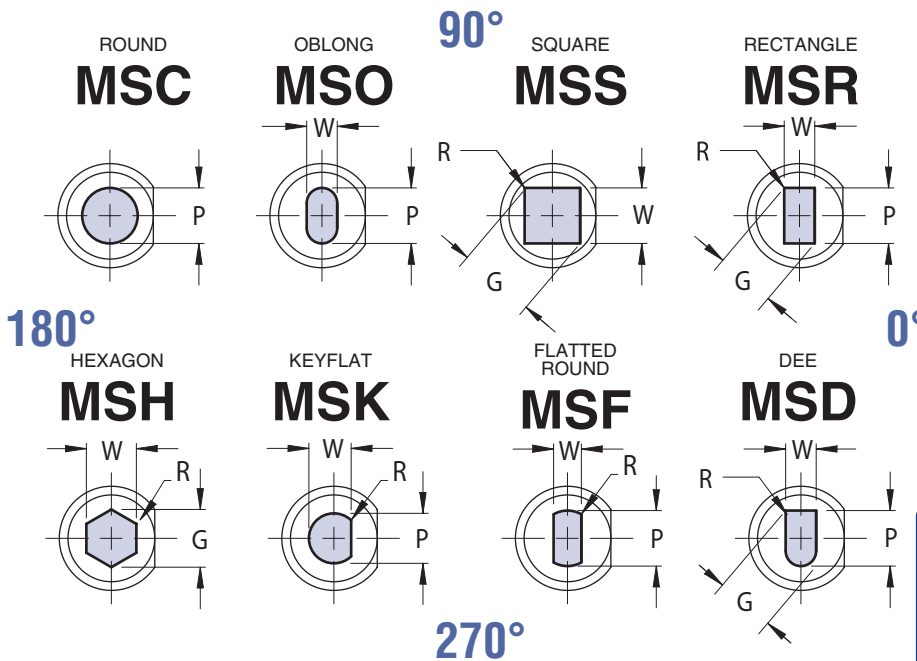
Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$       $\text{Ⓞ}$  .01 P to D

Shape P, W  $\pm .01$       $\text{Ⓞ}$  .02 P to D

STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME PRICE.

# SHOULDER PUNCHES

## SOLID



**ORDER EXAMPLE:**  
(Reference page 4)

SPECIFY:	QTY:	TYPE:	"D":	"L":	LENGTH	P (OR P&W) DIMENSIONS	ALTERATION CODE	ALTERNATE POINT TOLERANCE
EXAMPLE:	6	MSC	13	90	13	10.0	F1	T2
EXAMPLE:	6	MSO	16	80	STD	14.0 x 8.0	F1	STD

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCD.COM](http://WWW.MOELLERMCD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"										
		RANGE P	MIN W	MAX G/P	40	50	56	60	63	70	71	80	90	100	
MS_04	4	1.60 - 3.99	1.60	4.00	X	X	X	X	X	X	X	X	X	X	X
MS_05	5	1.60 - 4.99	1.60	5.00	X	X	X	X	X	X	X	X	X	X	X
MS_06	6	1.60 - 5.99	1.60	6.00		X	X	X	X	X	X	X	X	X	X
MS_08	8	2.50 - 7.99	2.50	8.00		X	X	X	X	X	X	X	X	X	X
MS_10	10	3.20 - 9.99	3.20	10.00		X	X	X	X	X	X	X	X	X	X
MS_13	13	5.00 - 12.99	4.50	13.00		X	X	X	X	X	X	X	X	X	X
MS_16	16	8.00 - 15.99	6.00	16.00		X	X	X	X	X	X	X	X	X	X
MS_20	20	10.00 - 19.99	8.00	20.00			X	X	X	X	X	X	X	X	X
MS_25	25	12.00 - 24.99	9.00	25.00			X	X	X	X	X	X	X	X	X
MS_32	32	16.00 - 31.99	10.00	32.00				X	X	X	X	X	X	X	X
MS_40	40	30.00 - 39.99	14.00	40.00								X	X	X	X

NOTE: FOR EXTENDED RANGE SHANK DIAMETERS OF 45, 50, 56 & 63, SEE PAGE NO. 20, 21

### Material

Steel: M2, HRC 60-63  
Heads HRC 45-55

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$   $\text{\textcircled{C}}$  .01 P to D

Shape P, W  $\pm$  .01  $\text{\textcircled{C}}$  .02 P to D

Alternate Point Tolerance

**T2**

P, W TOLERANCE  $\begin{matrix} +.005 \\ -.000 \end{matrix}$

P to D  $\begin{matrix} .008 \\ \text{\textcircled{C}} \end{matrix}$

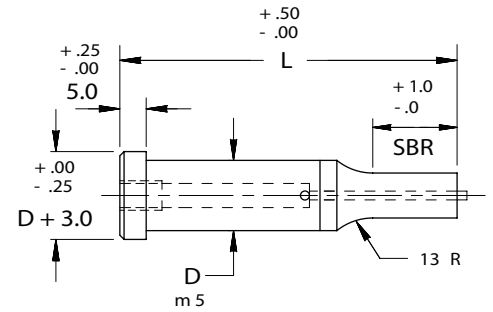
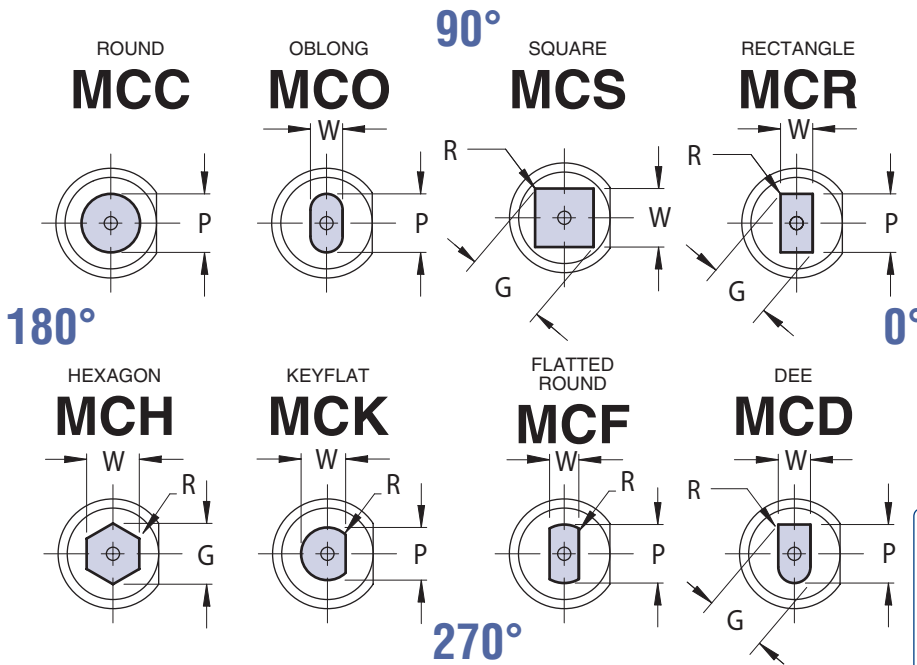
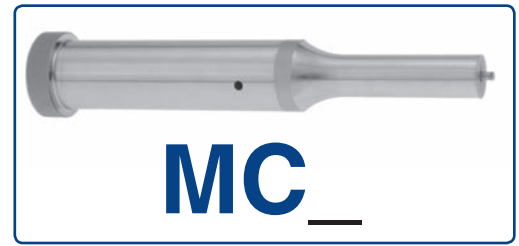
CATALOG TYPE	SHANK D	SBR		
		NAPMA	ALTERNATES	
		STD	B	C
MS_04	4	8	10	—
MS_05	5	13	10	—
MS_06	6	13	10	—
MS_08	8	19	13	—
MS_10	10	19	13	25
MS_13	13	19	13	25
MS_16	16	19	13	25
MS_20	20	19	13	25
MS_25	25	19	13	25
MS_32	32	25	19	30
MS_40	40	25	19	30

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

L=50 SBR MAX=13 L=60 SBR MAX=19  
L=56 SBR MAX=19 L=63 SBR MAX=25

# SHOULDER PUNCHES

## EJECTOR



**ORDER EXAMPLE:**  
 (Reference page 4)  
 SPECIFY: QTY: TYPE "D" "L" LENGTH DIMENSIONS CODE ALTERATION ALTERNATE POINT TOLERANCE  
 EXAMPLE: 6 MCC 13 90 STD 10.0 F1 STD  
 EXAMPLE: 6 MCO 16 80 B 13.0 x 9.0 F1 T2  
 Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"									
		RANGE P	MIN W	MAX G/P	50	56	60	63	70	71	80	90	100	
MC_05	5	1.60 - 4.99	1.60	5.00	X	X	X	X	X	X	X	X	X	
MC_06	6	2.50 - 5.99	2.50	6.00	X	X	X	X	X	X	X	X	X	
MC_08	8	3.20 - 7.99	3.20	8.00	X	X	X	X	X	X	X	X	X	
MC_10	10	4.50 - 9.99	4.50	10.00	X	X	X	X	X	X	X	X	X	
MC_13	13	6.00 - 12.99	6.00	13.00	X	X	X	X	X	X	X	X	X	
MC_16	16	8.00 - 15.99	7.50	16.00	X	X	X	X	X	X	X	X	X	
MC_20	20	10.00 - 19.99	8.00	20.00		X	X	X	X	X	X	X	X	
MC_25	25	12.00 - 24.99	9.00	25.00		X	X	X	X	X	X	X	X	
MC_32	32	16.00 - 31.99	10.00	32.00				X	X	X	X	X	X	
MC_40	40	30.00 - 39.99	14.00	40.00							X	X	X	

NOTE: FOR EXTENDED RANGE SHANK DIAMETERS OF 45, 50, 56 & 63, SEE PAGE NO. 20, 21

**Material**  
 Steel: M2, HRC 60-63  
 Heads HRC 45-55

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D  
 Shape P, W  $\pm .01$  .02 P to D

**Alternate Point Tolerance** **T2**

P, W TOLERANCE  $\begin{matrix} +.005 \\ -.000 \end{matrix}$   
 P to D  $\begin{matrix} .008 \\ \end{matrix}$

CATALOG TYPE	SHANK D	SBR			EJECTOR SIZE
		NAPMA STD	ALTERNATES		
MC_05	5	13	10	—	MAE 2
MC_06	6	13	10	—	MAE 3
MC_08	8	19	13	—	MAE 4
MC_10	10	19	13	25	MAE 5
MC_13	13	19	13	25	MAE 5
MC_16	16	19	13	25	MAE 6
MC_20	20	19	13	25	MAE 6
MC_25	25	19	13	25	MAE 6
MC_32	32	25	19	30	MAE 6
MC_40	40	25	19	30	MAE 6

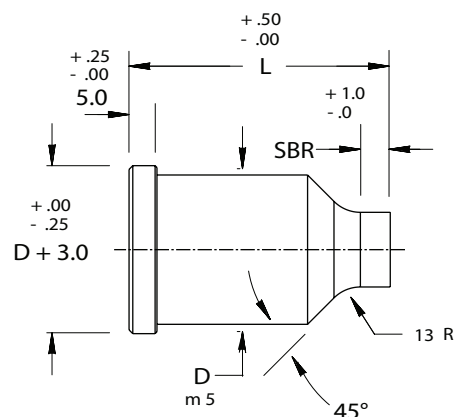
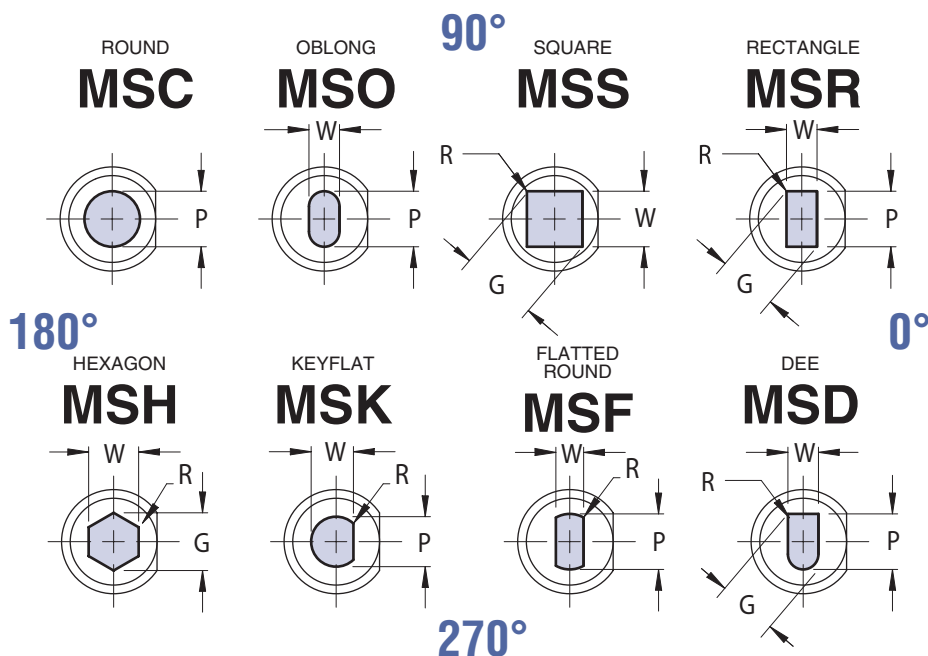
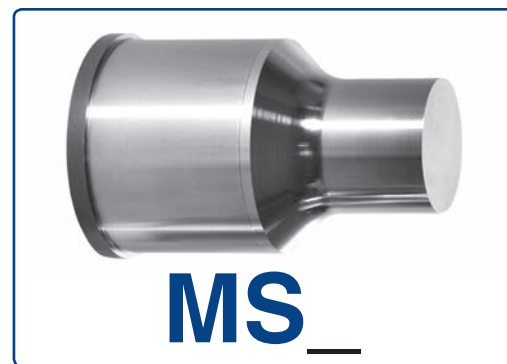
STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
 AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

L=50 SBR MAX=13 L=60 SBR MAX=19  
 L=56 SBR MAX=19 L=63 SBR MAX=25

# LARGE SHOULDER PUNCHES



## SOLID/EXTENDED RANGE



VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	SHANK DIA D	ROUND RANGE P	SHAPES		OVERALL LENGTH "L"			SBR		
			MIN W	MAX G/P	80	90	100	NAPMA	ALTERNATES	
								STD	B	C
MS_45	45	25.00 - 44.99	10.00	44.99	X	X	X	25	19	30
MS_50	50	30.00 - 49.99	12.00	49.99	X	X	X	25	19	30
MS_56	56	35.00 - 55.99	13.00	55.99	X	X	X	25	19	30
MS_63	63	40.00 - 62.99	14.00	62.99	X	X	X	25	19	30

**Material**  
Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D

Shape P, W  $\pm .01$  .02 P to D

**Alternate Point Tolerance** **T2**

P, W TOLERANCE  $\pm .005$

P to D  $\begin{matrix} .008 \\ \text{tolerance symbol} \end{matrix}$

**ORDER EXAMPLE:**  
(Reference page 4)

SPECIFY: QTY: TYPE "D" "L" LENGTH POINT P(OR P&W) DIMENSIONS ALTERATION CODE ALTERNATE POINT TOLERANCE

EXAMPLE: 6 MSC 50 90 STD 40.0 F1 STD

EXAMPLE: 6 MSO 63 100 B 50.0 x 20.0 F1 T2

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

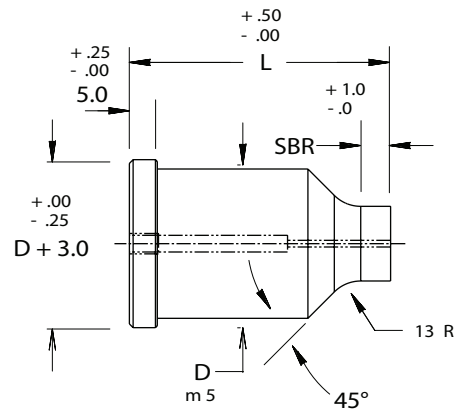
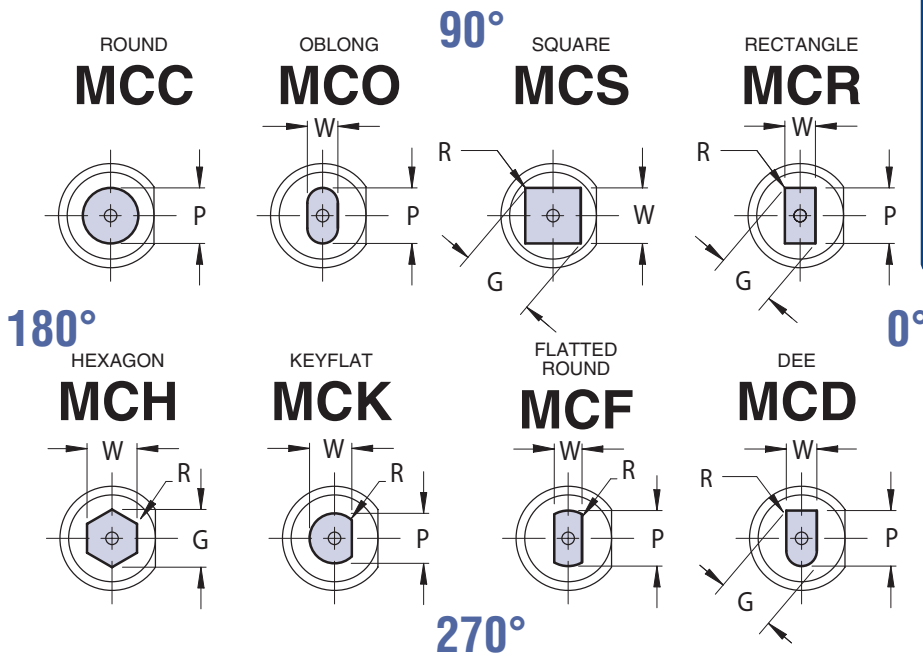
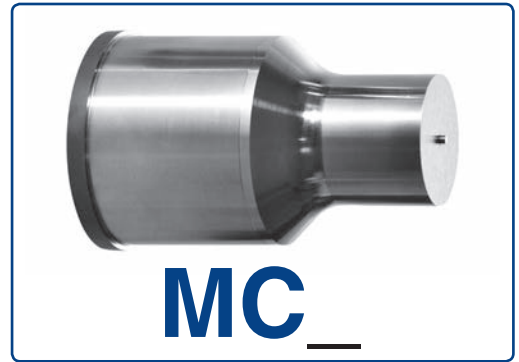
FOR STANDARD ALTERATIONS SEE PAGES 65-70.



# LARGE SHOULDER PUNCHES



## EJECTOR/EXTENDED RANGE



VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	SHANK DIA D	ROUND RANGE P	SHAPES		OVERALL LENGTH "L"			SBR			EJECTOR SIZE
			MIN W	MAX G/P	80	90	100	NAPMA	ALTERNATES		
								STD	B	C	
MC_45	45	25.00 - 44.99	10.00	44.99	X	X	X	25	19	30	MAE 12
MC_50	50	30.00 - 49.99	12.00	49.99	X	X	X	25	19	30	MAE 12
MC_56	56	35.00 - 55.99	13.00	55.99	X	X	X	25	19	30	MAE 12
MC_63	63	40.00 - 62.99	14.00	62.99	X	X	X	25	19	30	MAE 12

**Material**  
Steel: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D

Shape P, W  $\pm .01$  .02 P to D

Alternate Point Tolerance **T2**

P, W TOLERANCE  $\pm .005$   
P to D  $\begin{matrix} .008 \\ \text{circle with dot symbol} \end{matrix}$

**ORDER EXAMPLE:**  
(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	LENGTH	POINT DIMENSIONS	P(OR P&W)	ALTERATION CODE	ALTERNATE POINT TOLERANCE
EXAMPLE:	6	MCC	50	90	STD	40.0	F1	STD	
EXAMPLE:	6	MCO	63	100	B	50.0 x 20.0	F1	T2	

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

# SHOULDER PILOTS

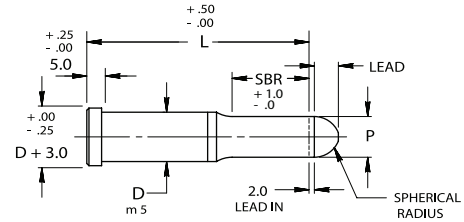
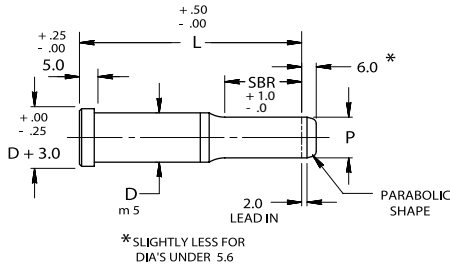


## PILOT

STANDARD STYLE



BULLET NOSE STYLE



**ORDER EXAMPLE:**

(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	"P" DIMENSION	ALTERNATE TOLERANCE
EXAMPLE:	6	MST	13	71	STD	10.0	T2
EXAMPLE:	6	MSP	20	80	B	18.0	STD

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

**MSP STYLE LEAD**

P DIM	LEAD
1.50-9.50	4
9.51-up	10

Complete design & CAD files visit [WWW.MOELLERMCD.COM](http://WWW.MOELLERMCD.COM)

CATALOG TYPE	SHANK DIA D	RANGE P	OVERALL LENGTH "L"									
			40	50	56	60	63	70	71	80	90	100
MS_04	4	1.55 - 4.00	X	X	X	X	X	X	X	X	X	X
MS_05	5	1.55 - 5.00	X	X	X	X	X	X	X	X	X	X
MS_06	6	1.55 - 6.00		X	X	X	X	X	X	X	X	X
MS_08	8	2.45 - 8.00		X	X	X	X	X	X	X	X	X
MS_10	10	3.15 - 10.00		X	X	X	X	X	X	X	X	X
MS_13	13	4.95 - 13.00		X	X	X	X	X	X	X	X	X
MS_16	16	7.95 - 16.00		X	X	X	X	X	X	X	X	X
MS_20	20	9.95 - 20.00			X	X	X	X	X	X	X	X
MS_25	25	11.95 - 25.00			X	X	X	X	X	X	X	X
MS_32	32	15.95 - 32.00					X	X	X	X	X	X

**Material**

Steel: M2, HRC 60-63  
Heads HRC 45-55

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D

When P = D Shank Tolerances Apply

**Alternate Point Tolerance**

**T2**

P, W TOLERANCE  $\begin{matrix} +.005 \\ -.000 \end{matrix}$

P to D  $\begin{matrix} .008 \\ \text{Surface texture symbol} \end{matrix}$

CATALOG TYPE	SHANK D	SBR		
		NAPMA	ALTERNATES	
			STD	B
MS_04	4	8	10	—
MS_05	5	13	10	—
MS_06	6	13	10	—
MS_08	8	19	13	—
MS_10	10	19	13	25
MS_13	13	19	13	25
MS_16	16	19	13	25
MS_20	20	19	13	25
MS_25	25	19	13	25
MS_32	32	25	19	30

L=50 SBR MAX=13

L=60 SBR MAX=19

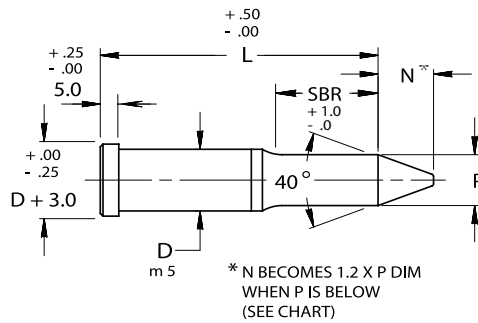
L=56 SBR MAX=19

L=63 SBR MAX=25

# SHOULDER PILOTS

## PILOT

LONG LEAD STYLE



### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L" LENGTH DIMENSION TOLERANCE

EXAMPLE: 6 MSA 20 90 STD 17.0 STD

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE	SHANK DIA D	RANGE P	LEAD N	P BELOW SEE NOTE*	LENGTH "L"								
					63	70	71	80	90	100	110	125	140
MS_10	10	4.85 - 10.00	8	5.64	X	X	X	X	X	X	X		
MS_13	13	6.30 - 13.00	10	7.11	X	X	X	X	X	X	X	X	X
MS_16	16	9.95 - 16.00	15	10.74		X	X	X	X	X	X	X	X
MS_20	20	13.60 - 20.00	20	14.38		X	X	X	X	X	X	X	X
MS_25	25	17.25 - 25.00	25	18.00		X	X	X	X	X	X	X	X
MS_32	32	20.85 - 32.00	30	21.67			X	X	X	X	X	X	X

### Material

Steel: M2, HRC 60-63  
Heads HRC 45-55

### Standard Point Tolerance

Round P  $+0.01$   
 $-0.00$  .01 P to D

When P = D Shank Tolerances Apply

### Alternate Point Tolerance

T2

P, W TOLERANCE  $+0.005$   
 $-0.000$

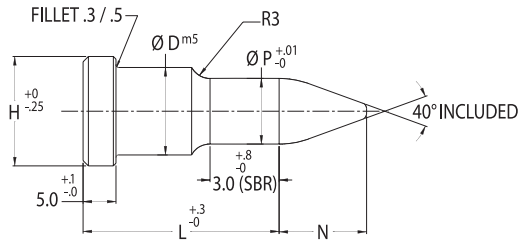
P to D .008

CATALOG TYPE	SHANK D	SBR	
		NAPMA	ALTERNATES
		STD	B
MS_10	10	19	25
MS_13	13	19	25
MS_16	16	19	25
MS_20	20	19	25
MS_25	25	19	25
MS_32	32	25	30

# SHOULDER PILOTS

## PILOT/COMPACT/POINTED

POINTED STYLE



Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE POINTED	SHANK DIA D	DIA P RANGE	LEAD N	H	OVERALL LENGTH "L"						
					16	20	22	25	28	32	35
MSW 04	4	1.95 - 3.99	4	7.0	X	X	X	X	X	X	X
MSW 05	5	2.65 - 4.99	5	8.0	X	X	X	X	X	X	X
MSW 06	6	3.30 - 5.99	6	9.0	X	X	X	X	X	X	X
MSW 08	8	4.10 - 7.99	7	11.0	X	X	X	X	X	X	X
MSW 10	10	4.80 - 9.99	8	13.0	X	X	X	X	X	X	X
MSW 13	13	6.25 - 12.99	10	16.0	X	X	X	X	X	X	x
MSW 16	16	9.85 - 15.99	15	19.0	X	X	X	X	X	X	X
MSW 20	20	13.50 - 19.99	20	23.0		X	X	X	X	X	X
MSW 25	25	17.20 - 24.99	25	28.0		X	X	X	X	X	X
MSW 32	32	20.80 - 31.99	30	35.0		X	X	X	X	X	X

**Material**  
Steel: M2, HRC 60-63

**Standard Point Tolerance**  
Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$   .01  P to D  
When P = D Shank Tolerances Apply

**ORDER EXAMPLE:**  
(Reference page 4)

"P" ALTERNATE  
SPECIFY: QTY: TYPE "D" "L" DIMENSION TOLERANCE

EXAMPLE: 6 MSW 13 25 10.0 STD

Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

Alternate Point Tolerance **T2**

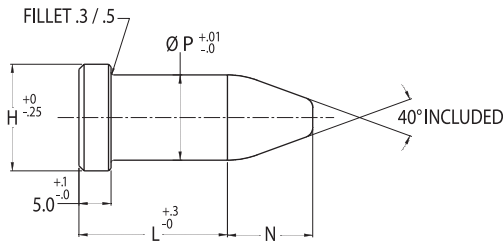
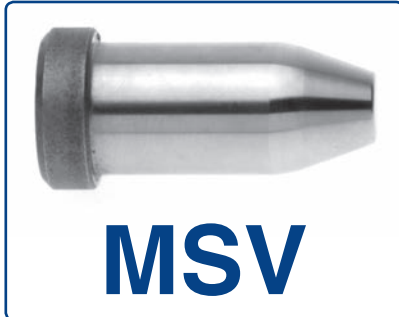
P, W TOLERANCE  $\begin{matrix} +.005 \\ -.000 \end{matrix}$   
P to D  .008

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

# SHOULDER PILOTS

## PILOT/COMPACT/STRAIGHT

STRAIGHT STYLE



Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE STRAIGHT	DIA P RANGE	LEAD N	H	OVERALL LENGTH "L"						
				16	20	22	25	28	32	35
MSV 04	3.01 - 4.00	4	7.0	X	X	X	X	X	X	X
MSV 05	4.01 - 5.00	5	8.0	X	X	X	X	X	X	X
MSV 06	5.01 - 6.00	6	9.0	X	X	X	X	X	X	X
MSV 08	6.01 - 8.00	7	11.0	X	X	X	X	X	X	X
MSV 10	8.01 - 10.00	8	13.0	X	X	X	X	X	X	X
MSV 13	10.01 - 13.00	10	16.0	X	X	X	X	X	X	X
MSV 16	13.01 - 16.00	15	19.0	X	X	X	X	X	X	X
MSV 20	16.01 - 20.00	20	23.0		X	X	X	X	X	X

### Material

Steel: M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D

Alternate Point Tolerance

**T2**

P, W TOLERANCE  $\begin{matrix} +.005 \\ -.000 \end{matrix}$

### ORDER EXAMPLE:

(Reference page 4)

"P" ALTERNATE  
SPECIFY: QTY: TYPE "L" DIMENSION TOLERANCE

EXAMPLE: 6 MSV 10 30 9.0 STD

Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

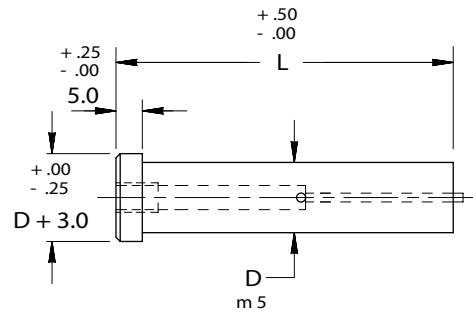
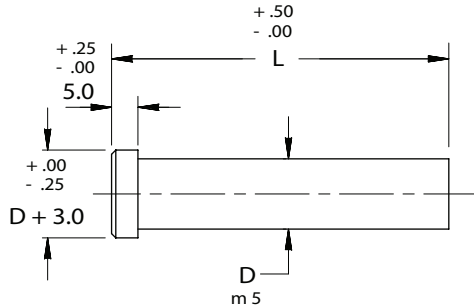
FOR STANDARD ALTERATIONS SEE PAGES 65-70.



# SHOULDER PUNCH BLANKS



## SOLID/EJECTOR



### Material

Steel: M2, HRC 60-63  
Heads HRC 45-55

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER SOLID	SHANK DIA D	OVERALL LENGTH "L"																
		40	50	56	60	63	70	71	80	90	100	120	125	150	155	160	165	170
MSB 04	4	X	X	X	X	X	X	X	X	X	X	X	X					
MSB 05	5	X	X	X	X	X	X	X	X	X	X	X	X					
MSB 06	6		X	X	X	X	X	X	X	X	X	X	X					
MSB 08	8		X	X	X	X	X	X	X	X	X	X	X					
MSB 10	10		X	X	X	X	X	X	X	X	X	X	X					
MSB 13	13		X	X	X	X	X	X	X	X	X	X	X	X				
MSB 16	16		X	X	X	X	X	X	X	X	X	X	X	X	X			
MSB 20	20			X	X	X	X	X	X	X	X	X	X	X		X		
MSB 25	25			X	X	X	X	X	X	X	X	X	X	X			X	
MSB 32	32					X	X	X	X	X	X	X	X	X				X
MSB 40	40								X	X	X							

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L"

EXAMPLE: 6 MSB 8 100

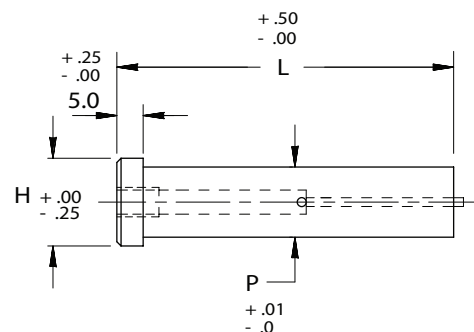
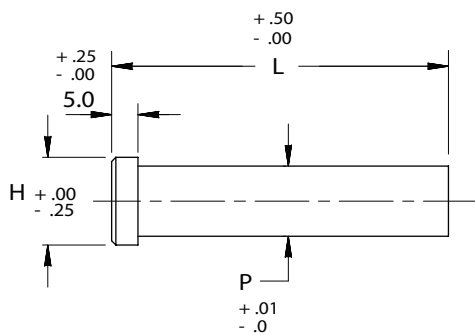
EXAMPLE: 6 MCB 16 125

FOR STANDARD ALTERATIONS  
SEE PAGES 65-70.

CATALOG NUMBER EJECTOR	SHANK DIA D	OVERALL LENGTH "L"										
		50	56	60	63	70	71	80	90	100	110	125
MCB 05	5	X	X	X	X	X	X	X	X	X		
MCB 06	6	X	X	X	X	X	X	X	X	X		
MCB 08	8	X	X	X	X	X	X	X	X	X		
MCB 10	10	X	X	X	X	X	X	X	X	X	X	X
MCB 13	13	X	X	X	X	X	X	X	X	X	X	X
MCB 16	16	X	X	X	X	X	X	X	X	X	X	X
MCB 20	20		X	X	X	X	X	X	X	X	X	X
MCB 25	25		X	X	X	X	X	X	X	X	X	X
MCB 32	32				X	X	X	X	X	X	X	X
MCB 40	40								X	X	X	X

# REDUCED SHANK PUNCHES **MOELLER** PRECISION TOOL

## SOLID/EJECTOR



### Material

Steel: M2, HRC 60-63  
Heads HRC 45-55

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "L" DIMENSION "P"

EXAMPLE: 6 MSX 10 80 8.50

EXAMPLE: 6 MCX 16 70 14.0

Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

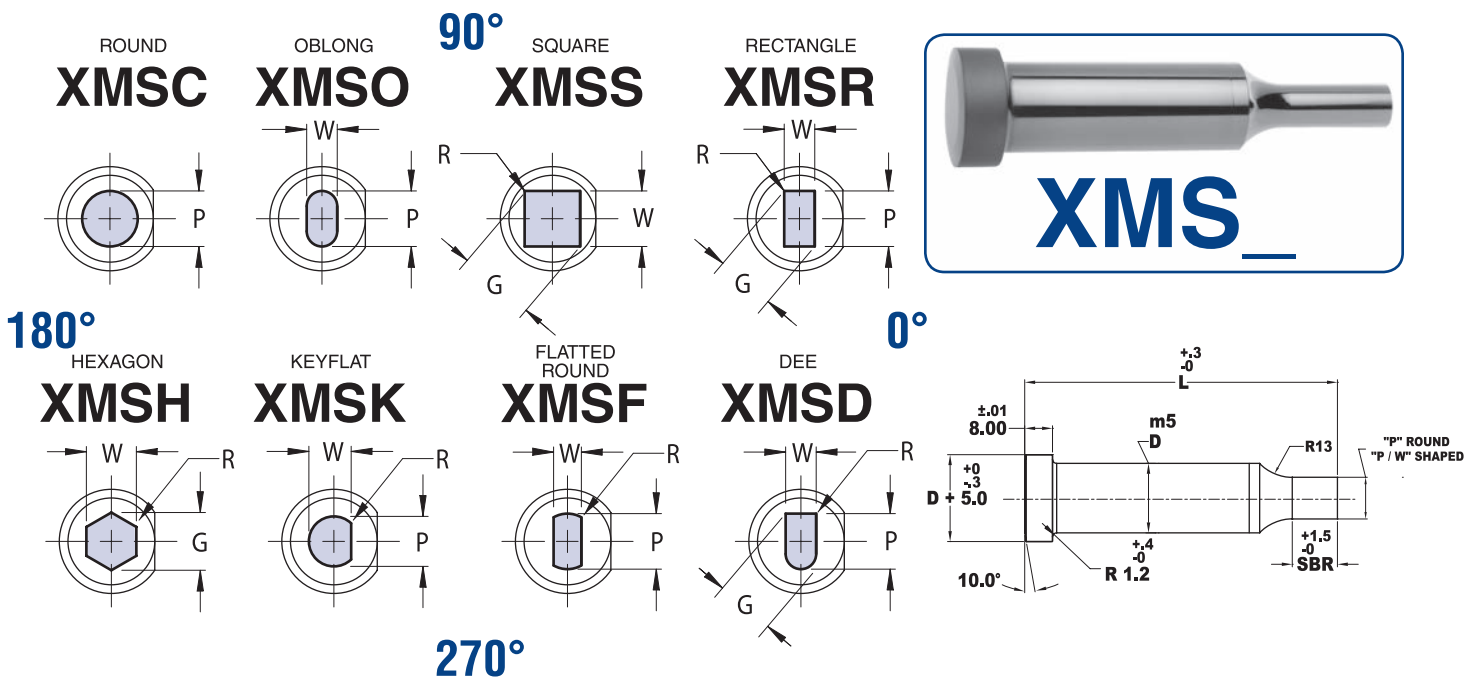
Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

FOR STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG TYPE SOLID	SHANK DIA D RANGE	HEAD DIA H	OVERALL LENGTH "L"										
			50	56	60	63	70	71	80	90	100	120	125
MSX 04	3.01 - 3.99	7	X	X	X	X	X	X	X	X	X	X	X
MSX 05	4.01 - 4.99	8	X	X	X	X	X	X	X	X	X	X	X
MSX 06	5.01 - 5.99	9	X	X	X	X	X	X	X	X	X	X	X
MSX 08	6.01 - 7.99	11	X	X	X	X	X	X	X	X	X	X	X
MSX 10	8.01 - 9.99	13	X	X	X	X	X	X	X	X	X	X	X
MSX 13	10.01 - 12.99	16	X	X	X	X	X	X	X	X	X	X	X
MSX 16	13.01 - 15.99	19	X	X	X	X	X	X	X	X	X	X	X

CATALOG TYPE EJECTOR	SHANK DIA D RANGE	HEAD DIA H	OVERALL LENGTH "L"										EJECTOR SIZE
			50	56	60	63	70	71	80	90	100		
MCX 05	4.01 - 4.99	8	X	X	X	X	X	X	X	X	X	X	MAE 2
MCX 06	5.01 - 5.99	9	X	X	X	X	X	X	X	X	X	X	MAE 3
MCX 08	6.01 - 7.99	11	X	X	X	X	X	X	X	X	X	X	MAE 4
MCX 10	8.01 - 9.99	13	X	X	X	X	X	X	X	X	X	X	MAE 5
MCX 13	10.01 - 12.99	16	X	X	X	X	X	X	X	X	X	X	MAE 5
MCX 16	13.01 - 15.99	19	X	X	X	X	X	X	X	X	X	X	MAE 6

## SOLID




VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.


FOR STANDARD ALTERATIONS SEE PAGES 65-70.

SHANK CATALOG TYPE	ROUND DIA D	ROUND	SHAPE		OVERALL LENGTH "L"			
		RANGE P	MIN W	MAX G/P	70	80	90	100
XMS_08	08	3.10 - 7.99	3.10	8.00	X	X	X	X
XMS_10	10	3.20 - 9.99	3.20	10.00	X	X	X	X
XMS_13	13	5.00 - 12.99	4.50	13.00	X	X	X	X
XMS_16	16	8.00 - 15.99	6.00	16.00	X	X	X	X
XMS_20	20	10.00 - 19.99	8.00	20.00	X	X	X	X
XMS_25	25	12.00 - 24.99	9.00	25.00	X	X	X	X
XMS_32	32	16.00 - 31.99	10.00	32.00	X	X	X	X

**Material**  
 Steel: CPM M4 HRC 60-62  
 Heads HRC 40-55

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$   .01 P to D

Shape P, W  $\pm .01$   .025 P to D

**ORDER EXAMPLE:**  
 (Reference page 4)

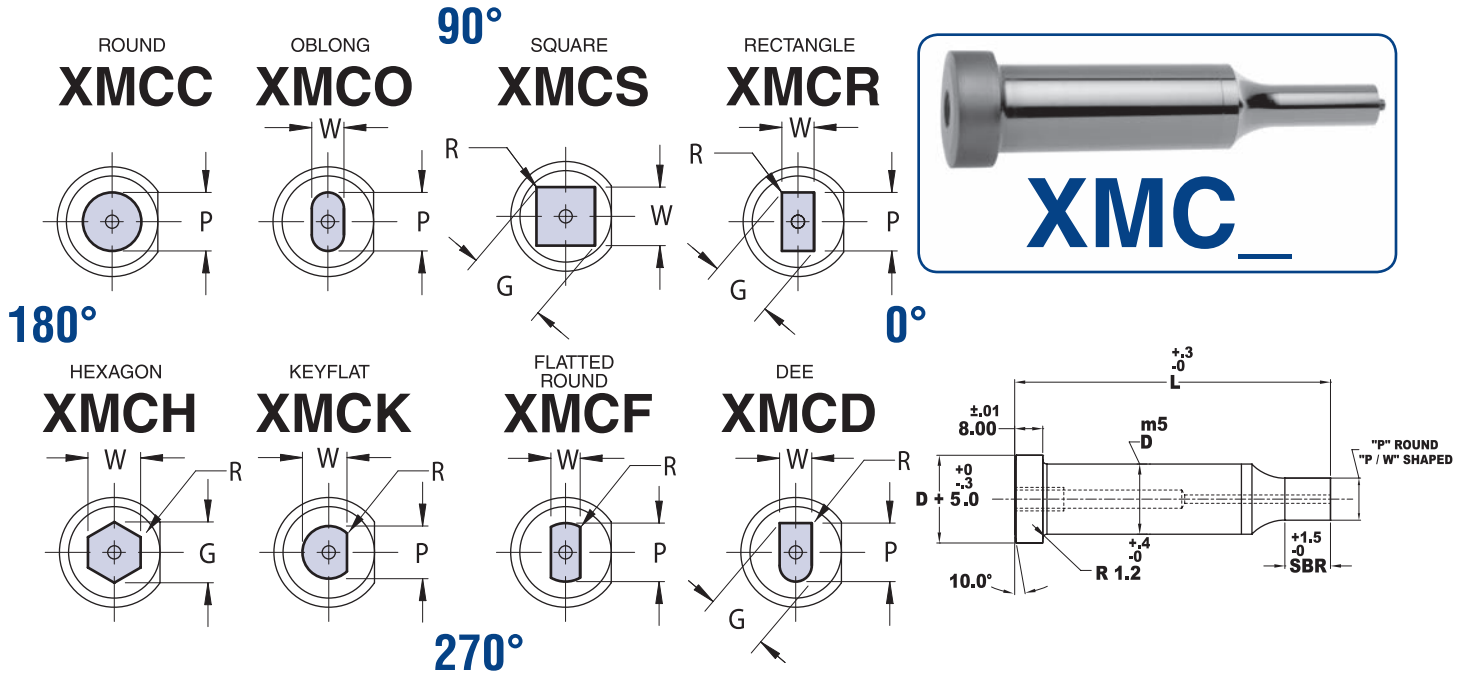
SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P(OR P&W) DIMENSIONS	ALTERATION CODE
EXAMPLE:	6	XMSC	13	90	13	10.0	F1
EXAMPLE:	6	XMSO	16	80	STD	14.0 x 8.0	F1 @ 90

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

CATALOG TYPE	SHANK D	POINT LENGTH "SBR"	
		STD	ALTERNATE B
XMS_08	10	13	19
XMS_10	10	13	19
XMS_13	13	13	19
XMS_16	16	19	25
XMS_20	20	19	25
XMS_25	25	19	25
XMS_32	32	19	25

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
 AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

## EJECTOR




VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.


FOR STANDARD ALTERATIONS SEE PAGES 65-70.

SHANK CATALOG TYPE	ROUND DIA D	ROUND	SHAPE		OVERALL LENGTH "L"			
		RANGE P	MIN W	MAX G/P	70	80	90	100
XMC_08	08	4.00 - 7.99	4.00	8.00	X	X	X	X
XMC_10	10	4.50 - 9.99	4.50	10.00	X	X	X	X
XMC_13	13	6.00 - 12.99	6.00	13.00	X	X	X	X
XMC_16	16	8.00 - 15.99	7.50	16.00	X	X	X	X
XMC_20	20	10.00 - 19.99	8.00	20.00	X	X	X	X
XMC_25	25	12.00 - 24.99	9.00	25.00	X	X	X	X
XMC_32	32	16.00 - 31.99	10.00	32.00	X	X	X	X

**Material**  
 Steel: CPM M4 HRC 60-62  
 Heads HRC 40-55

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$   .01 P to D

Shape P, W  $\pm .01$   .025 P to D

**ORDER EXAMPLE:**  
(Reference page 4)

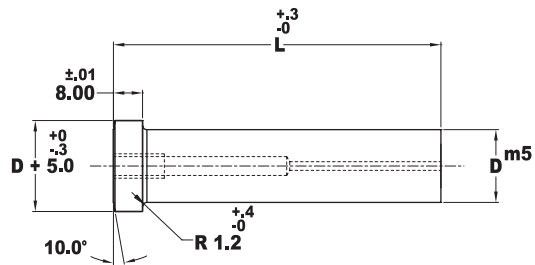
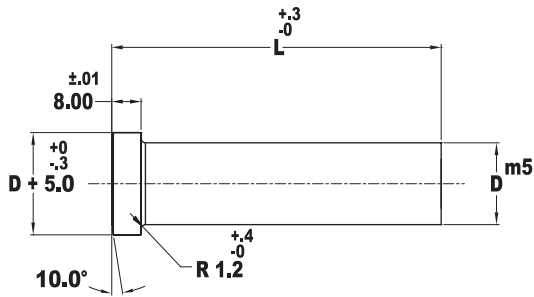
SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH DIMENSIONS	P(OR P&W) DIMENSIONS	ALTERATION CODE
EXAMPLE:	6	XMCC	13	90	13	10.0	F1
EXAMPLE:	6	XMCO	16	80	STD	14.0 x 8.0	F1 @ 90

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

CATALOG TYPE	SHANK D	POINT LENGTH "SBR"		EJECTOR SIZE
		STD	ALTERNATE B	
XMC_08	10	13	19	MAE 4
XMC_10	10	13	19	MAE 5
XMC_13	13	13	19	MAE 5
XMC_16	16	19	25	MAE 6
XMC_20	20	19	25	MAE 6
XMC_25	25	19	25	MAE 6
XMC_32	32	19	25	MAE 6

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
 AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

# SOLID/EJECTOR



### Material

Steel: CPM M4 HRC 60-62  
Heads HRC 40-55

FOR STANDARD ALTERATIONS SEE  
PAGES 65-70.

CATALOG NUMBER SOLID	SHANK DIA D	OVERALL LENGTH "L"			
		70	80	90	100
XMSB 08	08	X	X	X	X
XMSB 10	10	X	X	X	X
XMSB 13	13	X	X	X	X
XMSB 16	16	X	X	X	X
XMSB 20	20	X	X	X	X
XMSB 25	25	X	X	X	X
XMSB 32	32	X	X	X	X

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L"

EXAMPLE: 6 XMSB 8 100

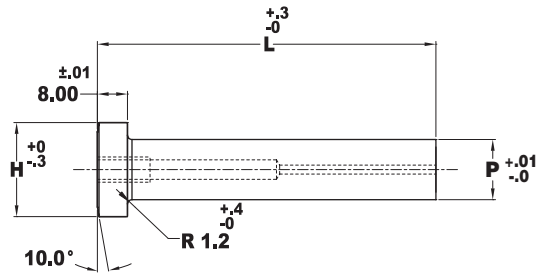
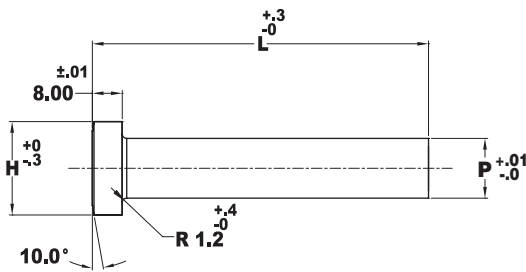
EXAMPLE: 6 XMCB 16 90

Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

CATALOG NUMBER EJECTOR	SHANK DIA D	OVERALL LENGTH "L"				EJECTOR SIZE
		70	80	90	100	
XMCB 08	08	X	X	X	X	MAE 4
XMCB 10	10	X	X	X	X	MAE 5
XMCB 13	13	X	X	X	X	MAE 5
XMCB 16	16	X	X	X	X	MAE 6
XMCB 20	20	X	X	X	X	MAE 6
XMCB 25	25	X	X	X	X	MAE 6
XMCB 32	32	X	X	X	X	MAE 6



## SOLID/EJECTOR



### Material

Steel: CPM M4 HRC 60-62  
Heads HRC 40-55

FOR STANDARD ALTERATIONS SEE  
PAGES 65-70.

CATALOG TYPE SOLID	SHANK DIA P RANGE	HEAD DIA H	OVERALL LENGTH "L"			
			70	80	90	100
XMSX 08	6.01 - 8.00	13	X	X	X	X
XMSX 10	8.01 - 10.00	15	X	X	X	X
XMSX 13	10.01 - 13.00	18	X	X	X	X
XMSX 16	13.01 - 16.00	21	X	X	X	X

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "L" "P"

EXAMPLE: 6 XMSX 08 100 7.50

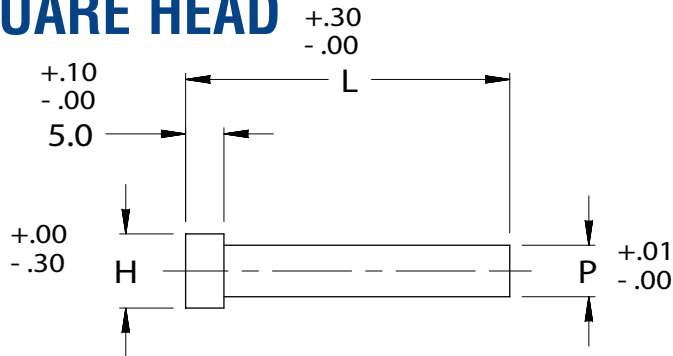
EXAMPLE: 6 XMCX 16 90 14.30

Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

CATALOG TYPE EJECTOR	SHANK DIA P RANGE	HEAD DIA H	OVERALL LENGTH "L"				EJECTOR SIZE
			70	80	90	100	
XMCX 08	6.01 - 8.00	13	X	X	X	X	MAE 4
XMCX 10	8.01 - 10.00	15	X	X	X	X	MAE 5
XMCX 13	10.01 - 13.00	18	X	X	X	X	MAE 5
XMCX 16	13.01 - 16.00	21	X	X	X	X	MAE 6

# QUILL PUNCHES

## SQUARE HEAD



# MQS

### Material

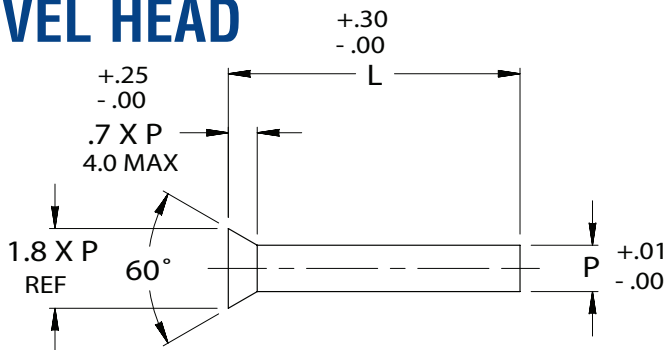
Steel: M2, HRC 60-63

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	RANGE P	HEAD DIA. H	OVERALL LENGTH "L"				
			STD. LENGTHS		OPTIONAL LENGTHS		
			50	63	40	45	56
MQS 01	.80 - 1.60	3	X	X	X	X	X
MQS 02	1.61 - 2.00	4	X	X	X	X	X
MQS 03	2.01 - 3.00	5	X	X	X	X	X
MQS 04	3.01 - 4.00	6	X	X	X	X	X
MQS 05	4.01 - 5.00	7	X	X	X	X	X
MQS 06	5.01 - 6.00	8	X	X	X	X	X
MQS 07	6.01 - 7.00	9	X	X	X	X	X

"P" Dimension must be ordered in .01 increments. Other three place sizes are P.O.R.

## BEVEL HEAD



# MQB

### Material

Steel: M2, HRC 60-63

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	RANGE P	OVERALL LENGTH "L"				
		STD. LENGTHS		OPTIONAL LENGTHS		
		50	63	40	45	56
MQB 01	.80 - 1.60	X	X	X	X	X
MQB 02	1.61 - 2.00	X	X	X	X	X
MQB 03	2.01 - 3.00	X	X	X	X	X
MQB 04	3.01 - 4.00	X	X	X	X	X
MQB 05	4.01 - 5.00	X	X	X	X	X
MQB 06	5.01 - 6.00	X	X	X	X	X
MQB 07	6.01 - 7.00	X	X	X	X	X

\*\*"P" Dimension must be ordered in .01 increments. Other three place sizes are P.O.R.

\*All metric quill punches are P.O.R.

### ORDER EXAMPLE:

(Reference page 4)

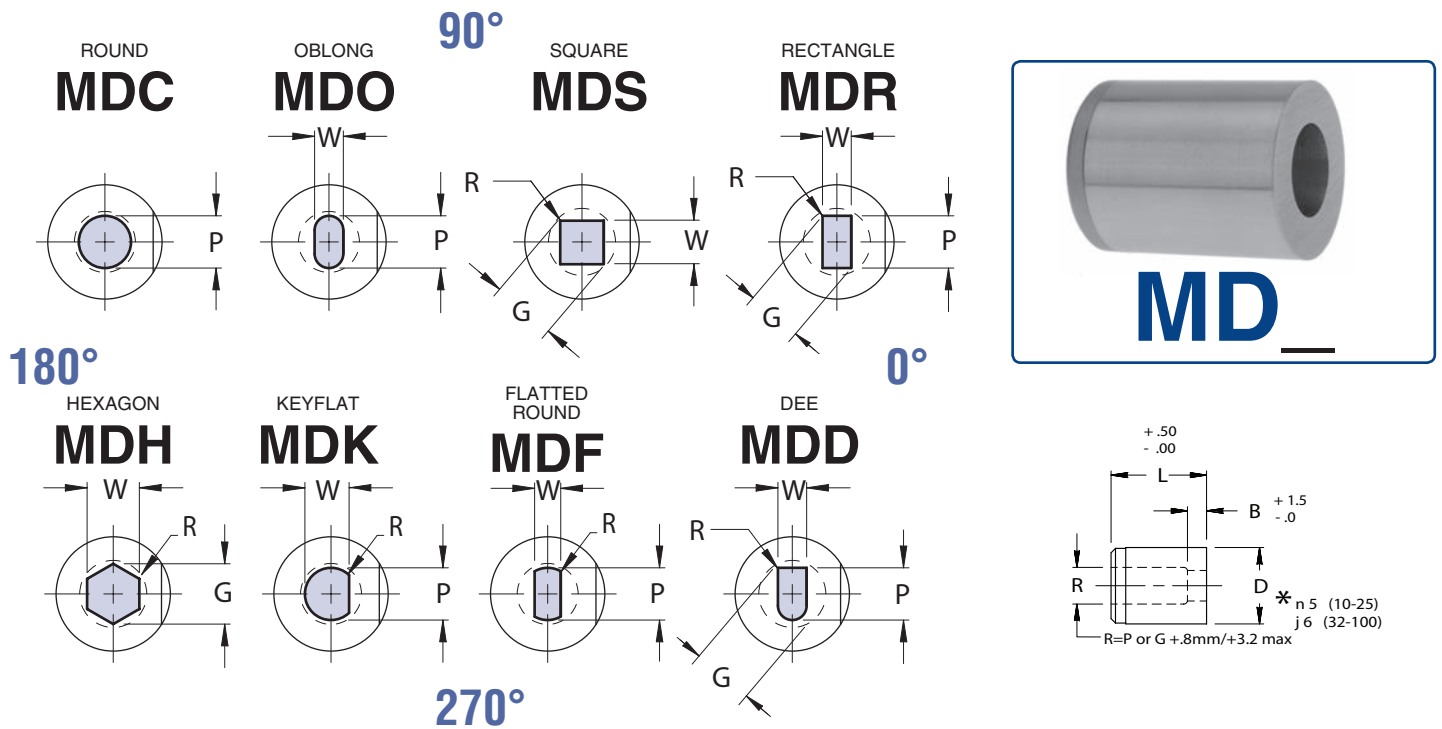
SPECIFY:	QTY:	TYPE	"D"	"L"	"P"
EXAMPLE:	6	MQS	04	40	3.50
EXAMPLE:	6	MQB	05	50	4.50

Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR STANDARD ALTERATIONS SEE  
PAGES 65-70.

# PRESS-FIT BUTTONS

## COUNTER BORE RELIEF



VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	BODY DIA D	LAND LENGTH "B"			MAX DIA R	SHAPE		OVERALL LENGTH "L"							
		STD	ALT A	ALT B		ROUND RANGE P	MIN W	MAX G/P	20	22	25	28	30	32	35
MD_08	8	4.0	8.0		4.0	1.50 - 3.20	1.50	3.20	X	X	X	X	X	X	X
MD_10	10	4.0	8.0		5.6	1.60 - 5.00	1.60	5.00	X	X	X	X	X	X	X
MD_13	13	5.0	8.0		8.0	1.80 - 7.20	1.80	7.20	X	X	X	X	X	X	X
MD_16	16	5.0	8.0		9.5	5.00 - 8.80	2.50	8.80	X	X	X	X	X	X	X
MD_20	20	5.0	12.0		12.0	5.50 - 11.00	3.20	11.00	X	X	X	X	X	X	X
MD_22	22	6.0	12.0		15.0	7.50 - 14.00	4.00	14.00	X	X	X	X	X	X	X
MD_25	25	6.0	12.0		17.5	9.50 - 16.50	4.80	16.50	X	X	X	X	X	X	X
MD_32	32	6.0	12.0		21.0	13.00 - 20.00	5.50	20.00	X	X	X	X	X	X	X
MD_38	38	8.0	12.0		27.0	16.00 - 26.00	6.40	26.00	X	X	X	X	X	X	X
MD_40	40	8.0	12.0		27.0	16.60 - 26.00	6.40	26.00	X	X	X	X	X	X	X

### Material

Steel: A2, HRC 58-60  
Alternate M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D

Shape P, W  $\begin{matrix} +.02 \\ -.0 \end{matrix}$  .02 P to D

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

### ORDER EXAMPLE:

(Reference page 4)

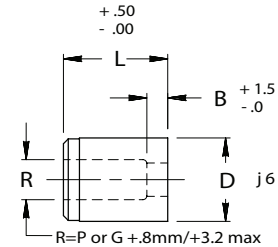
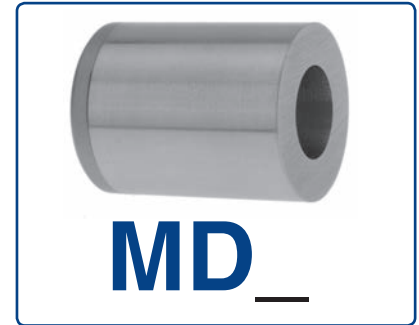
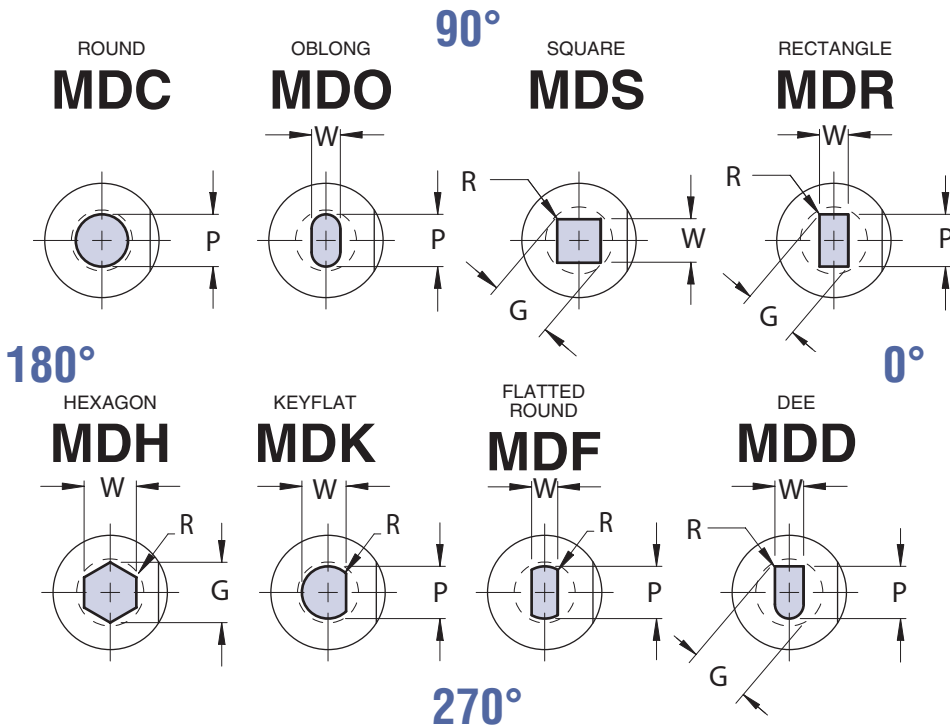
SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	P (OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	6	MDC	20	30	A	9.0	F2	A-2
EXAMPLE:	6	MDO	13	20	STD	6.0 x 3.0	F2	M-2

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 65-70.

# PRESS-FIT BUTTONS

## COUNTER BORE RELIEF/EXTENDED RANGE



VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	BODY DIA D	LAND LENGTH "B"			MAX DIA R	ROUND	SHAPE		OVERALL LENGTH "L"					
		STD	ALT A	ALT B		RANGE P	MIN W	MAX G/P	22	25	28	30	32	35
MD_45	45	8.0	12.0	20.0	36.0	17.50 - 35.00	7.50	35.00	X	X	X	X	X	X
MD_50	50	8.0	12.0	20.0	41.0	20.00 - 40.00	8.00	40.00	X	X	X	X	X	X
MD_56	56	8.0	12.0	20.0	46.0	22.50 - 45.00	9.00	45.00	X	X	X	X	X	X
MD_63	63	8.0	12.0	20.0	51.0	25.00 - 50.00	10.00	50.00	X	X	X	X	X	X
MD_71	71	8.0	12.0	20.0	57.0	27.50 - 56.00	11.00	56.00	X	X	X	X	X	X

### Material

Steel: A2, HRC 58-60  
Alternate M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D

Shape P, W  $\begin{matrix} +.02 \\ -.0 \end{matrix}$  .02 P to D

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	LAND LENGTH DIMENSIONS	P (OR P&W)	ALTERATION CODE	STEEL
EXAMPLE:	6	MDC	50	30	A	35.0	F2	A-2	
EXAMPLE:	6	MDO	63	25	STD	42.5 x 18.3	F2	M2	

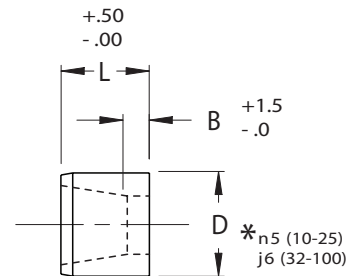
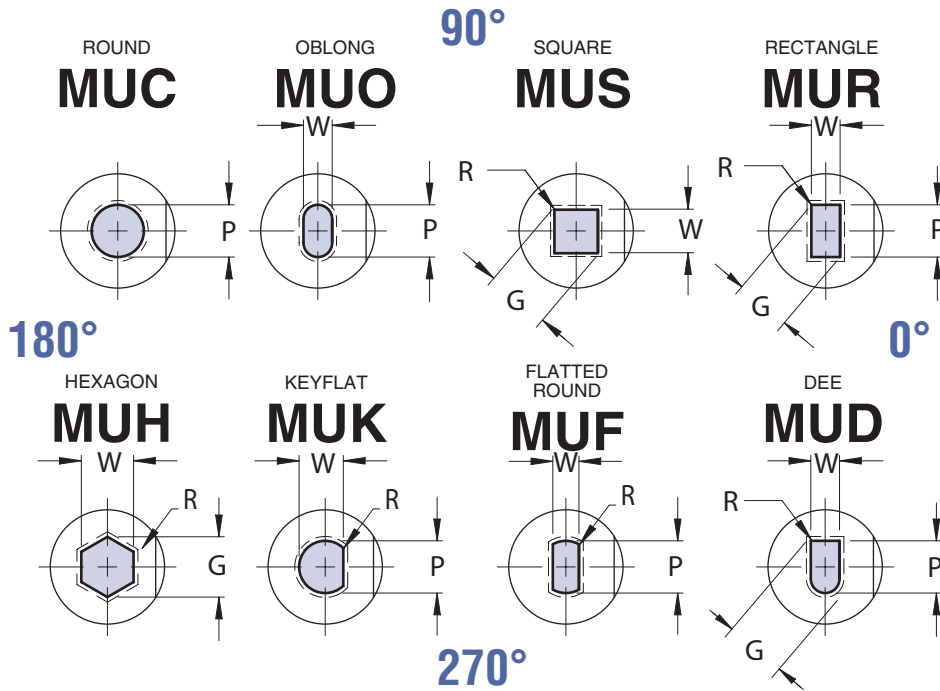
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 65-70.

# PRESS FIT BUTTONS



## ULTRA LIFE/TAPER RELIEF



VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

STANDARD TAPER: ROUND 1° PER SIDE/SHAPED 1-1/2° PER SIDE

Complete design & CAD files visit [WWW.MOELLERMCD.COM](http://WWW.MOELLERMCD.COM)

CATALOG TYPE	BODY DIA D	LAND LENGTH "B"				ROUND RANGE P	SHAPE		OVERALL LENGTH "L"								
		NAPMA		ALTERNATES			MIN W	MAX G/P	20	22	25	28	30	32	35	40	
		STD	A	B	C												
MU_08	8	4.0	8.0		3.0	1.5 - 3.20	1.5	3.20	X	X	X	X	X	X	X	X	
MU_10	10	4.0	8.0		3.0	1.6 - 5.0	1.6	5.0	X	X	X	X	X	X	X	X	X
MU_13	13	5.0	8.0		3.0	3.0 - 7.2	1.8	7.2	X	X	X	X	X	X	X	X	X
MU_16	16	5.0	8.0		3.0	5.0 - 8.8	2.5	8.8	X	X	X	X	X	X	X	X	X
MU_20	20	5.0	12.0	20.0	3.0	5.5 - 11.0	3.2	11.0	X	X	X	X	X	X	X	X	X
MU_22	22	6.0	12.0	20.0	3.0	7.5 - 14.0	4.0	14.0	X	X	X	X	X	X	X	X	X
MU_25	25	6.0	12.0	20.0	3.0	9.5 - 16.5	4.8	16.5	X	X	X	X	X	X	X	X	X
MU_32	32	6.0	12.0	20.0	3.0	13.0 - 20.0	5.5	20.0	X	X	X	X	X	X	X	X	X
MU_38	38	8.0	12.0	20.0	3.0	16.0 - 26.0	6.4	26.0	X	X	X	X	X	X	X	X	
MU_40	40	8.0	12.0	20.0	3.0	16.6 - 26.0	6.4	26.0	X	X	X	X	X	X	X	X	

**Material**  
 Steel: STD A2, HRC 58-60  
 Alternate M2, HRC 60-63

**Standard Point Tolerance**

Round P  $+ .01$  /  $- .00$      $\text{Ⓢ}$  .01 P to D

Shape P, W  $+ .02$  /  $- .00$      $\text{Ⓢ}$  .02 P to D

Alternate Point Tolerance    **T2**

P, W TOLERANCE  $+ .005$  /  $- .000$

P to D  $.008$   $\text{Ⓢ}$

ONLY AVAILABLE BELOW 45 BODY DIAMETER

STANDARD FLAT LOCATION IS AT 0° AS SHOWN. AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

**ORDER EXAMPLE:**  
(Reference page 4)

SPECIFY	QTY	TYPE	"D"	"L"	"B"	LAND LENGTH DIMENSIONS	P(OR P&W) TOLERANCE	ALTERNATE TOLERANCE	ALTERATION CODE	STEEL
EXAMPLE:	6	MUC	25	30	A	15.0	T2	F2	A2	
EXAMPLE:	6	MUO	20	30	STD	10.0 x 5.0	STD	F2	M-2	

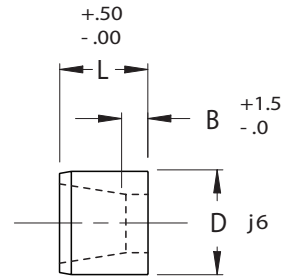
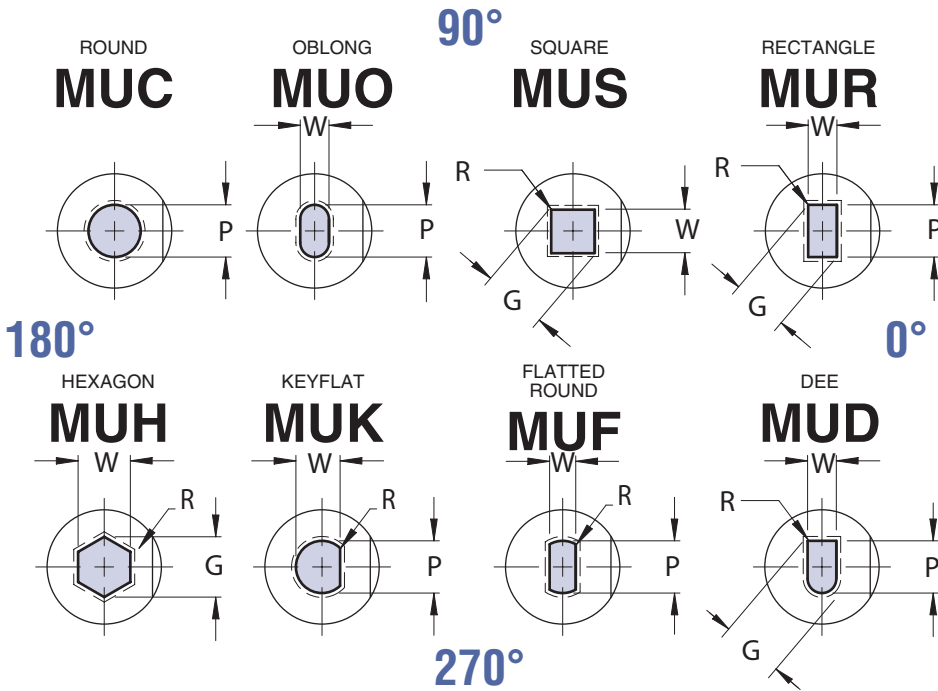
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 65-70.

# PRESS FIT BUTTONS



## ULTRA LIFE/TAPER RELIEF/EXTENDED RANGE



VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

STANDARD TAPER: ROUND 1° PER SIDE/SHAPED 1-1/2° PER SIDE

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	BODY DIA D	LAND LENGTH "B"				ROUND RANGE P	SHAPE		OVERALL LENGTH "L"				
		NAPMA STD	ALTERNATES				MIN W	MAX G/P	25	28	30	32	35
			A	B	C								
MU_45	45	8.0	12.0	20.0	3.0	22.0 - 31.0	7.5	31.0	X	X	X	X	X
MU_50	50	8.0	12.0	20.0	3.0	24.0 - 34.0	8.0	34.0	X	X	X	X	X
MU_56	56	8.0	12.0	20.0	3.0	26.0 - 38.0	8.5	38.0	X	X	X	X	X
MU_63	63	8.0	12.0	20.0	3.0	30.0 - 43.0	9.0	43.0	X	X	X	X	X
MU_71	71	8.0	12.0	20.0	3.0	34.0 - 48.0	9.5	48.0	X	X	X	X	X
MU_76	76	8.0	12.0	20.0	3.0	36.0 - 52.0	10.0	52.0					X
MU_85	85	8.0	12.0	20.0	3.0	40.0 - 58.0	11.0	58.0					X
MU_90	90	8.0	12.0	20.0	3.0	43.0 - 61.0	12.0	61.0					X
MU_100	100	8.0	12.0	20.0	3.0	48.0 - 68.0	13.0	68.0					X

### Material

Steel: STD A2, HRC 58-60  
Alternate M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D  
Shape P, W  $\begin{matrix} +.02 \\ -.00 \end{matrix}$  .02 P to D

STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	LAND LENGTH DIMENSIONS	P(OR P&W) TOLERANCE	ALTERNATE TOLERANCE	ALTERATION CODE	STEEL
EXAMPLE:	6	MUC	50	30	A	35.0	T2	F2	A-2	
EXAMPLE:	6	MUO	63	25	STD	42.5 x 18.3	STD	F2	M-2	

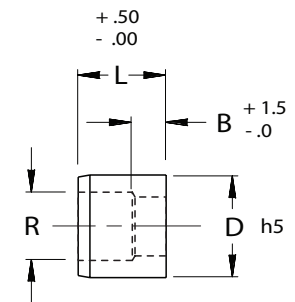
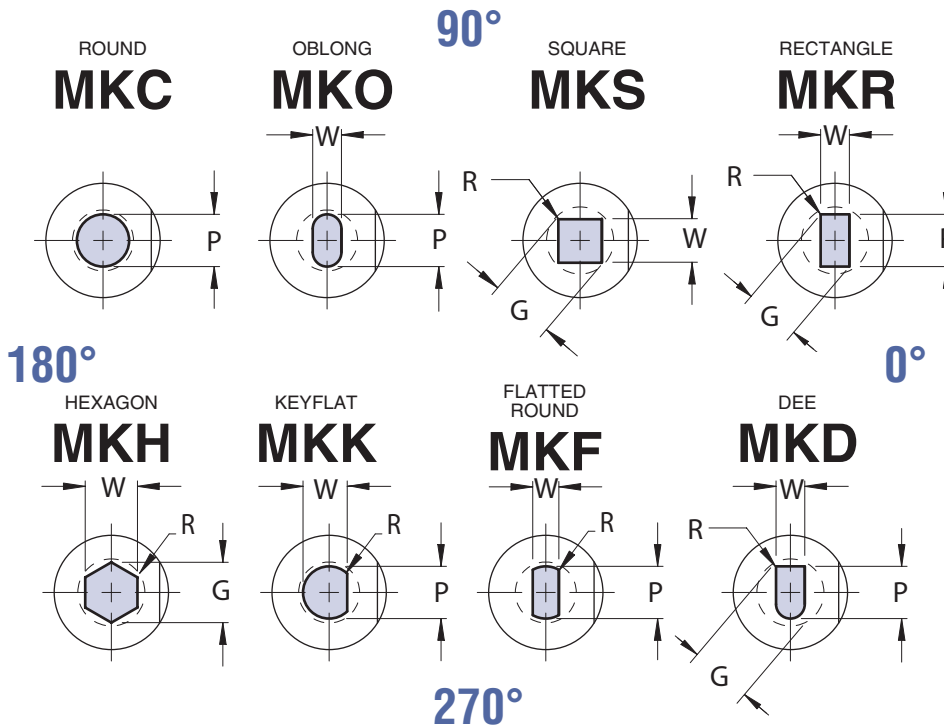
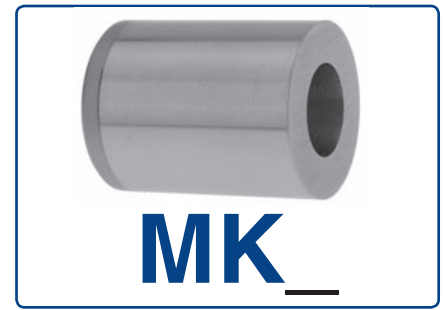
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 65-70.



# SLIP-FIT BUTTONS

## COUNTER BORE RELIEF



STANDARD FLAT LOCATION IS AT 0° AS SHOWN. AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

\*THESE LENGTHS ARE AVAILABLE WITH VDI STYLE RELIEF ONLY

VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.  
Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG TYPE	BODY DIA	LAND LENGTH "B"		ROUND RANGE P	SHAPE		RELIEF DIA	OVERALL LENGTH "L"	
		STANDARD	ALT A		MIN W	MAX P/G		25	32
MK_13	13	5	8	1.80 - 3.00	1.80	3.00	5.2	X	
		5	8	3.01 - 6.20	1.80	6.20	7.0	X	
MK_16	16	5	9	5.00 - 6.20	2.50	6.20	7.2	X	
		5	9	6.21 - 8.00	2.50	8.00	8.7	X	
MK_20	20	5	9	5.40 - 8.30	3.20	8.30	9.1	X	
		5	9	8.31 - 11.00	3.20	11.00	11.9	X	
MK_25	25	5	12	9.40 - 13.00	4.80	13.00	13.9	X*	X
		5	12	13.01 - 16.00	4.80	16.00	16.7	X*	X
MK_32	32	5	12	13.00 - 16.50	5.50	16.50	17.5	X*	X
		5	12	16.51 - 20.00	5.50	20.00	21.5	X*	X
MK_40	40	5	15	15.80 - 21.40	6.40	21.40	22.2	X*	X
		5	15	21.41 - 26.00	6.40	26.00	27.0	X*	X
MK_50	50	5	20	20.00 - 26.00	9.00	26.00	27.0		X
		5	20	26.01 - 37.00	9.00	37.00	38.0		X
MK_56	56	5	20	25.00 - 35.00	10.00	35.00	36.0		X
		5	20	35.01 - 44.00	10.00	44.00	45.0		X
MK_63	63	5	20	28.00 - 40.00	11.00	40.00	41.0		X
		5	20	40.01 - 50.00	11.00	50.00	50.0		X

### Material

Steel: A2, HRC 59-61  
M2 - CONSULT FACTORY

### Standard Point Tolerance

Round P	+ .01 - .00		.01	P to D
Shape P, W	+ .02 - .0		.02	P to D

VDI ALTERATION -  
FOR VDI STYLE RELIEF +.2/.3  
OVER "P" OR "G" ADD VDI AT  
END OF DESCRIPTION

### ORDER EXAMPLE:

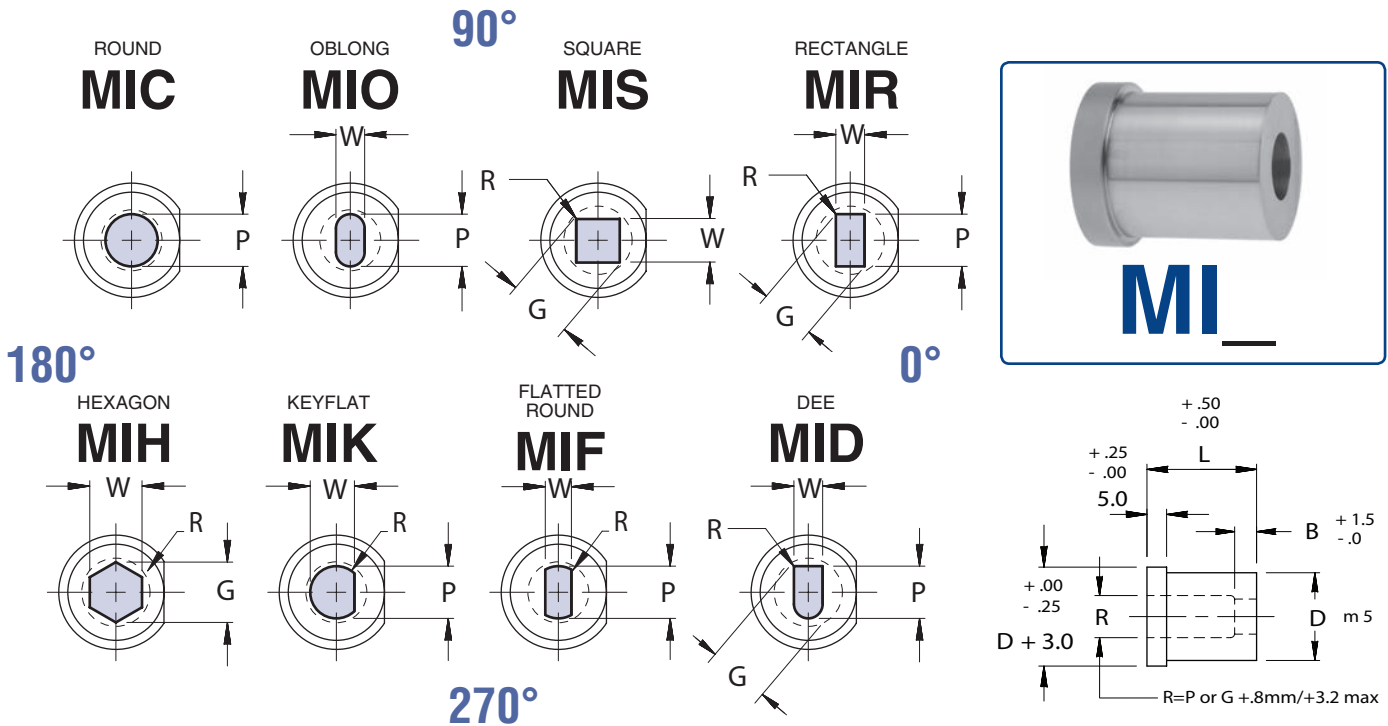
SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	LAND LENGTH DIMENSIONS	P(OR P&W) TOLERANCE	ALTERNATE TOLERANCE	ALTERATION CODE	STEEL
EXAMPLE:	6	MKC	25	32	A	15.0			F2	A-2
EXAMPLE:	6	MKO	20	25	STD	10.0 x 5.0	STD		F2	M-2

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND  
STANDARD ALTERATIONS SEE PAGES 65-70.

# SHOULDER BUTTONS

## COUNTER BORE RELIEF



VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)


CATALOG TYPE	BODY DIA D	LAND LENGTH "B"		MAX DIA R	SHAPE		OVERALL LENGTH "L"							
		STD	ALT A		RANGE P	MIN W	MAX G/P	20	22	25	28	30	32	35
MI_08	8	4.0	8.0	4.0	1.50 - 3.20	1.50	3.20	X	X	X	X	X	X	X
MI_10	10	4.0	8.0	5.6	1.60 - 5.00	1.60	5.00	X	X	X	X	X	X	X
MI_13	13	5.0	8.0	8.0	1.80 - 7.20	1.80	7.20	X	X	X	X	X	X	X
MI_16	16	5.0	8.0	9.5	5.00 - 8.80	2.50	8.80	X	X	X	X	X	X	X
MI_20	20	5.0	12.0	12.0	5.50 - 11.00	3.20	11.00	X	X	X	X	X	X	X
MI_22	22	6.0	12.0	15.0	7.50 - 14.00	4.00	14.00	X	X	X	X	X	X	X
MI_25	25	6.0	12.0	17.5	9.50 - 16.50	4.80	16.50	X	X	X	X	X	X	X
MI_32	32	6.0	12.0	21.0	13.00 - 20.00	5.50	20.00	X	X	X	X	X	X	X
MI_38	38	8.0	12.0	27.0	16.00 - 26.00	6.40	26.00	X	X	X	X	X	X	X
MI_40	40	8.0	12.0	27.0	16.00 - 26.00	6.50	26.30	X	X	X	X	X	X	X

### Material

Steel: A2, HRC 58-60  
Alternate M2, HRC 60-63

### Standard Point Tolerance

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$   .01 P to D

Shape P, W  $\begin{matrix} +.02 \\ -.0 \end{matrix}$   .02 P to D

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	P (OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	6	MIC	13	25	A	6.0	F1	M-2
EXAMPLE:	6	MIO	20	25	STD	9.0 x 4.0	F1	A-2

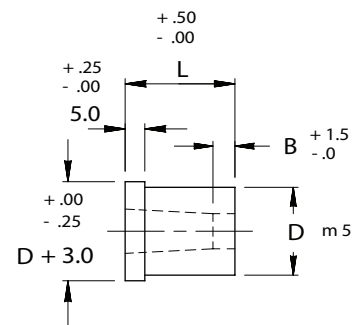
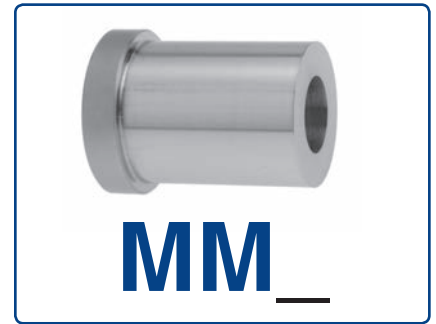
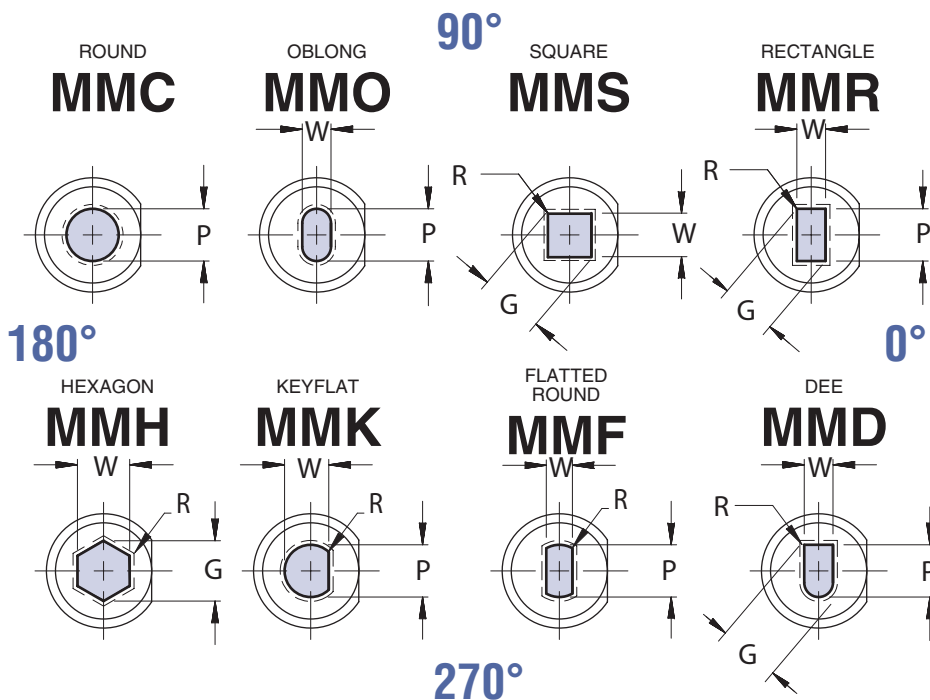
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND  
STANDARD ALTERATIONS SEE PAGES 65-70.

STANDARD FLAT LOCATION IS AT 0° AS SHOWN. AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

# SHOULDER BUTTONS

## ULTRA LIFE/TAPER RELIEF



VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

STANDARD TAPER: ROUND 1° PER SIDE/SHAPED 1-1/2° PER SIDE

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

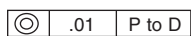
CATALOG TYPE	BODY DIA D	LAND LENGTH "B"				ROUND RANGE P	SHAPE		OVERALL LENGTH "L"						
		NAPMA STD	ALTERNATES				MIN W	MAX G/P	20	22	25	28	30	32	35
			A	B	C										
MM_08	8	4.0	8.0		3.0	1.50-3.20	1.50	3.20	X	X	X	X	X	X	X
MM_10	10	4.0	8.0		3.0	1.60-5.00	1.60	5.00	X	X	X	X	X	X	X
MM_13	13	5.0	8.0		3.0	1.80-7.20	1.80	7.20	X	X	X	X	X	X	X
MM_16	16	5.0	8.0		3.0	5.00-8.80	2.50	8.80	X	X	X	X	X	X	X
MM_20	20	5.0	12.0	20.0	3.0	5.50-11.00	3.20	11.00	X	X	X	X	X	X	X
MM_22	22	6.0	12.0	20.0	3.0	7.50-14.00	4.00	14.00	X	X	X	X	X	X	X
MM_25	25	6.0	12.0	20.0	3.0	9.50-16.50	4.80	16.50	X	X	X	X	X	X	X
MM_32	32	6.0	12.0	20.0	3.0	13.00-20.00	5.50	20.00	X	X	X	X	X	X	X
MM_38	38	8.0	12.0	20.0	3.0	16.00-26.00	6.40	26.00	X	X	X	X	X	X	X
MM_40	40	8.0	12.0	20.0	3.0	16.50-26.00	6.50	26.00	X	X	X	X	X	X	X
MM_45	45	8.0	12.0	20.0	3.0	22.00-31.00	7.50	31.00		X	X	X	X	X	X

### Material

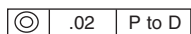
Steel: M2, HRC 60-63

### Standard Point Tolerance

Round P  $+.01$   
 $-.00$



Shape P, W  $+.02$   
 $-.00$



Alternate Hole Tolerance

T2

P, W TOLERANCE  $+.005$   
 $-.000$

P to D  $.008$

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L" "B" P(OR P&W) ALTERNATE ALTERATION

EXAMPLE: 6 MMC 13 25 C 6.0 STD F1

EXAMPLE: 6 MMS 20 30 A 9.0 T2 F1

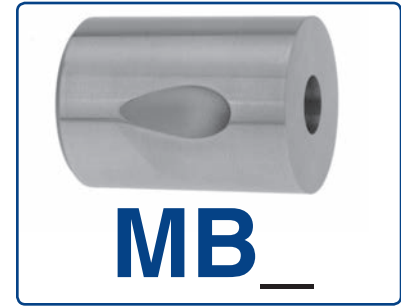
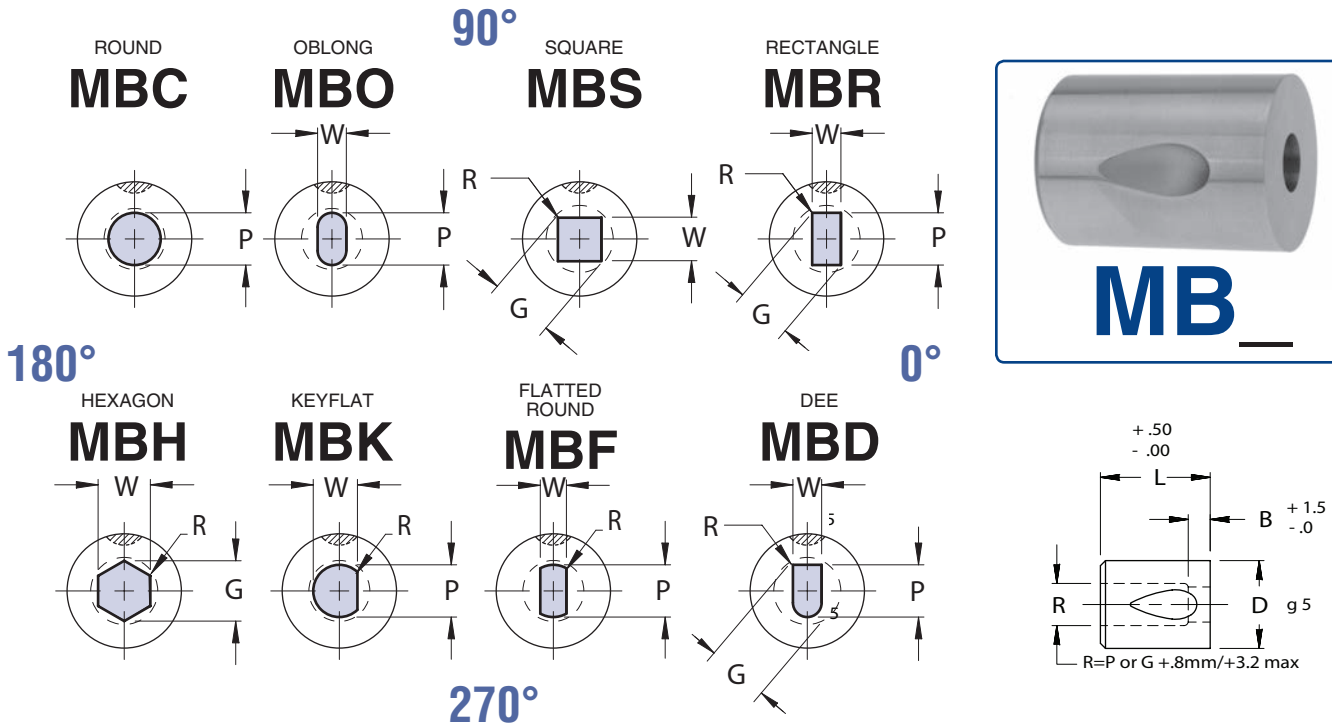
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 65-70.

STANDARD FLAT LOCATION IS AT 0° AS SHOWN. AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.

# BALL LOCK BUTTONS

## COUNTER BORE RELIEF



VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

Complete design & CAD files visit [WWW.MOELLERMCD.COM](http://WWW.MOELLERMCD.COM)

CATALOG TYPE	BODY DIA D	DIE LAND B	MAX DIA R	ROUND	SHAPE		OVERALL LENGTH "L"
				RANGE P	MIN W	MAX G/P	32
MB_13	13	4.0	6.0	1.60 - 5.00	1.60	5.00	X
MB_16	16	5.0	8.0	3.20 - 7.20	2.00	7.20	X
MB_20	20	5.0	12.0	4.00 - 11.00	2.50	11.00	X
MB_25	25	6.0	16.0	8.00 - 15.00	4.00	15.00	X
MB_32	32	6.0	20.0	11.00 - 19.00	5.00	19.00	X
MB_38	38	8.0	27.0	16.50 - 26.00	6.50	26.00	X

**Material**  
Steel: A2, HRC 58-60

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$  .01 P to D

Shape P, W  $\begin{matrix} +.02 \\ -.00 \end{matrix}$  .02 P to D

**ORDER EXAMPLE:**  
(Reference page 4) P(OR P&W)

SPECIFY: QTY: TYPE "D" "L" DIMENSIONS

EXAMPLE: 6 MBC 16 32 5.0

EXAMPLE: 6 MBO 20 32 9.0 x 4.0

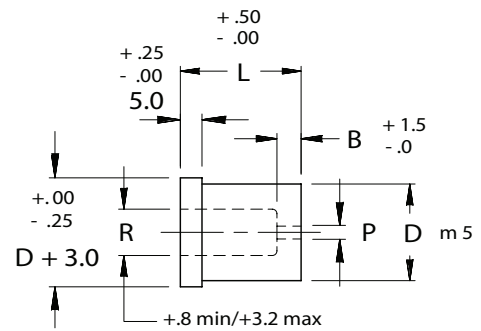
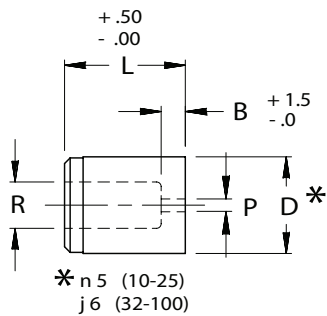
Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 65-70.

STANDARD BALL SEAT LOCATION IS AT 90° AS SHOWN. AVAILABLE AT 0°, 180°, 270°, FOR SAME ALTERATION PRICE.

# BUTTON BLANKS

## PRESS FIT WITH COUNTER BORE RELIEF



### Material

Steel: A2, HRC 58-60

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L"

EXAMPLE: 6 MDB 16 28

EXAMPLE: 6 MIB 25 30

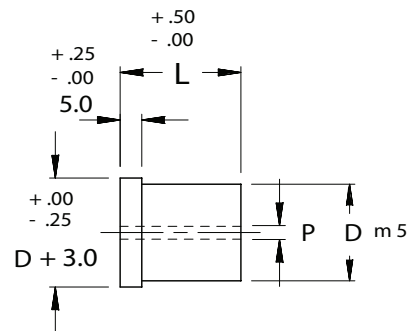
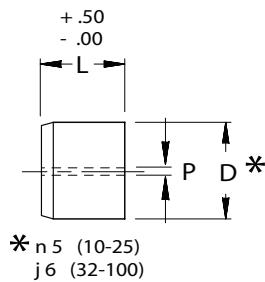
STANDARD ALTERATIONS SEE PAGES 65-70.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER	BODY DIA D	DIE LAND B	RLF DIA R	DRILL SIZE P	OVERALL LENGTH "L"						
					20	22	25	28	30	32	35
M_B 08	8	4.0	4.0	1.2	X	X	X	X	X	X	X
M_B 10	10	4.0	5.6	1.2	X	X	X	X	X	X	X
M_B 13	13	5.0	8.0	1.4	X	X	X	X	X	X	X
M_B 16	16	5.0	9.5	2.0	X	X	X	X	X	X	X
M_B 20	20	5.0	12.0	2.8	X	X	X	X	X	X	X
M_B 22	22	6.0	15.0	2.8	X	X	X	X	X	X	X
M_B 25	25	6.0	17.5	4.4	X	X	X	X	X	X	X
M_B 32	32	6.0	21.0	5.2	X	X	X	X	X	X	X
M_B 38	38	8.0	27.0	5.6		X	X	X	X	X	X
M_B 40	40	8.0	27.0	5.6		X	X	X	X	X	X

# BUTTON BLANKS

## PRESS FIT WITH STRAIGHT THRU HOLE



### Material

Steel: M2, HRC 60-63

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L"

EXAMPLE: 6 MUB 40 30

EXAMPLE: 6 MMB 20 32

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

STANDARD ALTERATIONS SEE PAGES 65-70.

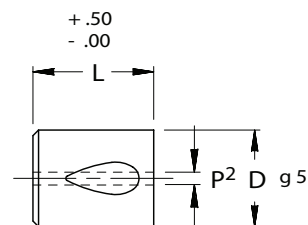
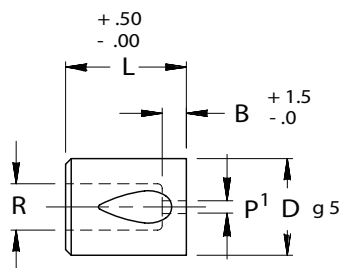
CATALOG NUMBER	BODY DIA D	DRILL SIZE P	OVERALL LENGTH "L"						
			20	22	25	28	30	32	35
M_B 08	8	1.2	X	X	X	X	X	X	X
M_B 10	10	1.2	X	X	X	X	X	X	X
M_B 13	13	1.4	X	X	X	X	X	X	X
M_B 16	16	2.0	X	X	X	X	X	X	X
M_B 20	20	2.4	X	X	X	X	X	X	X
M_B 22	22	2.4	X	X	X	X	X	X	X
M_B 25	25	2.4	X	X	X	X	X	X	X
M_B 32	32	2.4	X	X	X	X	X	X	X
M_B 38	38	2.4	X	X	X	X	X	X	X
M_B 40	40	2.4	X	X	X	X	X	X	X
M_B 45	45	2.4			X	X	X	X	X
MUB 50*	50	2.4			X	X	X		X
MUB 56*	56	2.4			X	X	X		X
MUB 63*	63	2.4			X	X	X		X
MUB 71*	71	2.4			X	X	X		X
MUB 76*	76	2.4			X	X	X		X
MUB 85*	85	2.4			X	X	X		X
MUB 90*	90	2.4			X	X	X		X
MUB 100*	100	2.4			X	X	X		X

\*Available in MUB Only



# BUTTON BLANKS

## BALL LOCK WITH COUNTER BORE RELIEF AND STRAIGHT THRU HOLE



### Material

Steel: A2, HRC 58-60

### Material

Steel: M2, HRC 60-63

### ORDER EXAMPLE:

(Reference page 4)

SPECIFY: QTY: TYPE "D" "L"

EXAMPLE: 6 MBB 16 32

EXAMPLE: 6 MFB 20 32

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

STANDARD ALTERATIONS SEE PAGES 65-70.

CATALOG NUMBER	BODY DIA D	DIE LAND B	RLF DIA R	DRILL SIZE P <sup>1</sup>	DRILL SIZE P <sup>2</sup>	OVERALL LENGTH "L"
						32
M_B 13	13	4.0	5.8	1.2	1.2	X
M_B 16	16	5.0	8.0	1.6	1.6	X
M_B 20	20	5.0	11.9	2.0	2.0	X
M_B 25	25	6.0	16.0	3.6	2.4	X
M_B 32	32	6.0	20.0	4.4	2.4	X
M_B 38	38	8.0	27.0	5.6	2.4	X

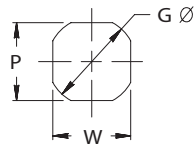
# UNIVERSAL SHAPES

Views are shown looking through the shank of punch and top of button, as in true die position. Standard ballseat location is at 90°, standard flat location is at 0°. Points are centered on shanks unless noted by drawing. Female corners on buttons will be furnished with a .2 radius to facilitate wire EDM. To order the first character is M, then specify body type similar to other standard items, (second alpha characters), then "U" as the third alpha character. ADD an alteration code U-\_\_ to describe universal shape.

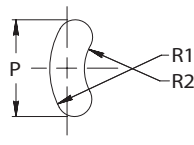
ORDER EXAMPLE: MHU 32-090 P=24.5 W=16.6 R=1.5, U-17

## MISCELLANEOUS

U-05

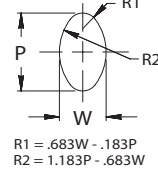


U-06

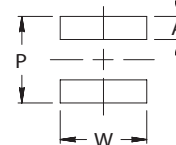


## 90°

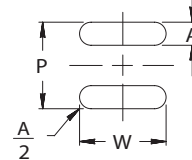
U-07



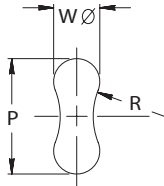
U-08



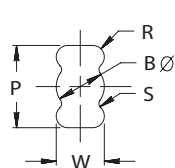
U-09



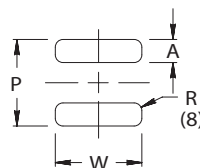
U-10



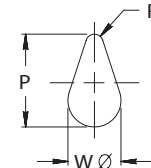
U-11



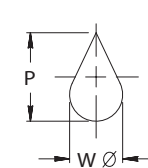
U-12



U-13

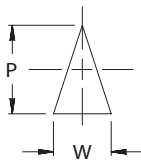


U-14

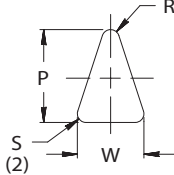


## TRIANGLES/TRAPEZOIDS

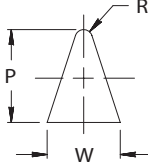
U-15



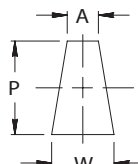
U-16



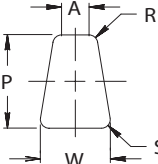
U-17



U-18



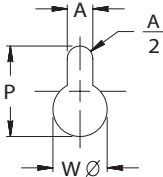
U-19



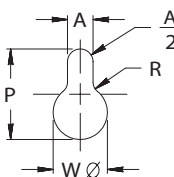
## MONO LOBES

180°

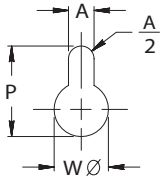
U-20



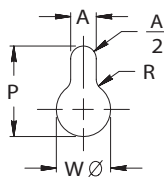
U-21



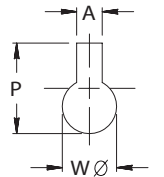
U-22



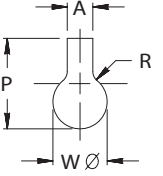
U-23



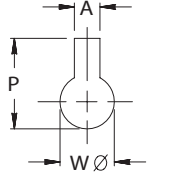
U-24



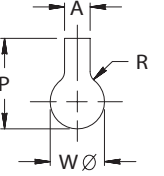
U-25



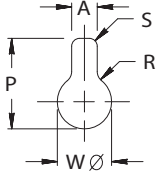
U-26



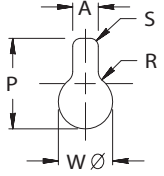
U-27



U-28

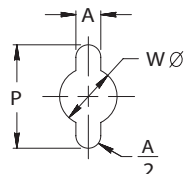


U-29

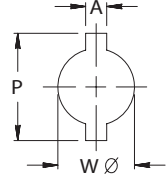


## MULTI LOBES

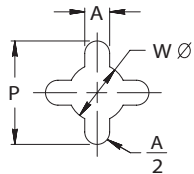
U-30



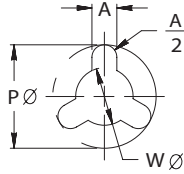
U-31



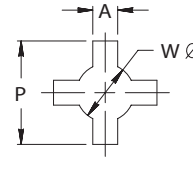
U-32



U-33



U-34



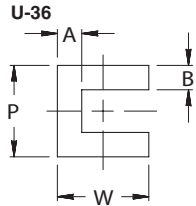
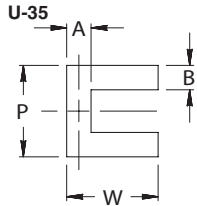
270°

# UNIVERSAL SHAPES

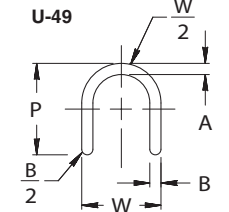
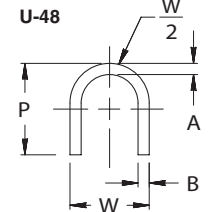
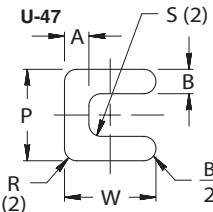
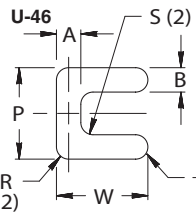
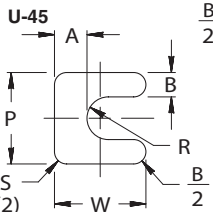
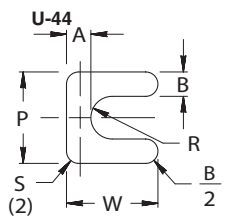
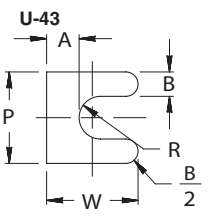
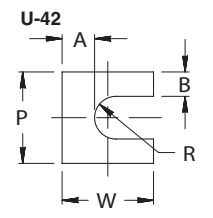
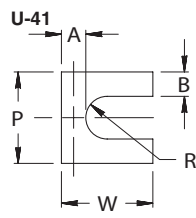
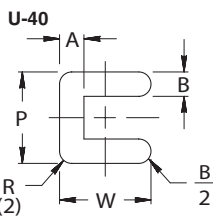
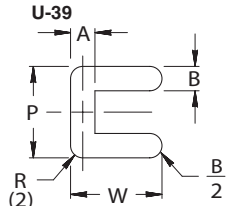
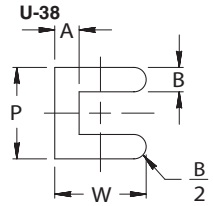
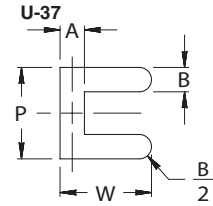
Views are shown looking through the shank of punch and top of button, as in true die position. Standard ballseat location is at 90°, standard flat location is at 0°. Points are centered on shanks unless noted by drawing. Female corners on buttons will be furnished with a .2 radius to facilitate wire EDM. To order, the first character is M, then specify body type similar to other standard items, (second alpha characters), then "U" as the third alpha character. ADD an alteration code U-\_\_ to describe universal shape.

ORDER EXAMPLE: MHU32-090 P=24.5 W=16.6 B=5.5 A=5.5, U-38

## U's

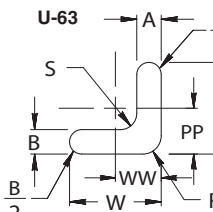
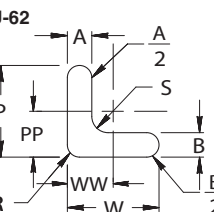
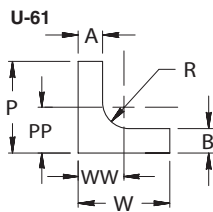
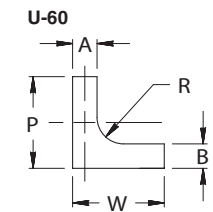
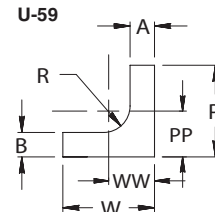
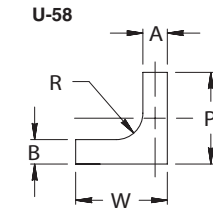
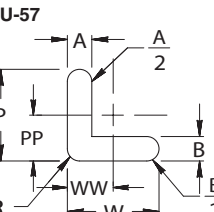
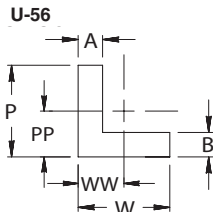
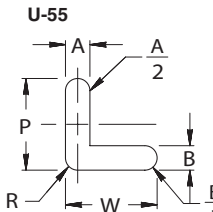
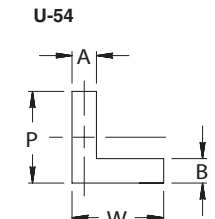
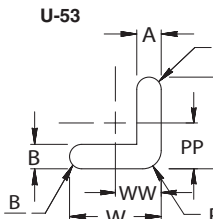
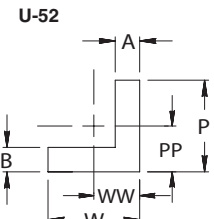
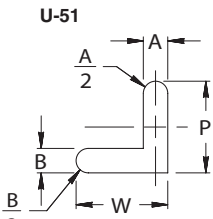
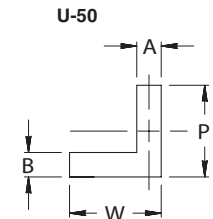


## 90°



## L's

## 180°



## 0°

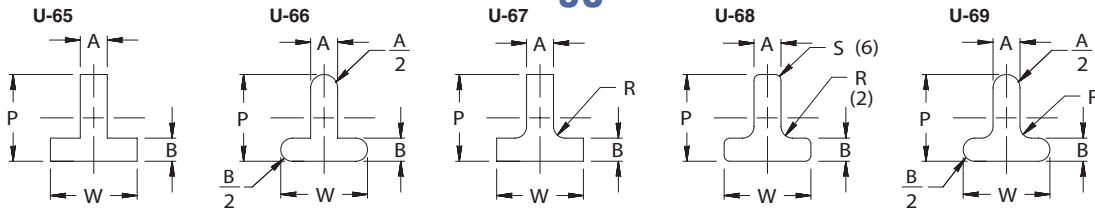
## 270°

# UNIVERSAL SHAPES

Views are shown looking through the shank of punch and top of button, as in true die position. Standard ballseat location is at 90°, standard flat location is at 0°. Points are centered on shanks unless noted by drawing. Female corners on buttons will be furnished with a .2 radius to facilitate wire EDM. To order, the first character is M, then specify body type similar to other standard items, (second alpha characters), then "U" as the third alpha character. ADD an alteration code U-\_\_ to describe universal shape.

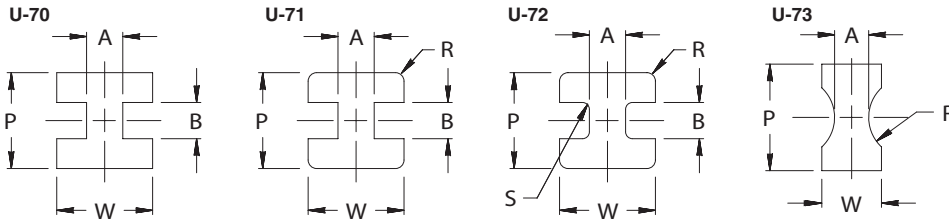
ORDER EXAMPLE: MHU25-100 P=23.5 W=16 R=1.5, U-81

## T's

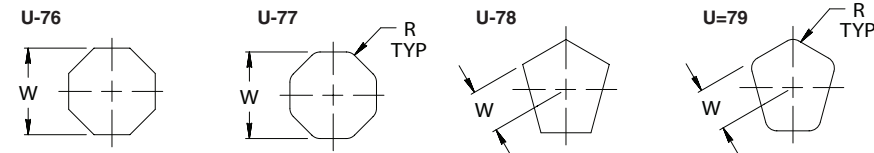


90°

## DUO TEES



## POLYGONS



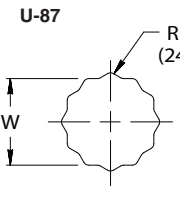
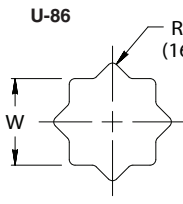
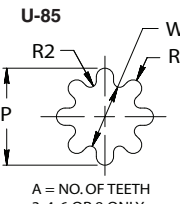
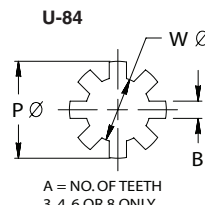
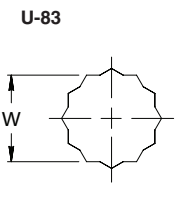
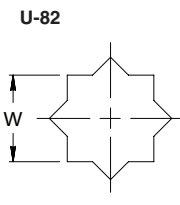
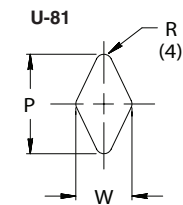
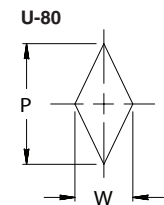
A = EVEN NO. OF SIDES

A = EVEN NO. OF SIDES

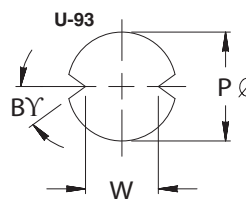
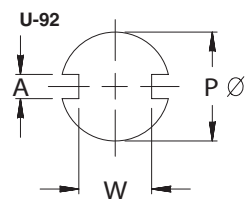
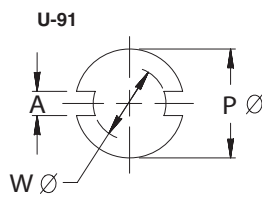
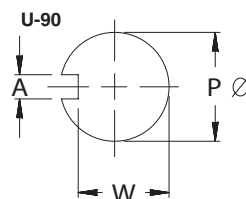
A = ODD NO. OF SIDES

A = ODD NO. OF SIDES

180°



## KEYS



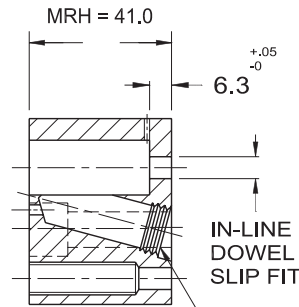
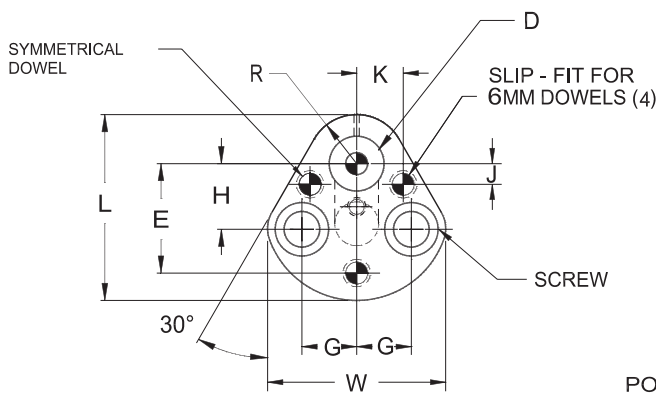
270°



# BALL LOCK RETAINERS



## TRUE SET-ADVANCED



POSITIVE RETENTION  
SET SCREW  
AND BOOSTER SPRING



Manufactured under Patent No.'s 0351395, 5357835

FOR ACCESSORIES AND SHIM PLATES,  
SEE PAGES 57-62.



- Advanced Design for the most demanding stamping applications, such as AHSS and Aluminum.
- The Industry's only True One-Piece construction produced from through-hardened shock resistant Tool steel.
- *True Set Exclusive* - Booster spring & positive Ball-Lock retention system resistant to shock resulting to Punch retention failure.
- Symmetrical 4th dowel providing increased versatility. Compatible with all predominant Global OEM Die Standards.

## Heavy Duty

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

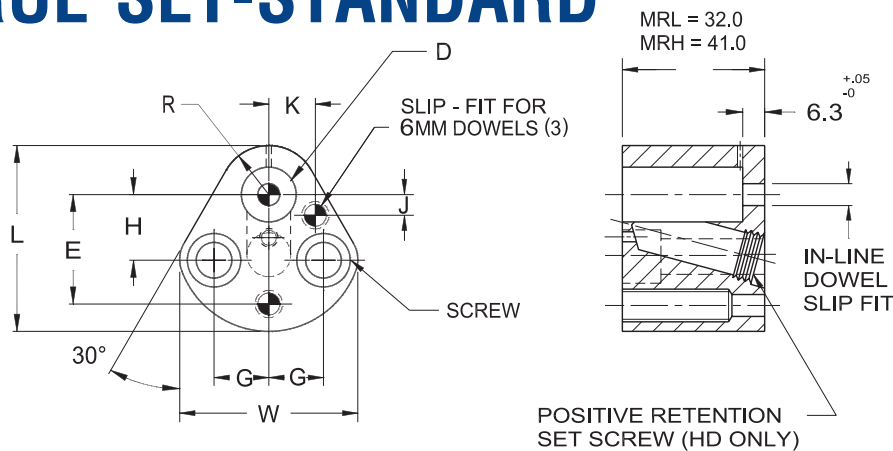
CATALOG NUMBER	D DIA.	±.01 E	G	L	W	R	H	±.01 J	±.01 K	IN-LINE DOWEL	SCREW SIZE
MRH 10A	10	26.924	11.12	44.5	39.9	9.5	19.05	7.50	9.00	6	M8
MRH 13A	13	29.972	14.27	50.8	48.3	12.7	19.05	6.50	12.00	6	M8
MRH 16A	16	31.750	15.87	54.0	51.6	14.3	19.05	6.00	13.50	6	M8
MRH 20A	20	33.528	17.47	60.3	58.2	17.5	19.05	5.00	16.50	6	M10
MRH 25A	25	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRH 32A	32	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRH 40A	40	43.993	24.00	77.4	77.8	26.0	27.00	10.00	26.00	6	M12



# BALL LOCK RETAINERS



## TRUE SET-STANDARD



Manufactured under Patent No.'s 0351395, 5357835

FOR ACCESSORIES AND SHIM PLATES,  
SEE PAGES 57-62.

## Heavy Duty

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER	D DIA.	±.01 E	G	L	W	R	H	±.01 J	±.01 K	IN-LINE DOWEL	SCREW SIZE
MRH 10	10	26.924	11.12	44.5	39.9	9.5	19.05	7.50	9.00	6	M8
MRH 13	13	29.972	14.27	50.8	48.3	12.7	19.05	6.50	12.00	6	M8
MRH 16	16	31.750	15.87	54.0	51.6	14.3	19.05	6.00	13.50	6	M8
MRH 20	20	33.528	17.47	60.3	58.2	17.5	19.05	5.00	16.50	6	M10
MRH 25	25	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRH 32	32	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRH 40	40	43.993	24.00	77.4	77.8	26.0	27.00	10.00	26.00	6	M12

## Light Duty

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER	D DIA.	±.01 E	G	L	W	R	H	±.01 J	±.01 K	IN-LINE DOWEL	SCREW SIZE
MRL 06	06	23.000	11.10	41.3	37.8	8.0	19.00	9.00	8.00	3*	M6
MRL 10	10	26.924	11.12	44.5	39.9	9.5	19.05	7.50	9.00	6	M8
MRL 13	13	29.972	14.27	50.8	48.3	12.7	19.05	6.50	12.00	6	M8
MRL 16	16	31.750	15.87	54.0	51.6	14.3	19.05	6.00	13.50	6	M8
MRL 20	20	33.528	17.47	60.3	58.2	17.5	19.05	5.00	16.50	6	M10
MRL 25	25	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRL 32	32	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRL 38	38	43.993	24.00	77.4	77.8	26.0	27.00	10.00	26.00	6	M12

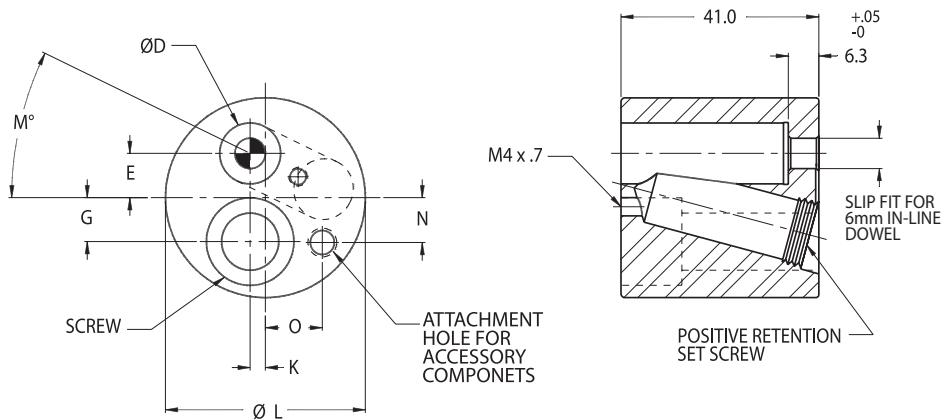




# BALL LOCK RETAINERS



## ECONOMY ROUND TRUE SET HEAVY DUTY



Manufactured under US Patent 8,459,161 B2  
European Patent EP 2004368

FOR ACCESSORIES AND SHIM PLATES SEE PAGE 57-62.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

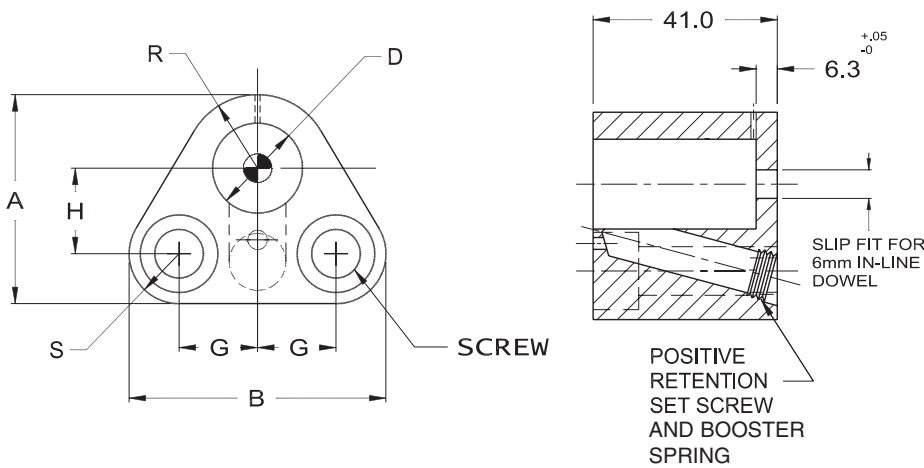
CATALOG NUMBER	ØD	ØL	E	G	K	M	N	O	SCREW SIZE	IN-LINE DOWEL	ATTACHMENT HOLE
MRR 10	10.00	38.1	9.86	7.10	2.65	20.5°	4.47	12.72	M12	6	M6 x 1.0
MRR 13	13.00	41.3	9.25	9.17	3.18	26°	9.35	11.88	M12	6	M6 x 1.0
MRR 16	16.00	44.5	9.10	11.07	1.93	33.5°	10.21	13.16	M12	6	M6 x 1.0
MRR 20	20.00	57.2	12.20	14.30	0	30°	9.35	19.40	M16	6	M8 x 1.25
MRR 25	25.00	63.5	12.51	17.50	0	30°	14.27	20.17	M16	6	M8 x 1.25
MRR 32	32.00	76.2	15.67	20.83	0	30°	15.46	26.12	M20	6	M8 x 1.25
MRR 40	40.00	82.6	15.39	23.55	0	30°	15.46	26.12	M20	6	M8 x 1.25



# BALL LOCK RETAINERS



## MINI TRUE SET



Manufactured under Patent No.'s 0351395, 5357835

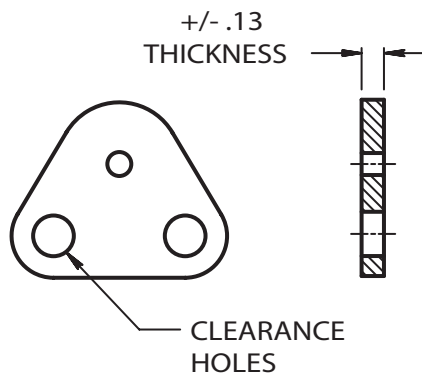
FOR ACCESSORIES SEE PAGES 57-62.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

## Heavy Duty

CATALOG NUMBER	DIA.	A	B	G	H	R	S	SCREW SIZE
MRM 10	10	37.8	40.6	11.1	19.0	9.5	9.2	M8
MRM 13	13	40.3	47.6	14.3	19.0	11.7	9.5	M8
MRM 16	16	42.1	50.8	15.9	19.0	13.5	9.5	M8
MRM 20	20	46.5	57.1	17.5	19.0	16.4	11.1	M10
MRM 25	25	56.5	65.1	19.8	23.8	20.0	12.7	M12
MRM 32	32	58.2	64.0	19.8	23.8	22.2	12.2	M12
MRM 40	40	67.3	76.2	24.0	27.0	26.0	14.3	M12

## SHIM PLATES



Available Thickness	Ordering Number
3.0	030
6.0	060
10.0	100
13.0	130

CATALOG NUMBER
MAM 10-
MAM 13-
MAM 16-
MAM 20-
MAM 25-
MAM 32-
MAM 40-

INSERT SHIM  
ORDERING NUMBER

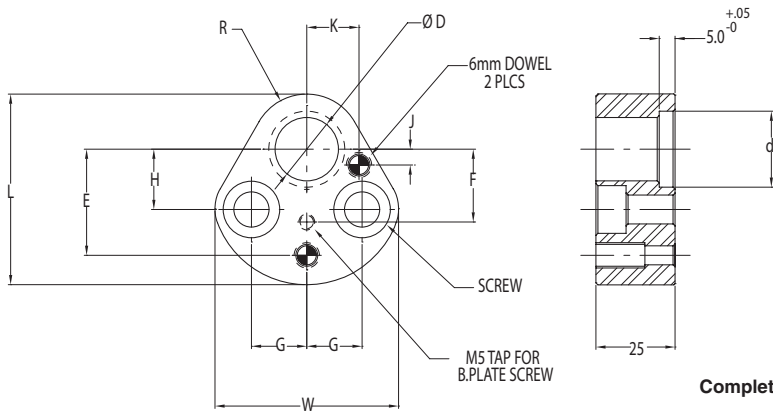
ORDERING EXAMPLE  
MAM 16-060



# SHOULDER PUNCH RETAINERS



## TRUE SET MRN STYLE For Round Punches

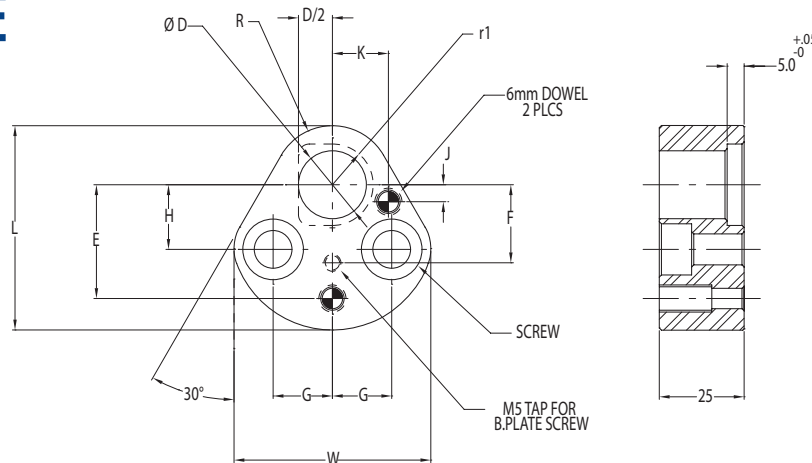


FOR ACCESSORIES AND BACKING PLATES  
SEE PAGES 57-62.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER	D	d1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRN 10	10	14.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRN 13	13	17.0	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRN 16	16	20.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRN 20	20	24.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRN 25	25	29.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRN 32	32	36.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12

## MRO STYLE For Shaped Punches



Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER	D	r1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRO 10	10	7.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRO 13	13	8.5	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRO 16	16	10.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRO 20	20	12.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRO 25	25	14.5	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRO 32	32	18.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12

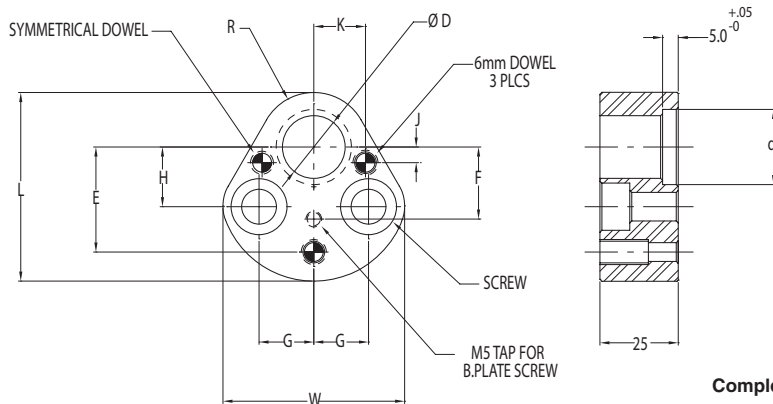


# SHOULDER PUNCH RETAINERS



## TRUE SET MRP STYLE

with Symmetrical 3rd Dowel  
For Round Punches

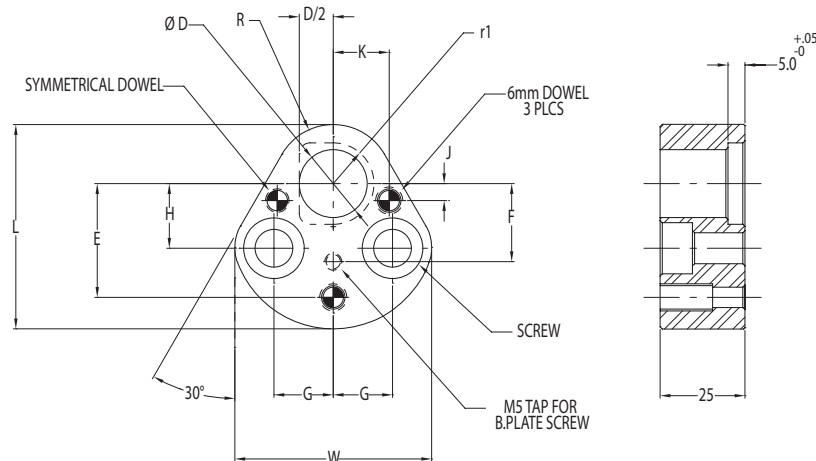


FOR ACCESSORIES AND BACKING PLATES  
SEE PAGES 57-62.

Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

CATALOG NUMBER	D	d1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRP 10	10	14.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRP 13	13	17.0	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRP 16	16	20.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRP 20	20	24.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRP 25	25	29.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRP 32	32	36.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRP 40	40	44.0	77.4	77.8	26.0	27.00	10.00	26.00	24.00	43.993	33.35	M12

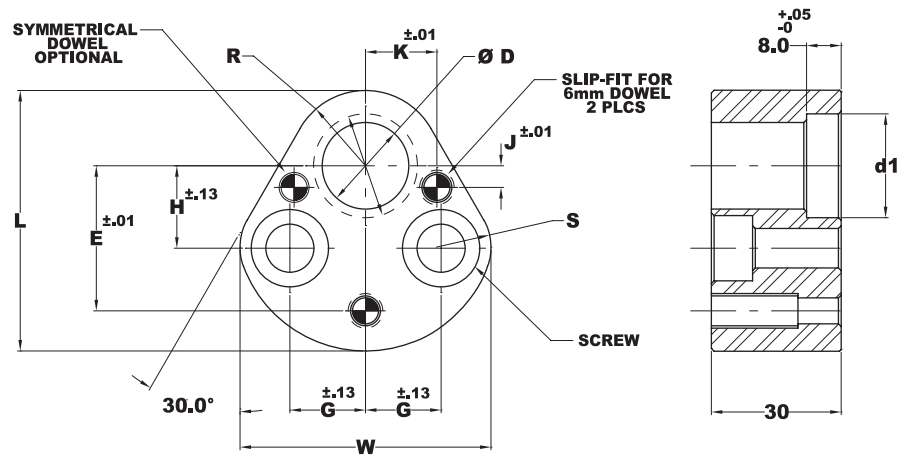
## MRQ STYLE with Symmetrical 3rd Dowel For Shaped Punches



Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

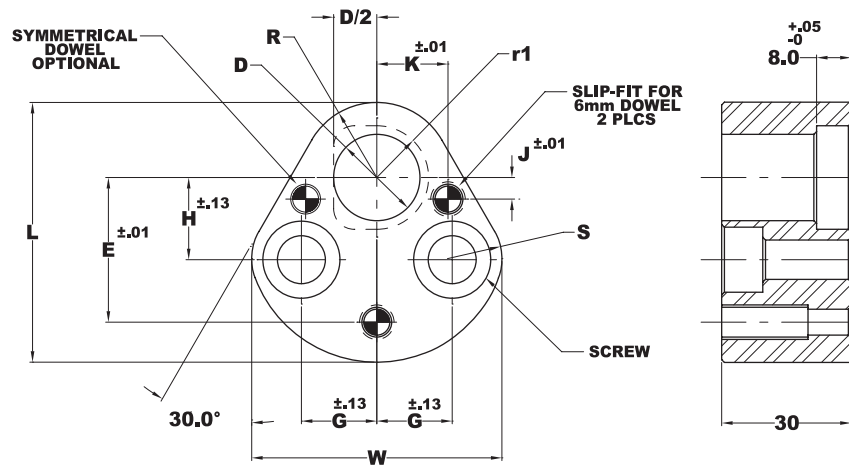
CATALOG NUMBER	D	r1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRQ 10	10	7.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRQ 13	13	8.5	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRQ 16	16	10.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRQ 20	20	12.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRQ 25	25	14.5	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRQ 32	32	18.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRQ 40	40	22.0	77.4	77.8	26.0	27.00	10.00	26.00	24.00	43.993	33.35	M12

## XMRN STYLE FOR ROUND PUNCHES



PART NUMBER	D	d1	L	W	R	H	J	K	S	G	E	SCREW SIZE
XMRN-10	10.00	15.5	44.5	43.7	9.5	19.0	7.5	9.0	12.0	11.1	26.925	M8
XMRN-13	13.00	18.5	50.8	50.0	12.7	19.0	6.5	12.0	15.2	14.3	29.970	M8
XMRN-16	16.00	21.5	54.0	53.2	14.3	19.0	6.0	13.5	16.8	15.9	31.750	M8
XMRN-20	20.00	25.5	60.3	59.5	17.5	19.0	5.0	16.5	20.0	17.5	33.530	M10
XMRN-25	25.00	30.5	69.9	69.1	22.2	23.8	7.0	22.0	24.7	19.8	40.640	M12

## XMRO STYLE FOR SHAPED PUNCHES

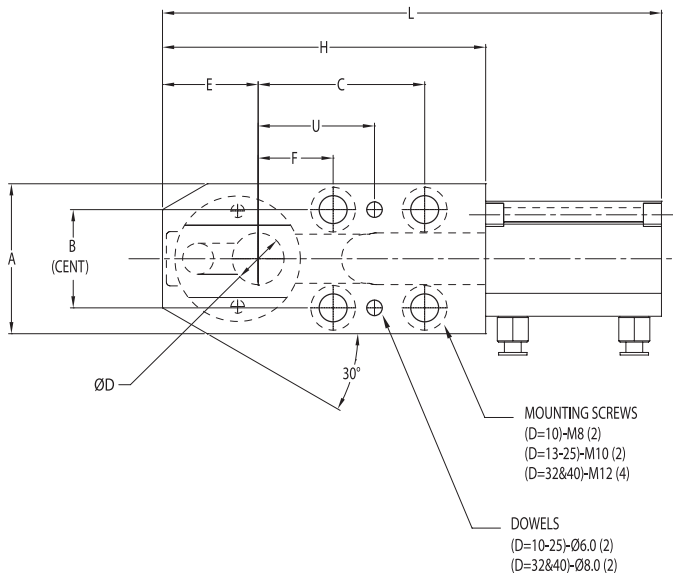


PART NUMBER	D	r1	L	W	R	H	J	K	S	G	E	SCREW SIZE
XMRO-10	10.00	7.75	44.5	43.7	9.5	19.0	7.5	9.0	12.0	11.1	26.925	M8
XMRO-13	13.00	9.25	50.8	50.0	12.7	19.0	6.5	12.0	15.2	14.3	29.970	M8
XMRO-16	16.00	10.75	54.0	53.2	14.3	19.0	6.0	13.5	16.8	15.9	31.750	M8
XMRO-20	20.00	12.75	60.3	59.5	17.5	19.0	5.0	16.5	20.0	17.5	33.530	M10
XMRO-25	25.00	15.25	69.9	69.1	22.2	23.8	7.0	22.0	24.7	19.8	40.640	M12

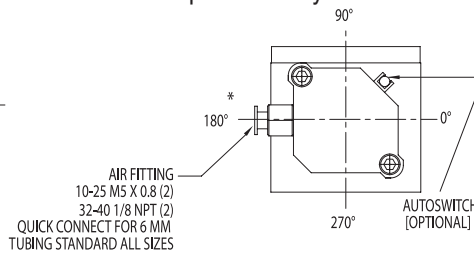
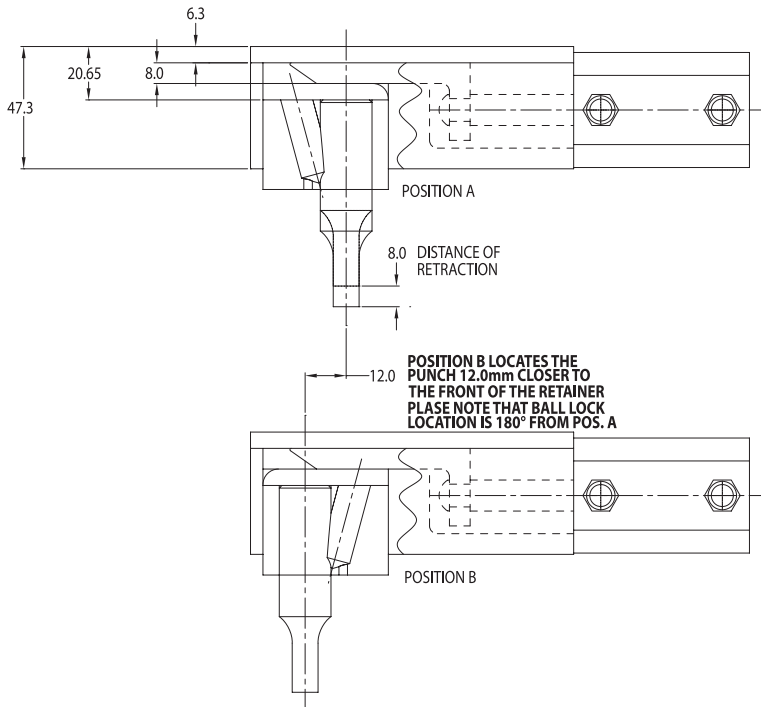
# RETRACTABLE RETAINERS



## BALL-LOCK STYLE/HEAVY DUTY



Moeller dual-position ball lock retractable retainers provide the capability to add, or subtract, holes quickly without affecting demanding production schedules, and without the added cost of additional tooling. Moeller dual-position ball lock retractable retainers are available to conform to NAAMS, and leading automotive standards. Position B facilitates close-space applications by moving the punch 12mm closer to the front end of the retainer. Moeller dual-position ball lock retainers feature a strong and convenient one-piece body, eliminating the need for a separate safety shield.



RECOMMENDED AIR PRESSURE:  
4.60-5.3 kgf/cm<sup>2</sup> (65-75 PSI)

MINIMUM PRESSURE:  
3.2 kgf/cm<sup>2</sup> (45 PSI)

MAXIMUM PRESSURE:  
10.2 kgf/cm<sup>2</sup> (145 PSI)

NOTE:  
CHANGE RETAINER SET INCLUDES ALL NECESSARY SCREWS AND DOWELS, AIR CYLINDER AND FITTINGS. TUBING FOR AIR SUPPLY AND AUTOSWITCH ARE NOT INCLUDED AND MUST BE ORDERED SEPARATELY.  
CONSULT FACTORY FOR ADDITIONAL ACCESSORIES.

CATALOG NUMBER	D	L	A	±.01 B	C		E		F		H	U ±.01		SCREW SIZE
					POS.A	POS.B	POS.A	POS.B	POS.A	POS.B		POS.A	POS.B	
MRA 10	10	161	46	30			28	16	21	33	93.5	37	49	M8
MRA 13	13	172.5	50	30			28	16	25	37	100	41	53	M10
MRA 16	16	177	50	30			31	19	25	37	104.5	41	53	M10
MRA 20	20	191.5	58	38			32.5	20.5	29	41	113.5	45	57	M10
MRA 25	25	206.5	58	38			35	23	29	41	123.5	45	57	M10
MRA 32	32	260	80	56	100	112	38	26	38	50	152	60	72	M12
MRA 40	40	264	80	56	100	112	42	30	38	50	156	60	72	M12

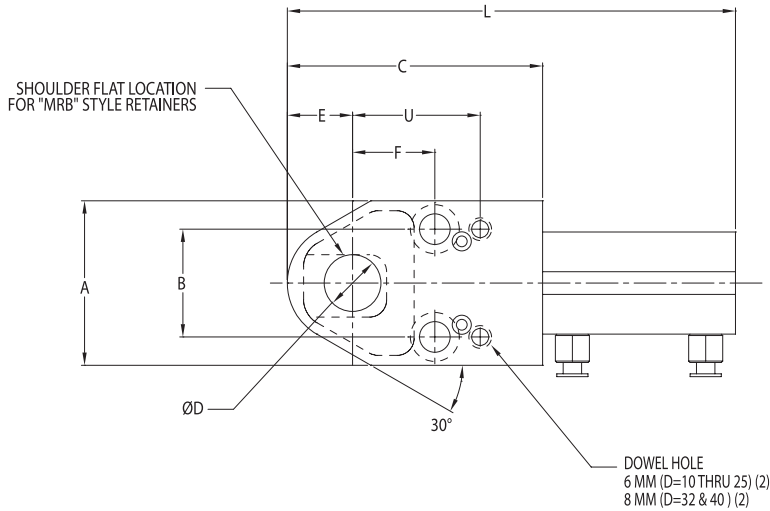
ORDERING EXAMPLE: MRA 13, OR MRA 13 POSITION B



# RETRACTABLE RETAINERS



## SHOULDER STYLE



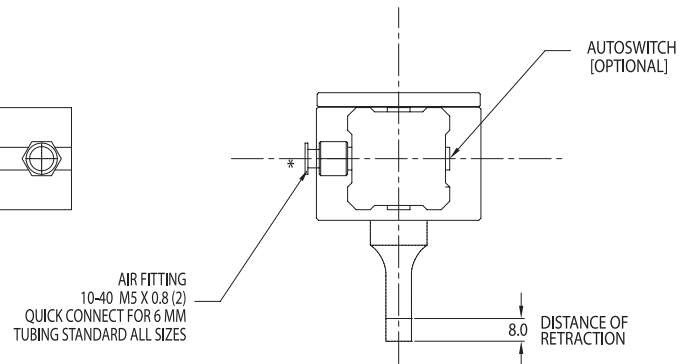
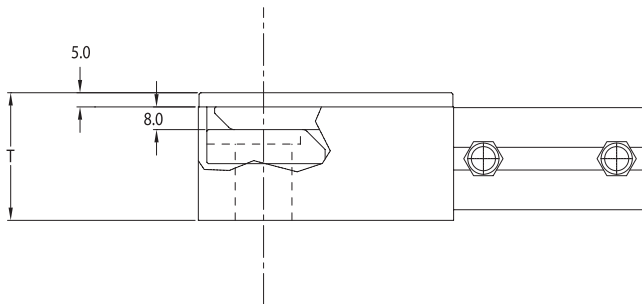
Moeller shoulder retractable retainers provide the capability to add, or subtract, holes quickly without affecting demanding production schedules, and without the added cost of additional tooling. Moeller shoulder retractable retainers feature a strong and convenient one-piece body, eliminating the need for a separate safety shield.

RECOMMENDED AIR PRESSURE:  
4.60-5.3 kgf/cm<sup>2</sup> (65-75 PSI)

MINIMUM PRESSURE:  
3.2 kgf/cm<sup>2</sup> (45 PSI)

MAXIMUM PRESSURE:  
10.2 kgf/cm<sup>2</sup> (145 PSI)

NOTE:  
CHANGE RETAINER SET INCLUDES ALL NECESSARY SCREWS AND DOWELS, AIR CYLINDER AND FITTINGS. TUBING FOR AIR SUPPLY AND AUTOSWITCH ARE NOT INCLUDED AND MUST BE ORDERED SEPARATELY. CONSULT FACTORY FOR ADDITIONAL ACCESSORIES.



ROUND PUNCH CATALOG NUMBER	SHAPED PUNCH CATALOG NUMBER	D	L	A	±.01 B	C	E	F	T	±.01 U	SCREW SIZE
MRC 10	MRB 10	10	128	46	30	73	18	25	45	41	M8
MRC 13	MRB 13	13	128	49	30	73	18	25	45	41	M10
MRC 16	MRB 16	16	128	49	30	73	18	25	45	41	M10
MRC 20	MRB 20	20	155	58	38	90	23	29	45	45	M10
MRC 25	MRB 25	25	155	58	38	90	23	29	45	45	M10
MRC 32	MRB 32	32	208	80	56	125	33	38	55	60	M12
MRC 40	MRB 40	40	208	80	56	125	33	38	55	60	M12

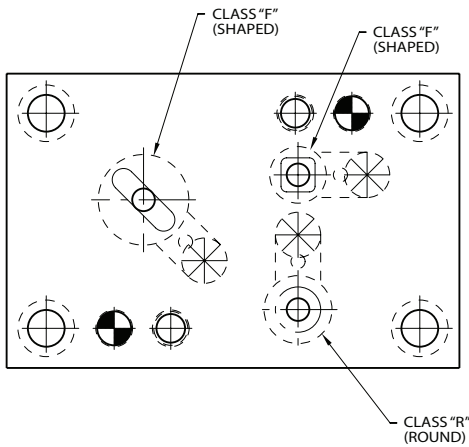
ORDERING EXAMPLE: MRC 13 (FOR ROUND POINT PUNCH)  
ORDERING EXAMPLE: MRB 13 (FOR SHAPED POINT PUNCHES - PLEASE NOTE FLAT LOCATION WHEN ORDERING PUNCHES)

# SPECIAL MULTI HOLE BALL-LOCK RETAINERS

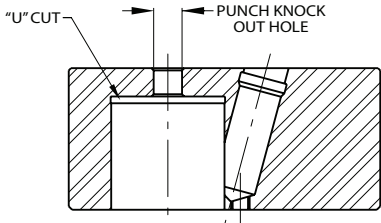
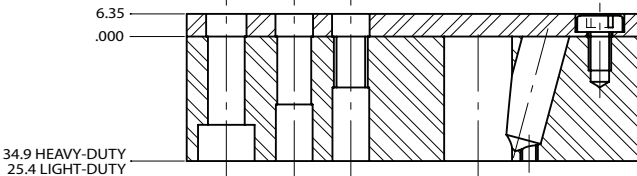
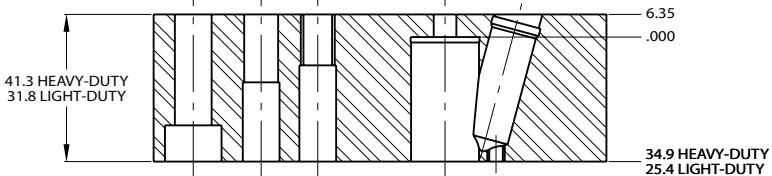
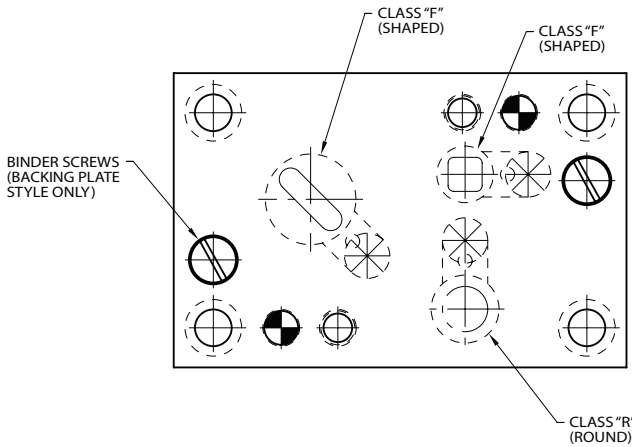


Shown below are examples of the two styles of Special Multi-Hole Ball Lock Retainers offered by Moeller Precision Tool. The True Set Style is Moeller's patented one piece construction, through hardened retainer. The conventional Backing Plate Style is supplied with a hardened Backing Plate attached by fasteners to the Retainer. All Ball Lock retainer punch or button holes must be designated as Round, class "R" or Shaped, class "F". Where shaped components are being used, the angle holes are precision ground. This guarantees radial location, but adds cost to the retainer. **Note: Ball-Seat class "R" will be supplied unless otherwise specified.**

## TRUE SET STYLE



## BACKING PLATE STYLE



### DETAIL VIEW OF PUNCH HOLE SPECIAL FEATURES:

- \*AN EXCLUSIVE PATENTED MOELLER PRODUCT PATENT NO.'s 0351395 & 5357835
- INTERNATIONAL PATENT PENDING
- \*ONE-PIECE CONSTRUCTION

### TOLERANCES ALL TYPES

OUTSIDE EDGES	± .5
DOWEL HOLE LOCATIONS	± .01
SCREW HOLE LOCATIONS	± .1
COMPONENT HOLE LOCATIONS	± .01

CLASS	BALL-HOLES	RADIAL TOL.
R	.....	± 5°
F	.....	± .0°5'

# RETAINER COMPONENTS





## TRUE SET RETAINER COMPONENTS

	TRUE SET RETAINER	SOC.HD. CAP SCREW	DOWELS	BALL	SPRING	BALL RELEASE SCREW	ANGLE HOLE SET SCREW
HEAVY DUTY	MRH 10	MAC 8-45 M8 x 45	MAD 6-20 6mm x 20	MAB 10 10mm	MAS 10 (W/CLIP) MAS 10T (W/SCREW) 10mm	MAC 4-20 M4 X 20	MAN 10
	MRH 13			MAB 12 12mm	MAS 12 (W/CLIP) MAS 12T (W/SCREW) 12mm 13mm/40mm		MAN 12
	MRH 16						
	MRH 20	MAC 10-50 M10 x 50					
	MRH 25	MAC 12-50 M12 x 50					
	MRH 32						
MRH 40							
LIGHT DUTY	MRL 06	MAC 6-35 M6 X 35	MAD 3-20 3mm x 20 MAD 6-20 6mm x 20	MAB 6 6mm	MAS 6 6mm	MAC 3-15 M3 x 15	
	MRL 10	MAC 8-35 M8 x 35	MAD 6-20 6 mm x 20	MAB 8 8mm	MAS 8 8mm	MAC 4-20 M4 x 20	
	MRL 13						
	MRL 16						
	MRL 20	MAC 10-40 M10 x 40					
	MRL 25	MAC 12-40 M12 x 40					
	MRL 32						
	MRL 38						

### SPECIAL BACKING PLATE RETAINER ACCESSORIES

	SPRINGS	BALLS
6 DIA.	MAS 6S	MAB 6
8 DIA.	MAS 8S	MAB 8
10 DIA.	MAS 10S	MAB 10
12 DIA.	MAS 12S	MAB 12

### BOOSTER SPRINGS

	PUNCH SIZE 10 MM HDBL  CATALOG # MAS010B
	PUNCH SIZE 13 THRU 40 MM HDBL  CATALOG # MAS012B

## ECONOMY ROUND TRUE SET RETAINER COMPONENTS

TRUE SET ROUND RETAINER	SOC. HD. CAP SCREW	DOWELS	BALL	SPRING	BALL RELEASE SCREW	ANGLE HOLE SET SCREW
MRR 10	MAC 12-50 TL M12-1.75 x 50mm	MAD 6-20 6mm X 20	MAB 10 10mm	MAS 10T 10 mm	MAC 4-20 4mm X 20	MAN 10
MRR 13			MAB 12 12mm	MAS 12T 12mm		MAN 12
MRR 16						
MRR 20	MAC 16-50 TL M16-2.0 x 50mm					
MRR 25	MAC 20-50 TL M20-2.5 x 50mm					
MRR 32						
MRR 40						

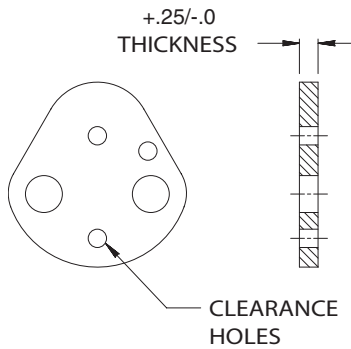
## SHOULDER TRUE SET RETAINER COMPONENTS

TRUE SET SHOULDER RETAINER	SOC. HD. CAP SCREW	DOWELS	TRUE SET SHOULDER RETAINER	SOC. HD. CAP SCREW	DOWELS
MRN 10	CAT#: MAC 8-35 DESC: M8 x 35	MAD 6-20 6mm x 20	MRO-10	CAT#: MAC 8-35 DESC: M8 x 35	MAD 6-20 6mm x 20
MRN 13			MRO-13		
MRN 16			MRO-16		
MRN 20	CAT#: MAC 10-40 DESC: M10 x 40		MRO-20	CAT#: MAC 10-40 DESC: M10 x 40	
MRN 25	CAT#: MAC 12-40 DESC: M12 x 40		MRO-25	CAT#: MAC 12-40 DESC: M12 x 40	
MRN 32			MRO-32		

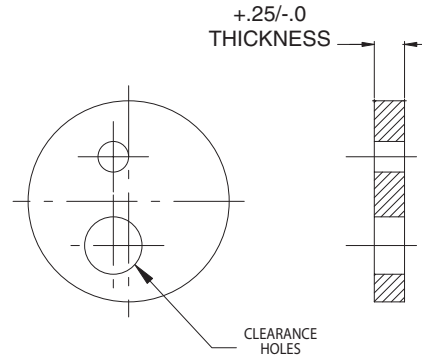
# RETAINER ACCESSORIES



## TRUE SET SHIM PLATES



Available Thickness	Ordering Number
1.80	018
3.00	030
3.18	031
4.75	047
6.00	060
6.35	063
10.00	100
13.00	130



CATALOG NUMBER
MAX 10-
MAX 13-
MAX 16-
MAX 20-
MAX 25-
MAX 32-
MAX 40-

INSERT SHIM THICKNESS

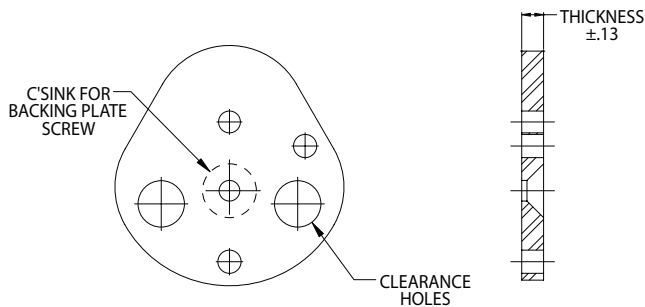
ORDERING EXAMPLE  
MAX 13-031

CATALOG NUMBER
MAY 10-
MAY 13-
MAY 16-
MAY 20-
MAY 25-
MAY 32-
MAY 40-

INSERT SHIM THICKNESS

ORDERING EXAMPLE  
MAY 13-031

## TRUE SET SHOULDER RETAINER BACKING PLATES



CATALOG NUMBER
MAW 10-
MAW 13-
MAW 16-
MAW 20-
MAW 25-
MAW 32-
MAW 40-

Available Thickness	Ordering Number
4.75	047
6.35	063

HARDENED TO R/C 50-52

ORDERING EXAMPLE  
MAW 13-047

INSERT BACKING PLATE THICKNESS

## BALL RELEASE TOOLS

ANGLE TIP  
(for all Retainers)

Cat. No. MAT 01



STRAIGHT TIP  
(for all Retainers)

Cat. No. MAT 02



THREADED TIP HEAVY DUTY  
(for True Set Retainers) 10-40 Diameter

Cat. No. MAT 03



THREADED TIP LIGHT DUTY  
(for True Set Retainers) 10-25 Diameter

Cat. No. MAT 04



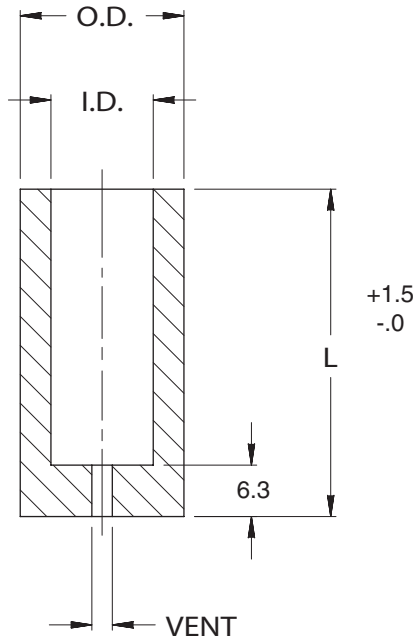
ANGLE HOLE SET SCREW TOOL  
(for True Set Retainers)

Cat. No. MAO 01



# URETHANE STRIPPERS

## CLOSED END



CATALOG NUMBER	I.D.	O.D.	LENGTH L	APPROXIMATE PRESSURE AVAILABLE AT DEFLECTION OF		
				3.0	6.5	9.5
MTC 06-45	06	19	45	1324	2256	—
MTC 06-53			53	1079	1863	—
MTC 06-71			71	686	1079	1765
MTC 08-45	08	21	45	1471	2207	—
MTC 08-53			53	1324	1961	2942
MTC 08-71			71	981	1618	2648
MTC 10-45	10	23	45	1716	2795	—
MTC 10-53			53	1422	2452	3187
MTC 10-56			56	1422	2452	3187
MTC 10-71			71	1128	2010	2697
MTC 13-45	13	26	45	2109	3334	—
MTC 13-53			53	1471	2354	3432
MTC 13-56			56	1471	2354	2942
MTC 13-71			71	1275	1961	2452
MTC 16-45	16	30	45	2354	3825	—
MTC 16-53			53	2158	3531	4511
MTC 16-56			56	2158	3431	4511
MTC 16-71			71	1814	2942	3825
MTC 20-45	20	38	45	2452	3923	—
MTC 20-53			53	2158	3629	5590
MTC 20-71			71	1618	2942	4658
MTC 25-45	25	50	45	9317	14318	—
MTC 25-53			53	7355	11572	15985
MTC 25-71			71	4904	8336	13485

VENT	I.D.'s
1.6	06-10
3.2	13-25

**CLOSED END** urethane strippers are shaped to suit the punch point by closing the die – without the material – the point and the die cavity provide the shearing action to shape the closed end.

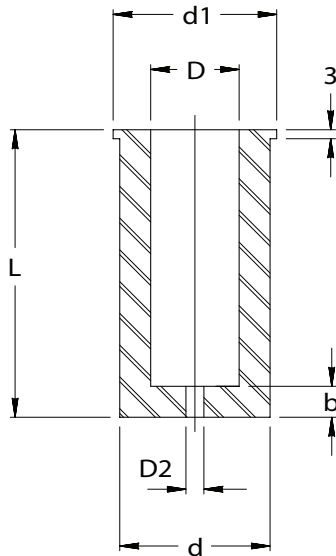
Urethane provides an excellent balance of load bearing and memory rate, with a tensile strength of 30,250 newtons. Deflections greater than 25% are not recommended. For optimum life in high speed continuous operations, a 15% deflection is suggested.

**Durometer hardness 95 Shore A.**

# TRUE SET STRIPPERS



- Innovative One-Piece construction
- Patented cost savings “Snap in” retention feature
- Interchangeable and complies with NAAMS standards
- Precision machined to assure perpendicularity resulting in prolonged Urethane life



## URETHANE STRIPPERS

Stripper Catalog Number	Punch Shank	Press Fit D	d	L	d1	d2	b
MTS10 - 44	10	9.75	18	44	21	1.6	6
MTS10 - 54	10	9.75	18	54	21	1.6	6
MTS10 - 64	10	9.75	18	64	21	1.6	6
MTS10 - 74	10	9.75	18	74	21	1.6	6
MTS13 - 44	13	12.75	23	44	26	3.0	6
MTS13 - 54	13	12.75	23	54	26	3.0	6
MTS13 - 64	13	12.75	23	64	26	3.0	6
MTS13 - 74	13	12.75	23	74	26	3.0	6
MTS16 - 44	16	15.75	28	44	31	3.0	6
MTS16 - 54	16	15.75	28	54	31	3.0	6
MTS16 - 64	16	15.75	28	64	31	3.0	6
MTS16 - 74	16	15.75	28	74	31	3.0	6
MTS20 - 44	20	19.75	33	44	36	3.0	7
MTS20 - 54	20	19.75	33	54	36	3.0	7
MTS20 - 64	20	19.75	33	64	36	3.0	7
MTS20 - 74	20	19.75	33	74	36	3.0	7
MTS25 - 44	25	24.75	40	44	43	3.0	7
MTS25 - 54	25	24.75	40	54	43	3.0	7
MTS25 - 64	25	24.75	40	64	43	3.0	7
MTS25 - 74	25	24.75	40	74	43	3.0	7
MTS32 - 44	32	31.70	50	44	55	3.0	7
MTS32 - 54	32	31.70	50	54	55	3.0	7
MTS32 - 64	32	31.70	50	64	55	3.0	7
MTS32 - 74	32	31.70	50	74	55	3.0	7
MTS40 - 44	40	39.70	60	44	65	3.0	8
MTS40 - 54	40	39.70	60	54	65	3.0	8
MTS40 - 64	40	39.70	60	64	65	3.0	8

## URETHANE HARDNESS 95 SHORE A

Heavy Duty Ball Lock Punch Length	Light Duty Ball Lock Punch Length	Recommended Stripper Length "L"
80	71	43
90	80	52
100	90	63
110	100	72

Moeller reserves the right to modify, correct or improve this literature or products without notice.

# TRUE SET STRIPPER RETAINERS

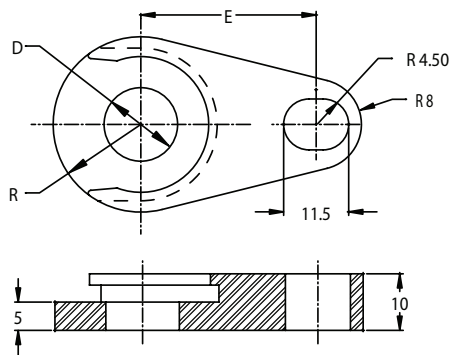


- Innovative One-Piece construction
- Patented cost savings “Snap in” retention feature
- Interchangeable and complies with NAAMS standards
- Precision machined to assure perpendicularity resulting in prolonged Urethane life
- Adaptable to special multi-hole Retainers



## MTR STYLE STRIPPER RETAINER

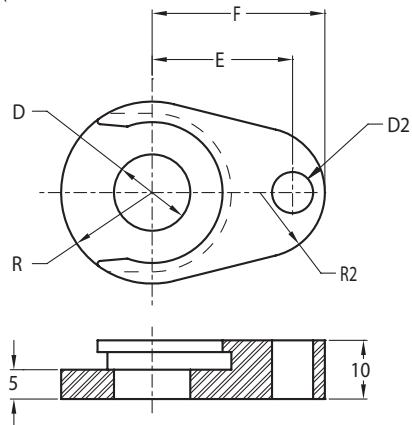
(To be used with Standard MRH True Set Retainer)



Catalog No.	D	R	E
MTR 10	10	13	28
MTR 13	13	15.5	31
MTR 16	16	18	32.9
MTR 20	20	20.5	34.8
MTR 25	25	24	39.8
MTR 32	32	31	41.3
MTR 40	40	36	45

## MTP STYLE STRIPPER RETAINER

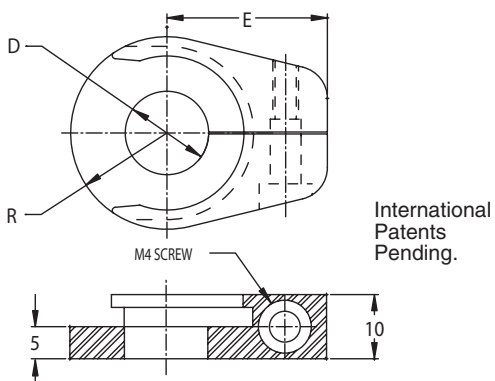
(To be used with the Round MRR True Set Retainer)



Catalog No.	D	R	E	F	D2	R2
MTP 10	10	13.0	21.0	26.5	7	10.0
MTP 13	13	15.5	23.9	29.4	7	11.0
MTP 16	16	18.0	24.5	30.0	7	12.8
MTP 20	20	20.5	29.0	36.0	9	11.8
MTP 25	25	24.0	33.5	40.5	9	12.9
MTP 32	32	31.0	40.6	49.3	9	8.0
MTP 40	40	36.0	44.0	53.0	9	8.0

## MTM STYLE STRIPPER RETAINER

(To be used with MRM and Multi Hole Retainer)



International Patents Pending.

Catalog No.	D	R	E
MTM 10	10	13	22.5
MTM 13	13	15.5	25
MTM 16	16	18	27.5
MTM 20	20	20.5	30
MTM 25	25	24	35.5
MTM 32	32	31	37.5
MTM 40	40	36	42.3

U.S. Patent No. 7,707,919B1 International Patents Pending.



# NOSE LARGE STRIPPER RETAINERS

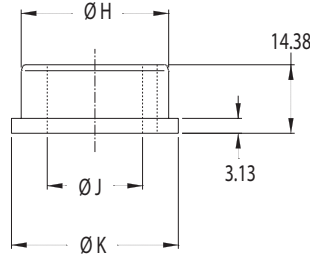
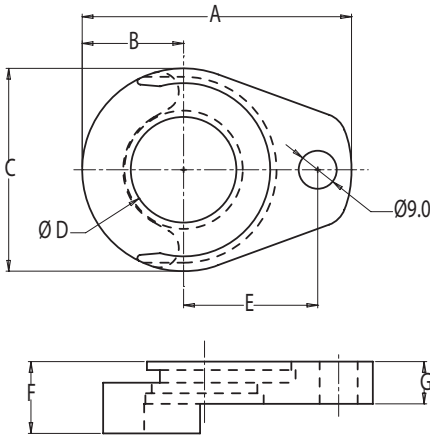


- Innovative One-Piece construction
- Patented cost savings “Snap in” retention feature
- Interchangeable and complies with NAAMS standards
- Precision machined to assure perpendicularity resulting in prolonged Urethane life



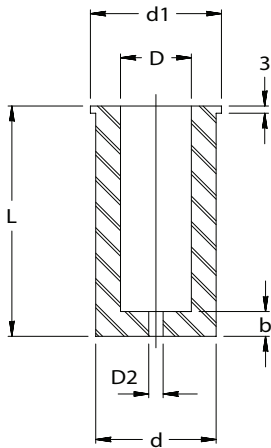
## NOSE LARGE STRIPPER RETAINER

(To be used with the Standard MRH True Set Retainer)



U.S. Patent No. 7,707,919B1 International Patents Pending.  
\*XX = “L” DIMENSION OF URETHANE

CATALOG TYPE	SHANK Ø	MAX P/G	A	B	C	D	E	F	G	H	J	K	*USE WITH URETHANE
MTB010016	10.0	15.75	53.18	18.0	36	16	26.93	17	10	15.75	10	19	MTS16-XX
MTB013020	13.0	19.75	58.60	20.5	41	20	29.97	17	10	19.75	13	23	MTS20-XX
MTB016025	16.0	24.75	63.75	24.0	48	25	31.75	17	10	24.75	16	28	MTS25-XX
MTB020032	20.0	31.75	73.86	31.0	62	32	33.53	17	10	31.70	20	34	MTS32-XX
MTB025040	25.0	39.75	83.63	36.0	72	40	40.64	17	10	39.70	25	44	MTS40-XX
MTB032040	32.0	39.75	83.63	36.0	72	40	40.64	18	10	39.70	32	44	MTS40-XX



## URETHANE HARDNESS 95 SHORE A

Heavy Duty Ball Lock Punch Length	Recommended Stripper Length “L”
80	43
90	52
100	63

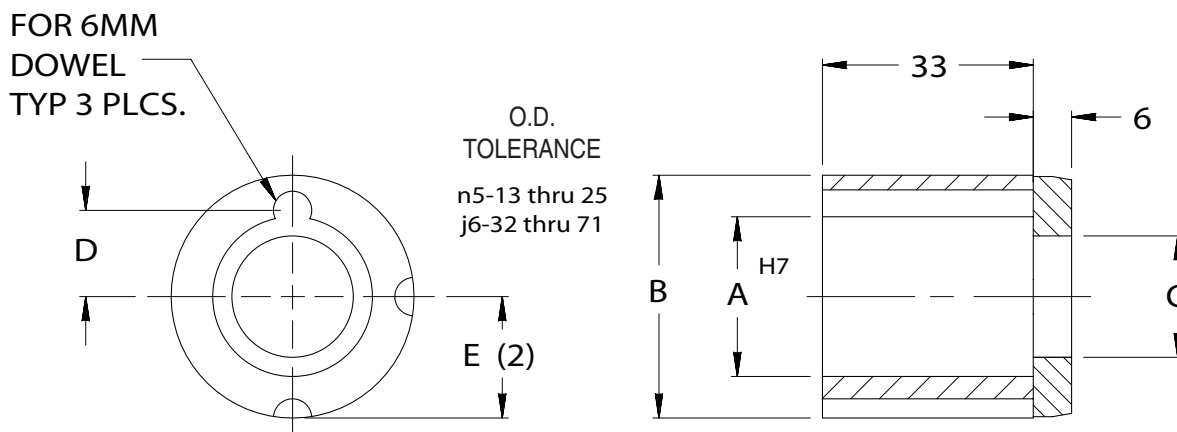
NOTE: THE FOLLOWING CHART DENOTES THE REQUIRED URETHANE FOR CORRESPONDING STRIPPER RETAINER ABOVE.

CATALOG TYPE	SHANK Ø	L +1.0/-0.6 STRIPPER LENGTHS	D	d1	d	b	D2
*MTS16-XX TO BE USE ON MTB010016	10.0	44	15.75	31	28	6	3
		54					
		64					
*MTS20-XX TO BE USE ON MTB013020	13.0	44	19.75	36	33	7	3
		54					
		64					
*MTS25-XX TO BE USE ON MTB016025	16.0	44	24.75	43	40	7	3
		54					
		64					
*MTS32-XX TO BE USE ON MTB020032	20.0	44	31.7	55	50	7	3
		54					
		64					
*MTS40-XX TO BE USE ON MTB025040	25.0	44	39.7	65	60	8	3
		54					
		64					
*MTS40-XX TO BE USE ON MTB032040	32.0	44	39.7	65	60	8	3
		54					
		64					

# SPECIAL TOOLING

## RELOCATION BUSHINGS

- Relocate Die Buttons up to 5mm eliminating the need of plugging or welding existing hole.
- Maintain the use of pre-existing Die Buttons.
- Cost effective method to relocate a Dowel Location.



CATALOG TYPE	A	B	C	D	E
MAR 13	13	25	9	8.2	13.5
MAR 16	16	32	10	9.0	16.0
MAR 20	20	32	14	11.0	16.0
MAR 25	25	38	19	13.5	19.0
MAR 32	32	45	26	16.0	22.5
MAR 38	38	50	32	19.0	25.0
MAR 45	45	56	39	22.5	28.0
MAR 50	50	63	44	25.0	31.5
MAR 56	56	71	50	28.0	35.5
MAR 63	63	82	57	31.5	41.0
MAR 71	71	89	65	35.5	44.5

# EJECTOR COMPONENTS


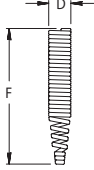



## PUNCH EJECTOR COMPONENTS

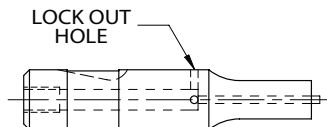
### Ejector Punch Dimensional Specifications

SHANK DIA. D	EJECTOR SPECIFICATION	DRILL PIN HOLE	SIZE SPRING HOLE	SCREW SIZE	CROSS HOLE SIZE	PIN EXTENSION
5.0 SHOULDER	MAE 2	.64	2.18	M2.6	.81	.81±.25
6.0 ALL	MAE 3	.79	2.64	M3	.81	.81±.25
8.0 SHOULDER 10.0 BALL-LOCK	MAE 4	1.17	3.45	M4	1.57	1.57±.38
10.0 SHOULDER 13.0 ALL 16.0 BALL-LOCK	MAE 5	1.58	4.37	M5	1.57	1.57±.38
16.0 SHOULDER 20.0 ALL 25.0 ALL 32.0 ALL 40.0 ALL	MAE 6	2.36	5.18	M6	1.57 — —	1.57±.38
CONSULT FACTORY	MAE 12	3.18	7.13	M8 X 1.25	—	

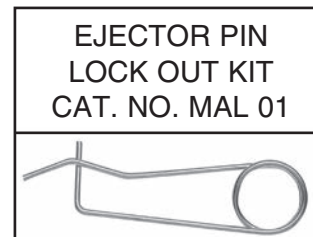
### Ejector Component Specifications

PART DESCRIPTION	SPEC. DESCRIPTION	MAE 2	MAE 3	MAE 4	MAE 5	MAE 6	MAE 12
SET SCREW 	THREAD SIZE "T"	M2.6	M3	M4	M5	M6	M8
	LENGTH "L"	5.0	5.0	5.0	5.0	6.0	6.0
SPRING 	DIAMETER "D" $\begin{matrix} +.0 \\ -.25 \end{matrix}$	1.98	2.38	3.30	4.16	5.05	6.86
	FREE-LENGTH "F" $\begin{matrix} +1.5 \\ -0 \end{matrix}$	60.4	60.4	81.0	81.0	81.0	81.0
	PRESSURE (3.0 PRE-LOAD)	2.22	3.34	4.45	6.67	8.9	8.9
PIN 	BODY DIAMETER "N" ±.025	.48	.69	1.04	1.47	2.26	3.05
	LENGTH "L" $\begin{matrix} +1.5 \\ -0 \end{matrix}$	35.0	35.0	49.3	49.3	63.5	76.20
	HEAD DIAMETER "H" +.025	1.20	1.98	2.39	3.18	4.01	4.75
	HEAD THICKNESS "T" ±.13	.81	1.17	1.57	1.57	2.39	2.39

CATALOG NUMBERS			
ASSEMBLY	PIN	SPRING	SCREW
MAE 2	MAE 2P	MAE 2S	MAE 2C
MAE 3	MAE 3P	MAE 3S	MAE 3C
MAE 4	MAE 4P	MAE 4S	MAE 4C
MAE 5	MAE 5P	MAE 5S	MAE 5C
MAE 6	MAE 6P	MAE 6S	MAE 6C
MAE 12	MAE 12P	MAE 12S	MAE 12C



Note: Not available on shank diameters of 32mm and above, shoulder and ball lock.



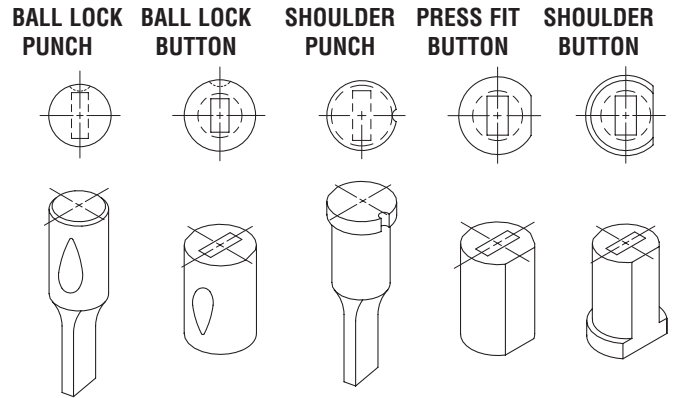
Set includes 12 pcs. of each size.

# LOCATING DEVICES

## STANDARD LOCATION

Standard ballseat location for all ball lock products is 90°. Standard flat, dowel groove and Windsor Lock location is at 0°. Note: 0° is at 3:00. Alternate no charge locations are 0°, 90°, 180°, 270° (see drawing). To order alternate locations specify locating device type @ \_\_\_°.

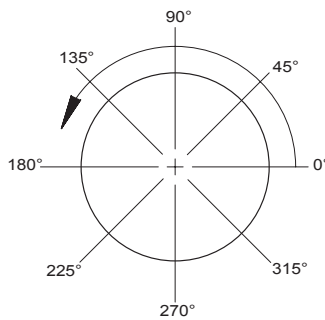
Ball lock punch example: MHR 13-08 P=6.0 W=5.5 B/S @ 0°  
Button flat example: MDO25-32 P=13.0 W=10.5 F1@90°



## CUSTOM LOCATIONS

Any locating device can be radially positioned by specifying the appropriate device and its desired angle. The appropriate angle is defined by a counter clockwise rotation from 0°.

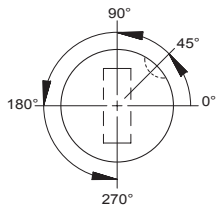
Note: Parts are viewed in die position looking from above the die. Punches are viewed looking through the shanks. Buttons are viewed through top face.



## TYPICAL EXAMPLES:

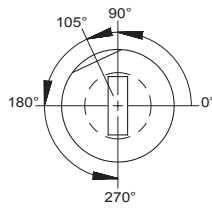
CUSTOM BALL SEAT LOCATION PUNCH

**BS@45°**

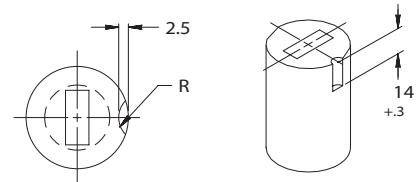


CUSTOM FLAT LOCATION DIE BUTTON

**F2@105°**



## WINDSOR LOCK



**W6**

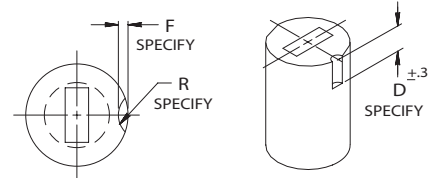
6.0 WINDSOR LOCK R = 3.0 RAD

**W10**

10.0 WINDSOR LOCK R = 5.0 RAD

**W13**

13.0 WINDSOR LOCK R = 6.5 RAD

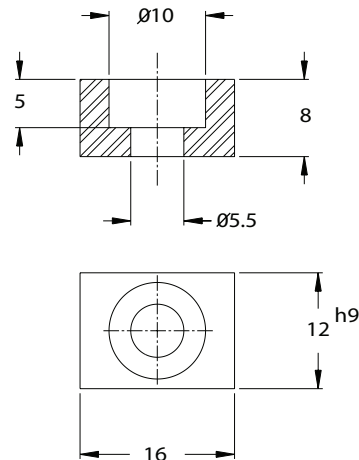


**WX**

USER DEFINED - Must specify "F", "R" and "D" dimensions

## BUTTON RETENTION KEY

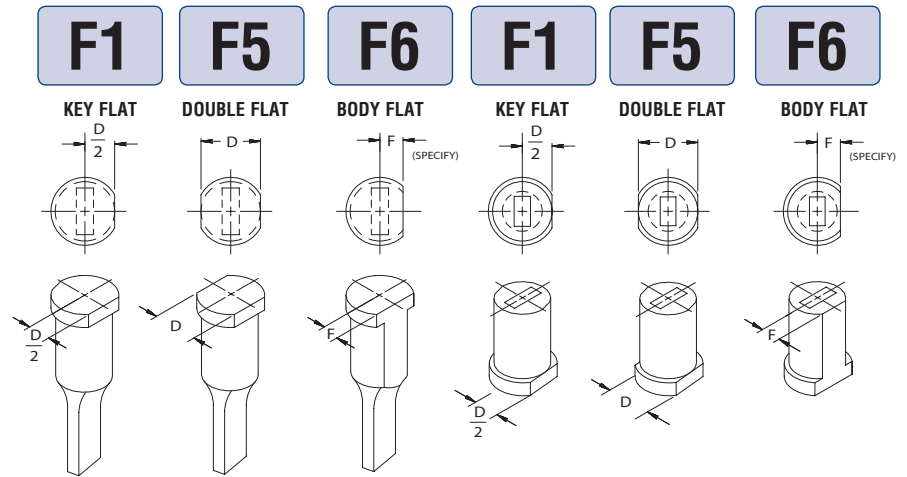
**MAK-01**



# LOCATING DEVICES

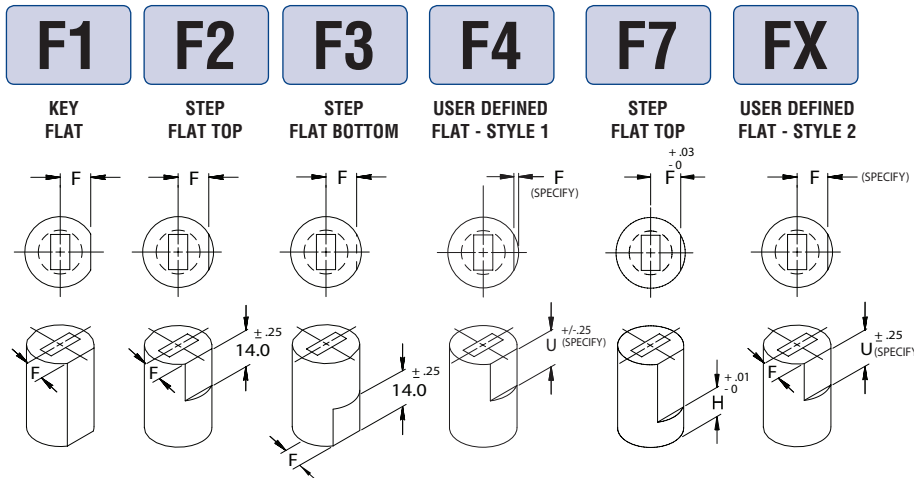
## FLATS ON SHOULDER PRODUCTS

F1, F5 are ground flush to shank. F6 is a user defined flat and requires an "F" dimension specified with order. F5 flats are standard 180° apart.



## FLATS ON PRESS FIT BUTTONS

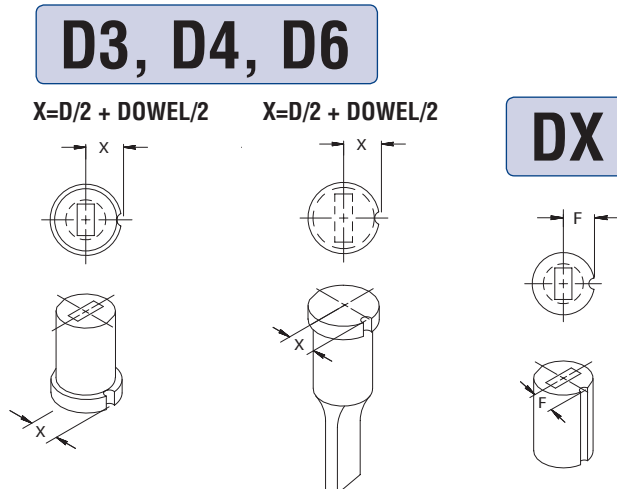
F1, F2, F3 use "F" dimensions as defined in chart. FX is a user defined flat and requires an "F" and "U" dimension specified with order.



BODY DIA	F1, F2, F3		F7	
	"F" +0.02 -0.00	F	F	H
8	3.5			
10	4.0			
13	5.5	5.0	9	
16	7.0	6.5	9	
20	8.5	8.5	9	
22	9.5			
25	11.0	10.5	16	
32	14.0	14.0	16	
38	17.0			
40	18.0	18.0	16	
45	20.5			
50	23.0	23.0	16	
56	26.0			
63	29.5	29.5	16	
71	33.5			
76	35.5			
85	40.0			
90	42.5			
100	47.5			

## DOWEL GROOVES

D3, D4, D6 are standard 3, 4, 6, dowel grooves. On shoulder products, the groove is positioned tangent to shank. On all other products the dowel is ground to an "F" dimension as shown on chart. DX is a user defined dowel groove and requires an "F" dimension and dowel size specified with the order.



BODY DIAMETER "D"	DX SPECIFY DOWEL	D3 3.0 DOWEL	D4 4.0 DOWEL	D6 6.0 DOWEL
	"F" DIM	"F" DIM	"F" DIM	"F" DIM
8	SPECIFY	4.7	5.2	6.2
10	SPECIFY	5.5	6.0	7.0
13	SPECIFY	6.7	7.2	8.2
16	SPECIFY	8.0	8.0	9.0
20	SPECIFY	10.0	10.0	11.0
22	SPECIFY	11.0	11.0	12.0
25	SPECIFY	12.5	12.5	13.5
32-UP	SPECIFY	D/2	D/2	D/2

X/F DIMS. +/- .013

# STANDARD ALTERATIONS

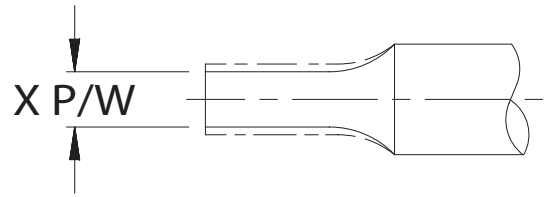


**XP**

## OUT OF RANGE PUNCH POINT

Point "P" or "W" dimensions below catalog standard. The minimums (see charts) apply to standard catalog point lengths and overall lengths. Extended B lengths and reduced overall lengths do not apply.

**XW**



### BALL LOCK AND SHOULDER PUNCHES SOLID

#### MAX S.B.R

SHANK D	MIN P ROUNDS		
	13	19	25
4	1.20		
5	1.30	1.30	
6	1.40	1.40	1.40
8	1.70	1.70	1.70
10	2.00	2.00	2.00
13	2.50	2.50	2.50
16	3.50	3.50	3.50
20	5.00	5.00	5.00
25	8.00	8.00	8.00
32	12.00	12.00	12.00
40	16.00	16.00	16.00
45	18.00	18.00	18.00
50	23.00	23.00	23.00
56	28.00	28.00	28.00
63	33.00	33.00	33.00

#### MAX S.B.R

SHANK D	MIN W SHAPES		
	13	19	25
4	1.20		
5	1.30	1.30	
6	1.40	1.40	
8	1.70	1.70	1.70
10	2.00	2.00	2.00
13	2.50	2.50	2.50
16	3.50	3.50	3.50
20	4.50	4.50	4.50
25	4.50	4.50	4.50
32	5.00	5.00	5.00
40	6.00	6.00	6.00
45	6.00	6.00	6.00
50	8.00	8.00	8.00
56	9.00	9.00	9.00
63	10.00	10.00	10.00

### LIGHT DUTY EJECTOR PUNCHES

#### MAX S.B.R

SHANK D	MIN P ROUNDS		
	13 63.0 MIN O.A.L.	19 63.0 MIN O.A.L.	25 71.0 MIN O.A.L.
6	2.00		
10	2.70	2.70	
13	3.20	3.20	3.20
16	3.50	3.50	3.50
20	5.00	5.00	5.00
25	8.00	8.00	8.00

#### MAX S.B.R

SHANK D	MIN W SHAPES		
	13 63.0 MIN O.A.L.	19 63.0 MIN O.A.L.	25 71.0 MIN O.A.L.
6	2.00		
10	2.70	2.70	
13	3.20	3.20	3.20
16	3.50	3.50	3.50
20	4.00	4.00	4.00
25	5.00	5.00	5.00

### HEAVY DUTY EJECTOR PUNCHES

#### MAX S.B.R

SHANK D	MIN P ROUNDS		
	13 63.0 MIN O.A.L.	19 63.0 MIN O.A.L.	25 71.0 MIN O.A.L.
10	2.70	2.70	
13	3.20	3.20	3.20
16	3.50	3.50	3.50
20	5.00	5.00	5.00
25	8.00	8.00	8.00
32	12.00	12.00	12.00
40	16.00	16.00	16.00

#### MAX S.B.R

SHANK D	MIN W SHAPES		
	13 63.0 MIN O.A.L.	19 63.0 MIN O.A.L.	25 71.0 MIN O.A.L.
10	2.50	2.50	
13	3.20	3.20	3.20
16	3.50	3.50	3.50
20	4.00	4.00	4.00
25	5.00	5.00	5.00
32	6.00	6.00	6.00
40	8.00	8.00	8.00

### SHOULDER EJECTOR PUNCHES

#### MAX S.B.R

SHANK D	MIN P ROUNDS		
	13 63.0 MIN O.A.L.	19 63.0 MIN O.A.L.	25 71.0 MN O.A.L.
5	1.60		
6	2.00		
8	3.00	3.00	
10	3.20	3.20	3.20
13	3.20	3.20	3.20
16	4.00	4.00	4.00
20	4.00	4.00	4.00
25	5.00	5.00	5.00
32	6.00	6.00	6.00
40	8.00	8.00	8.00
45	18.00	18.00	18.00
50	23.00	23.00	23.00
56	28.00	28.00	28.00
63	33.00	33.00	33.00

#### MAX S.B.R

SHANK D	MIN W SHAPES		
	13 63.0 MIN O.A.L.	19 63.0 MIN O.A.L.	25 71.0 MN O.A.L.
5	1.60		
6	2.00		
8	3.00	3.00	
10	3.20	3.20	3.20
13	3.20	3.20	3.20
16	4.00	4.00	4.00
20	4.00	4.00	4.00
25	4.50	4.50	4.50
32	5.00	5.00	5.00
40	6.00	6.00	6.00
45	6.00	6.00	6.00
50	8.00	8.00	8.00
56	9.00	9.00	9.00
63	10.00	10.00	10.00

# STANDARD ALTERATIONS

## XP OUT OF RANGE BUTTON DIMENSIONS

Hole "P" or W" dimension above or below catalog standard range (see charts) available on Ultra Life style button only.

## XW

### PRESS FIT ULTRA LIFE TAPER RELIEF

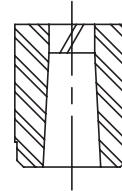
CATALOG TYPE	MIN P	MIN W	MAX P/G
MU_08	1.50	1.50	3.60
MU_10	1.60	1.60	5.80
MU_13	1.80	1.80	8.00
MU_16	2.50	2.50	10.00
MU_20	2.80	2.80	13.00
MU_22	3.10	3.10	16.00
MU_25	3.20	3.20	18.50
MU_32	3.20	3.20	22.00
MU_38	3.20	3.20	29.00
MU_40	3.20	3.20	30.00
MU_45	3.20	3.20	34.00
MU_50	3.20	3.20	37.00
MU_56	3.20	3.20	41.00
MU_63	3.20	3.20	47.00
MU_71	3.20	3.20	52.00
MU_76	3.20	3.20	56.00
MU_85	3.20	3.20	62.00
MU_90	3.20	3.20	65.00
MU_100	3.20	3.20	73.00

### SHOULDER ULTRA LIFE TAPER RELIEF

CATALOG TYPE	MIN P	MIN W	MAX P/G
MM_08	1.50	1.50	3.60
MM_10	1.60	1.60	5.80
MM_13	1.80	1.80	8.00
MM_16	2.50	2.50	10.00
MM_20	2.80	2.80	13.00
MM_22	3.10	3.10	16.00
MM_25	3.20	3.20	18.50
MM_32	3.20	3.20	22.00
MM_38	3.20	3.20	29.00
MM_40	3.20	3.20	30.00
MM_45	3.20	3.20	34.00

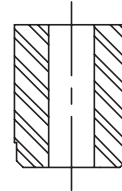
## XS

### SLUG CONTROL ALTERATION



NOTE: Advise material thickness and die clearance, per side at time of order.

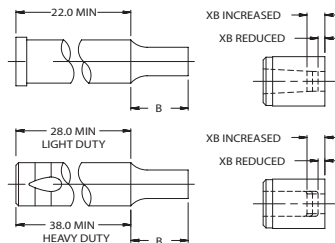
## XR



Button round or shape/I.D. through hole no relief

## XB ALTERED POINT LENGTH OR LAND DIMENSION

This is a customer specific alteration and a dimension must be supplied.

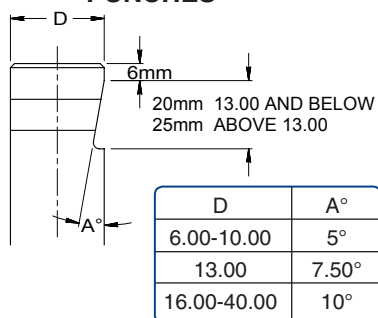


## AE

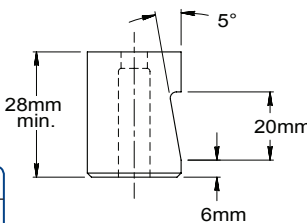
### AIR EJECTOR APPLICATION

Filled cross pin hole with no ejector components.

## W1 WHISTLE NOTCH PUNCHES

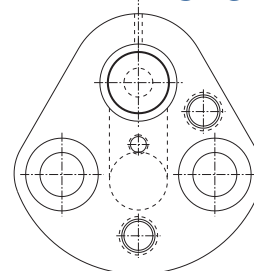


### BUTTONS

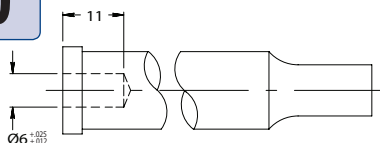


## SR

### OPEN IN-LINE DOWEL FOR SLUG RELIEF



## CD CENTER DOWEL



Available on all solid shoulder punches. Available on ejector style shoulder punches in diameters of 10mm through 40mm and lengths of 80, 90 & 100mm.

## SD SYMMETRICAL RETAINER DOWEL

## GB BALL SEAT

BALL SEAT  
GRIND CHANGE

NOTE: Specify a radial location if a double ballseat is required.

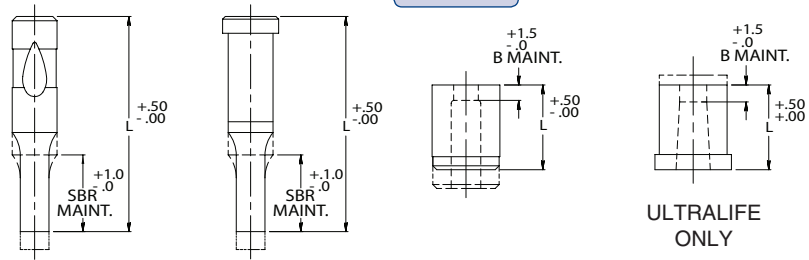


# STANDARD ALTERATIONS

## OVERALL LENGTH REDUCTIONS

Reduces punch or button length maintaining "B" point or land length. Not available in counter bore style on shoulder or ball lock buttons.

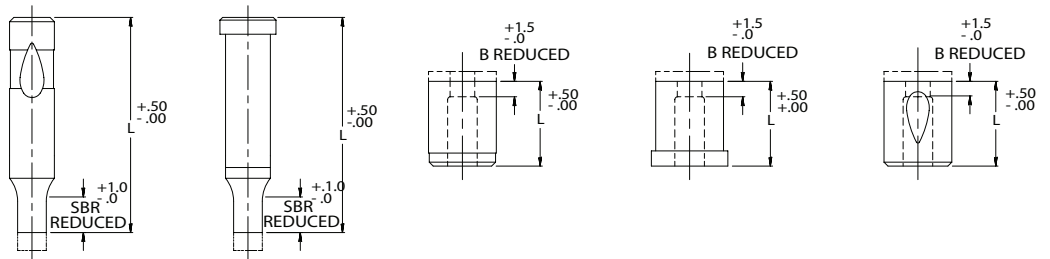
### X1



ULTRALIFE ONLY

### X2

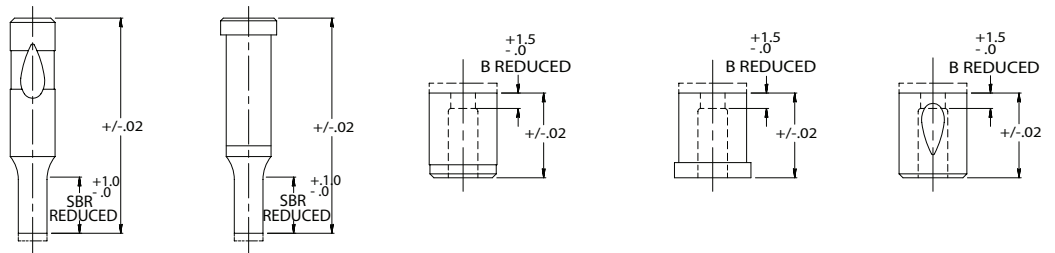
Reduces punch or button length but also reduces "B" dimension or land length.



### X3

Provides a precision overall length of +/- .02

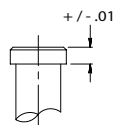
Note: .5 maximum stock removal



## HEAD ALTERATIONS

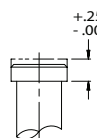
### X4

Provides a precision head length but reduces overall length



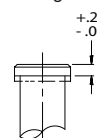
### X5

Reduces head length but reduces overall length



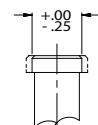
### X6

Reduces head length while maintaining overall length



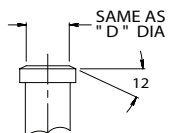
### X7

Reduces head diameter



### X8

Angle on head face to improve strength



# SPECIAL ALTERATIONS

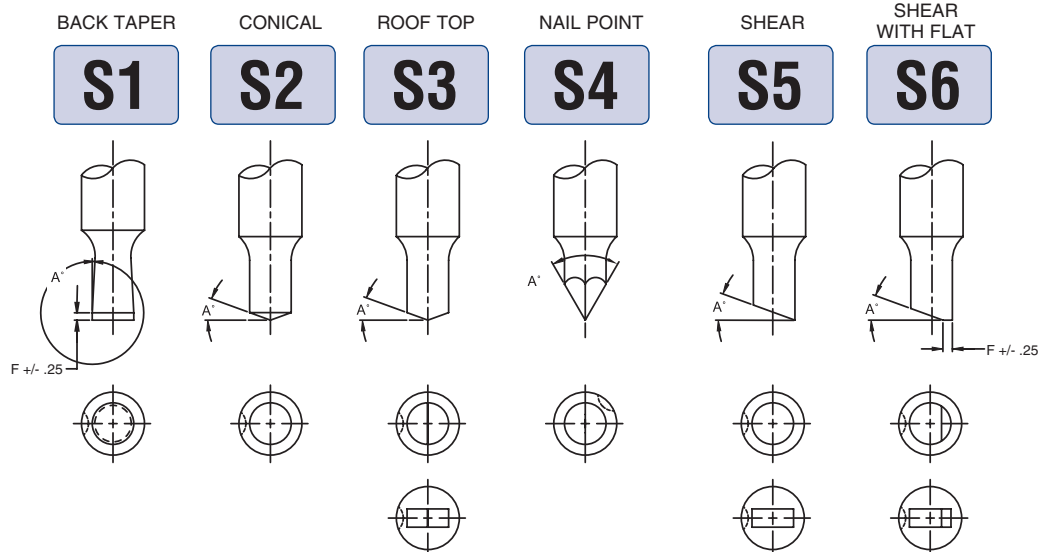
## SHEAR ANGLES

Angle "A" and dimension "F" are user defined and must be specified with order.

### STANDARD LOCATION DEVICES:

Standard Ball Seat location as shown.

Shoulder Flat location counter clockwise 90°.

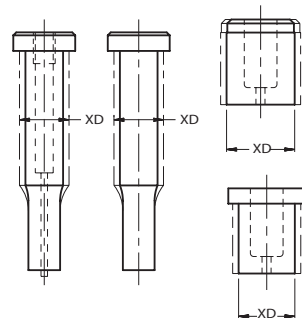


## XD REDUCTION OF SHANK DIMENSION

Reduce shank to customer specific size. Does not alter head diameter.

Example: MDO 20-32  
P=10.0, W=5.0, XD=19.0

BODY	5	6	8	10	13	16	20	25	32	38	40
PUNCH SOLID MIN D	3.5	5.0	6.5	8.5	11.5	14.5	18.5	23.5	30.5		38.5
PUNCH EJECTOR MIN D	4.5	5.0	6.8	9.0	11.5	14.5	18.5	23.5	30.5		38.5
BUTTON MIN D			6.5	8.5	11.5	14.5	18.5	23.0	30.0	36.0	38.0

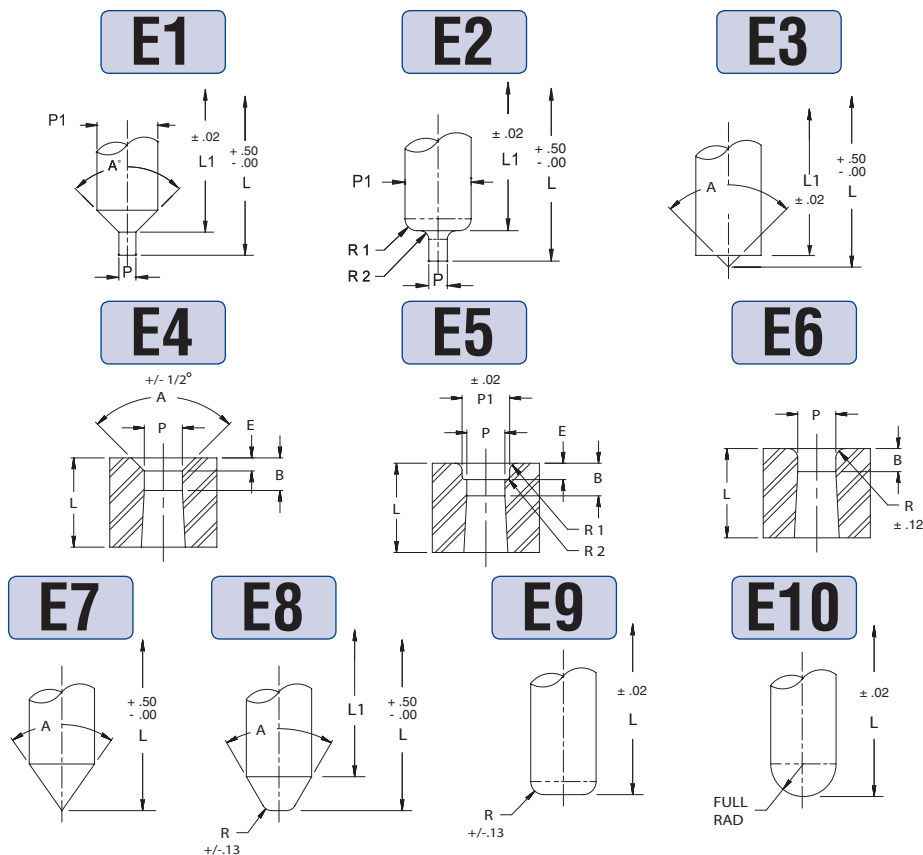


## EXTRUSION TOOLS

How precise L1 and E dimensions need to be is application specific. Please specify tolerance with order.

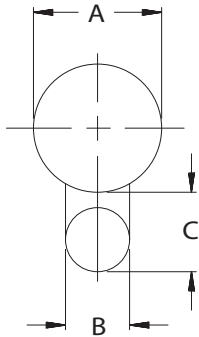
For a precision "L" dimension add alteration code X3.

For strength, all extrusion buttons are produced in the "Ultralife" style.



## BALL LOCK RETAINER SPACE REQUIREMENTS

### True-Set Style Ball Lock Space Requirements



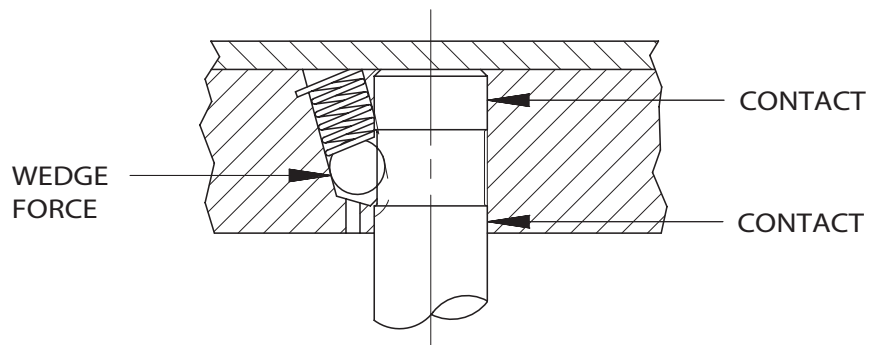
DIE BUTTON AND LIGHT-DUTY PUNCH - TRUE-SET STYLE FOR PIERCING STOCK UP TO 3.0			HEAVY-DUTY PUNCH - TRUE-SET STYLE FOR PIERCING STOCK UP TO 10.0		
DIA. PUNCH SHANK OR DIE BUTTON O.D. A	BALL DIA. B	CLEARANCE C	DIA. PUNCH SHANK A	BALL DIA. B	CLEARANCE C
6	6.0	11.4	10	10.0	15.7
10	8.0	12.9	13	12.0	18.4
13	8.0	12.9	16	12.0	18.4
16	8.0	12.9	20	12.0	18.4
20	8.0	12.9	25	12.0	18.4
25	8.0	12.9	32	12.0	18.4
32	8.0	12.9	40	12.0	18.4
38	8.0	12.9			

### Backing Plate Style Ball Lock Space Requirements

DIE BUTTON AND LIGHT-DUTY PUNCH FOR PIERCING STOCK UP TO 3.0			HEAVY-DUTY PUNCH FOR PIERCING STOCK UP TO 10.0		
DIA. PUNCH SHANK OR DIE BUTTON O.D. A	BALL DIA. B	CLEARANCE C	DIA. PUNCH SHANK A	BALL DIA. B	CLEARANCE C
6	6.0	10.0	10	10.0	13.0
10	8.0	11.0	13	12.0	15.0
13	8.0	11.0	16	12.0	15.0
16	8.0	11.0	20	12.0	15.0
20	8.0	11.0	25	12.0	15.0
25	8.0	11.0	32	12.0	15.0
32	8.0	11.0	40	12.0	15.0
38	8.0	11.0			

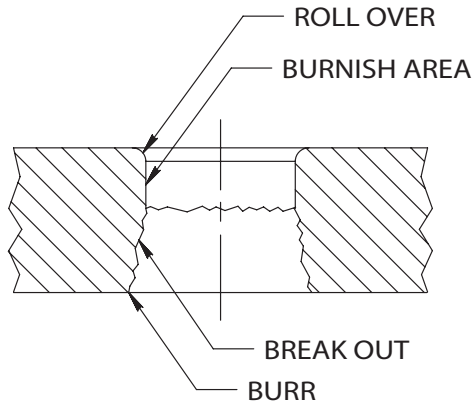
### Body Band Ball Relief

Moeller incorporates a body band ball relief on all ball lock punches. This type of relief facilitates a rounder shank diameter, thusly improving the "fit" between the tool and its mating retainer. When centerless grinding, the interruption of contact caused by the ball-seat, generates a slight "hump" 180° opposite the ball-seat. Moeller's process includes grinding or precision turning the ball-relief area, thusly removing this out of round condition. This band relief also produces a balanced three point contact condition, improving the punches stability while in die position (see illustration).



## Punch & Die Clearances

Clearance between punch and die is based upon type of material being stamped, material thickness, finish requirement of hole and anticipated tool life. It is expressed as a total percentage of material thickness being stamped. It is important to remember that the punch determines hole size and the die determines slug size. As a rule, optimal clearance provides flat, sharp and clean punching with minimum tool load. Insufficient clearance results in minimum burr and rollover, but tool life is shortened due to high tool loads. Excessive clearance results in deformation and larger rollover but increased tool life. Below are some general guidelines for different types of material being stamped. The values shown are recommended total die clearance for general purpose holes using non-ejector punches. By doubling the amount of clearance and using ejector punches, anticipated tool life will be greatly increased. Most of the punch wear is produced by stripping forces when the punch is being withdrawn. The increased clearance by using ejector punches helps keep tool wear to a minimum.



Material	Soft	Hard
Aluminum	10%	12%
Brass/Copper	6%	8%
Steel (Low Carbon)	10%	12%
Steel (High Carbon)	18%	20%

## Suggested Surface Treatment Applications

	PIERCE & TRIM	EXTRUDE & DRAW	FORM & EMBOSS	SHAVE & LANCE	COIN & HOB
M-Tride™	X	X	X	X	X
TiN	X	X		X	
TiCN	X	X	X	X	
MSP™	X	X	X	X	
M-Wear™	X	X	X	X	X
M-Wear Extreme™	X	X	X	X	X
Alcrona™	X	X	X	X	
TiAlN				X	
MoST™		X		X	
CDF	X	X	X	X	X

Note: Please reference the Moeller Performance Enhancement Coatings Brochure for additional surface treatments.

## TiN – (Titanium Nitride) PVD Coating

**Alteration Order Code: TIN** • Add 3 days to Delivery

TiN is the least expensive and most commonly used PVD (physical vapor deposition) wear resistant coating offering:

- Excellent wear resistance on cutting edges and wear surfaces
- Excellent lubricity
- Suitable thermal stability for most cold work metalworking applications
- High micro hardness of 2300 Vickers\*

*Note: TiN works best when used with lubricants and is not recommended for uses in stainless steel, nickel, or copper applications*

## TiCN – (Titanium CarboNitride) PVD Coating

**Alteration Order Code: TCN** • Add 4 days to Delivery

TiCN has the broadest range of application use regarding PVD coatings including stainless steel, nickel, and copper metal working operations offering:

- Higher hardness and lower coefficient of friction than that of TiN coating, resulting in extremely high wear resistance on cutting edges and wear surfaces
- Improved lubricity
- Extremely high micro hardness of 3000 Vickers\*

*Note: Suitable for uses in stainless steel, nickel, or copper applications*

## TiAlN - (Titanium Aluminum Nitride) PVD Coating

**Alteration Order Code: TAN** • Add 3 days to Delivery

TiAlN is ideal for applications where surface heat is generated, which converts the aluminum constituent to aluminum oxide for added protection against shear stress and wear resistance on cutting edges.

- High thermal stability
- Extremely high micro hardness of 3400 Vickers\*

## MoST™ – (Titanium CarboNitride with Molybdenum Disulfide)

### PVD w/Moly Top Coating

**Alteration Order Code: MST** • Add 7 days to Delivery

MoST coating reduces operating friction and galling through the use of a very lubricious top layer coat, which is ideal for pre-painted and plated material applications.

- Extremely high lubricity
- High micro hardness of 2000 Vickers\*

*In addition to surface treatments, a special heat treat enhancement process can be applied to optimize toughness.*

MoST® is a trademark of IonBond® Inc.

## MSP™ – (Moeller Special Process with TiCN)

### PVD Top Coating

**Alteration Order Code: MSP** • Add 5 days to Delivery

MSP offers the ultimate in galling resistance while providing the wear resistance of TiCN coating.

- Superior surface finish
- Extremely high lubricity
- Extremely high micro hardness of 3000 Vickers\*

*Note: This process combines a high hardness coating with a superior surface finish to provide the ultimate in galling resistance.*

## Alcrona™ – (Aluminum Chromium Nitride) PVD Coating

**Alteration Order Code: ACN** • *Add 3 days to Delivery*

Performance is enhanced utilizing the thermal stability, low coefficient of friction and ductility advantages of the aluminum and chromium, making it ideal for high temperature and high strength steel applications.

- Exceptionally low coefficient of friction
- Extraordinary high thermal stability
- Extremely high micro hardness of 3400 Vickers\*

Balanit® Alcrona is a trademark of Oerlikon Balzers.

## M-Tride™ - (Nitride)

**Alteration Order Code: MTN** • *Add 5 days to Delivery*

MTN is a case hardening surface treatment, effecting all outer surfaces of the tool.

- Increases surface hardness by approximately 10 points HRC.

*Note: It has the broadest range of use and is the least expensive of the surface treatments listed here. M-Tride case hardens all exposed surfaces and is ideal for die buttons and other tools with internal features which are difficult to coat using a PVD line of sight process.*

## M-Wear™

**Alteration Order Code: MWN** • *Add 7 days to Delivery*

A dual process surface treatment/coating process that provides a very hard coating on top of a less hard, but very tough surface treatment. This helps distribute load through the tool. Very beneficial for extruding or forming applications where isolated stress and load on small areas of the tool can cause premature failure.

- High micro hardness of 2300 Vickers\*

*Note: M-Wear works best when used with lubricants and is not recommended for use in stainless steel, nickel, or copper applications.*

## M-Wear Extreme™

**Alteration Order Code: MWE** • *Add 7 days to Delivery*

M-Wear Extreme is similar to M-Wear but with a lower coefficient of friction and higher wear resistance. Unlike M-Wear, it is suitable for stainless steel, nickel and copper applications.

- High micro hardness of 3000 Vickers\*

## CDF – (Cryogenic Deep Freeze)

**Alteration Order Code: CDF** • *Add 2 days to Delivery*

This process is an effective way to achieve optimum toughness and dimension stability even when exposed to temperatures up to fifty degrees Fahrenheit of the steel's original tempering temperature.

# NOTES

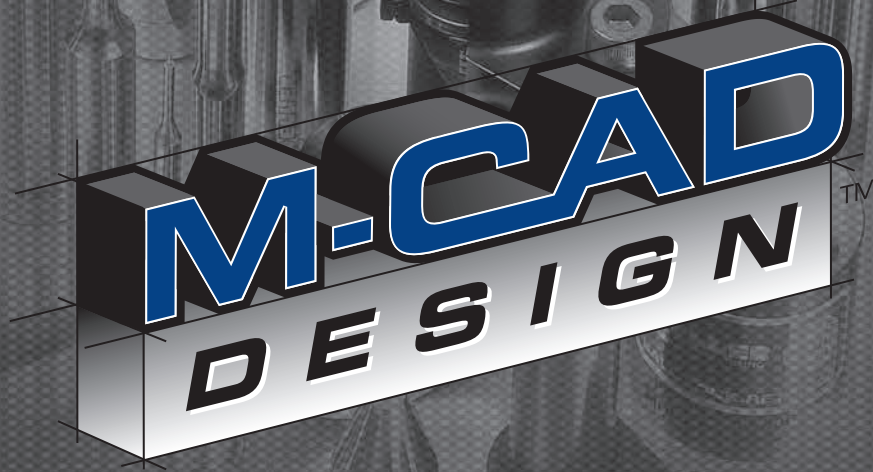
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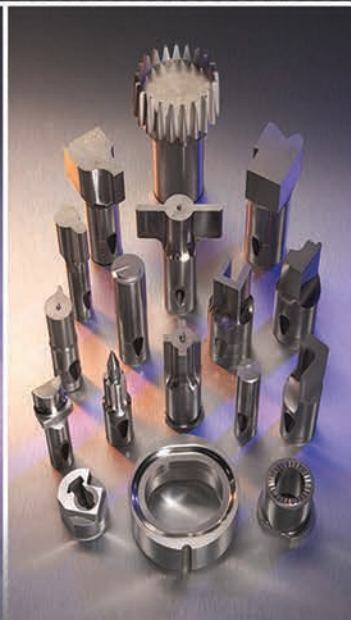


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REV. 10/2015  
Catalog # 510  
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