

# MOELLER™

## PRECISION TOOL

ADVANCED STAMPING APPLICATION TOOLING

EXCEEDING THE INDUSTRY'S STANDARD

- HIGH-STRENGTH MATERIALS
- HEAVY GAUGE MATERIALS
- HOT STAMPINGS
- HIGH-ABRASIVE MATERIALS



TRUE-FIT™

DURA-PUNCH™



TRUE STRIP™



PERFORMANCE COATINGS & ACCESSORIES



*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**



VALUE • QUALITY & SERVICE • TECHNOLOGY

# ADVANCED STAMPING APPLICATION TOOLING

Moeller Precision Tool's core values of continuous product innovation, providing tailored solutions to our customers, and using advanced manufacturing capabilities to provide the highest quality products are the pillars of our brand. As the industry moves toward more complex applications and more demanding materials, MPT is expanding our standard catalog offerings to support our customers with this "Advanced Application Tooling" catalog. Our Inch and Metric catalogs provide standard M2 and A2 material – but the products detailed in this Advanced Application Tooling catalog are focused on PM-M4 and M2 steel to improve tool life and reduce down time in the most extreme conditions.

### STANDARD PIERCE PUNCH MATERIAL:

**PM-M4 – Advanced Applications, M2 – Standard Applications**

### STANDARD DIE BUTTON MATERIAL:

**M2 – Advanced Applications, A2 – Standard Applications**

### KEY COMPONENTS AVAILABLE IN THIS CATALOG FOR ADVANCED APPLICATIONS:



**Dura Punch:** Designed with thicker, larger, and 10-degree angled diameter heads to reduce failure when piercing heavy gauge and high strength materials (see pages 18-20, 74-76).

**Dura Punch Retainer:** Standard, off the shelf retainer specifically for Dura Punches (see page 39, 93).



**Exclusive Trumpet Head Punch:** Designed with advanced head geometry to withstand the most extreme piercing applications (see pages 21-22).

**Exclusive Trumpet Head Retainer:** Standard, off the shelf retainer specifically for Trumpet Head punches (see page 40).



**Exclusive True Set Advanced Ball Lock Retainer:** The industry's only one-piece construction retainer manufactured from shock-resistant steel, created for the most demanding applications such as AHSS and aluminum (see page 35).

**Exclusive True-Fit Ball Lock Insert:** A one-piece construction ball lock insertable retainer (see page 41, 94).



**Exclusive Snap-in Urethane Retainer:** An economical urethane retaining device, adaptable to all standard and special multi-hole retainers manufactured by MPT (see page 46).



**Exclusive True Strip:** MPT's exclusive high-performance mechanical stripper. See MPT's True Strip catalog for more information and part specifications.



**Performance Enhancement Coatings:** MPT provides recommendations for advanced surface treatments to achieve maximum tool life (see page 108-109).

For additional MPT product catalogs and services, reference page 112 or visit [www.moellerprecisiontool.com](http://www.moellerprecisiontool.com)



EXCEEDING INDUSTRY STANDARDS FOR OVER 60 YEARS

## EXCLUSIVE PRODUCT LINE AND CAPABILITIES



### TRUE SET ADVANCED BALL LOCK RETAINER

The industry required a next-generation retainer, so MPT designed a one-piece construction retainer which eliminates old plug and backing plate style methods. Our retainers are produced from through-hardened, shock resistant material and machined to exacting tolerances.



### TRUE-FIT INSERTABLE BALL LOCK RETAINERS

Our newest innovation! The most economical installation for ball lock retainers, manufactured as a one-piece constructed component.



### TRUE SET TRUMPET STYLE AND DURA PUNCH RETAINERS

MPT now offers a standard, off-the-shelf retainer for Trumpet Head punch and Dura Punch head geometry, manufactured to True Set quality standards.



**MTR:** Our exclusive, one-piece construction for simplified installation is designed to extend urethane life and provide precision perpendicularity.



**MTM:** This innovative design will adapt to all standard and special multi-hole retainers without the required tapped fastening hole.

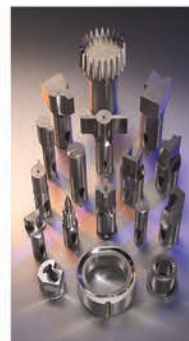


### TRUE STRIP MECHANICAL STRIPPERS

The world's highest performing mechanical stripper for exceeding the life of urethane with the supporting function to withstand side load and prevent point breakage.

### ADVANCED MACHINING CAPABILITIES

3D Surfacing, Key Hole, Spline and Universal Shaped Tools, Extrusion, Countersink Coining, Compacting and other Metal Forming Tools



Policies, Terms & Conditions ..... 4  
 Delivery Schedule ..... 5  
 Catalog Nomenclature and Ordering Example ..... 6  
 Extended Product Line Catalog Nomenclature  
 and Ordering Example ..... 7

**BALL LOCK PUNCHES HEAVY DUTY**

MH\_ Solid with Standard Point ..... 8  
 ME\_ Ejector with Standard Point ..... 9  
 MH\_ Pilots ..... 10, 11  
 M\_B Blanks ..... 12

**SHOULDER PUNCHES BASIC**

MS\_ Solid with Standard Point..... 13  
 MC\_ Ejector with Standard Point ..... 14  
 MS\_ Pilots ..... 15, 16  
 M\_B Blanks ..... 17

**DURA PUNCHES**

XMS\_ Solid with Standard Point..... 18  
 XMC\_ Ejector with Standard Point ..... 19  
 XM\_B Blanks ..... 20

**TRUMPET HEAD PUNCHES**

XMT\_ Solid with Standard Point..... 21  
 XMTB Blanks ..... 22

**PRESS FIT BUTTONS**

MD\_ Counter Bore Relief with Standard Hole ..... 23  
 MD\_ Counter Bore Relief/Extended Range ..... 24  
 MU\_ Ultra Life/Taper Relief with Standard Hole ..... 25  
 MU\_ Ultra Life/Taper Relief/Extended Range ..... 26

**SHOULDER BUTTONS**

MI\_ Counter Bore Relief with Standard Hole ..... 27  
 MM\_ Ultra Life/Taper Relief with Standard Hole ..... 28

**BUTTON BLANKS**

M\_B Blanks with Counter Bore Relief ..... 29  
 M\_B Blanks with Straight Thru Hole ..... 30  
 MFB Ball Lock Blanks with Straight Thru Hole..... 31

**UNIVERSAL SHAPES**

M\_U ..... 32, 33, 34

**RETAINERS**

MR\_ True Set Advanced ..... 35  
 MRR Ball Lock Economy Round True Set..... 36  
 MR\_ Shoulder True Set..... 37, 38  
 XMR\_ Dura Punch Retainers..... 39  
 XMRT Trumpet Head Punch Retainer ..... 40  
 XMA\_ Trumpet Head Retainer Accessories ..... 40  
 MR\_ True-Fit Insertable Punch Retainers ..... 41  
 Multi Hole ..... 42

**URETHANE STRIPPERS AND ACCESSORIES**

MTC Strippers Closed End ..... 44  
 MTS Strippers True Set (NAAMS) ..... 45  
 MTR Standard True Set Stripper Retainer ..... 46  
 MTP Economy True Set Stripper Retainer ..... 46  
 MTM Mini True Set Stripper Retainer ..... 46  
 MTB Nose Large Punch Strippers..... 47

**RETAINER ACCESSORIES / COMPONENTS**

Retainer Components ..... 48  
 Retainer Accessories ..... 49  
 MAX True Set Retainer Shims ..... 49  
 MAY Economy Round True Set Retainer Shims ..... 49

**STANDARD ALTERATIONS / LOCATING DEVICES**

Locating Devices ..... 51, 52  
 Out of Range “P” “W” or “B” ..... 53, 54  
 Button Slug Control ..... 54  
 Additional Alterations..... 54, 55

**SPECIAL ALTERATIONS**

Shears, Extrusions, Shank Reduction..... 56

**TECHNICAL TOPICS**

Ball Lock Retainer Space Requirements ..... 43  
 Ejector Specifications ..... 50  
 Performance Enhancement Coatings ..... 108, 109

# 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, 1 $\frac{1}{2}$ % 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.

**STANDARD DELIVERY**

**SAME DAY / 1 DAY:**

- Punch and Button Blanks, Standard Shoulder and Ball Lock 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
- Standard Dura Punch Retainers

**8 WORKING DAYS:**

- Counter Bore Relief Extended Range Buttons
- Slip Fit Counterbore Relief Buttons Over 40mm Diameter
- Standard Trumpet Head Retainers

**10 WORKING DAYS:**

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

**PERFORMANCE ENHANCER:**

- See pages 108-109 for a complete list of coatings  
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:**

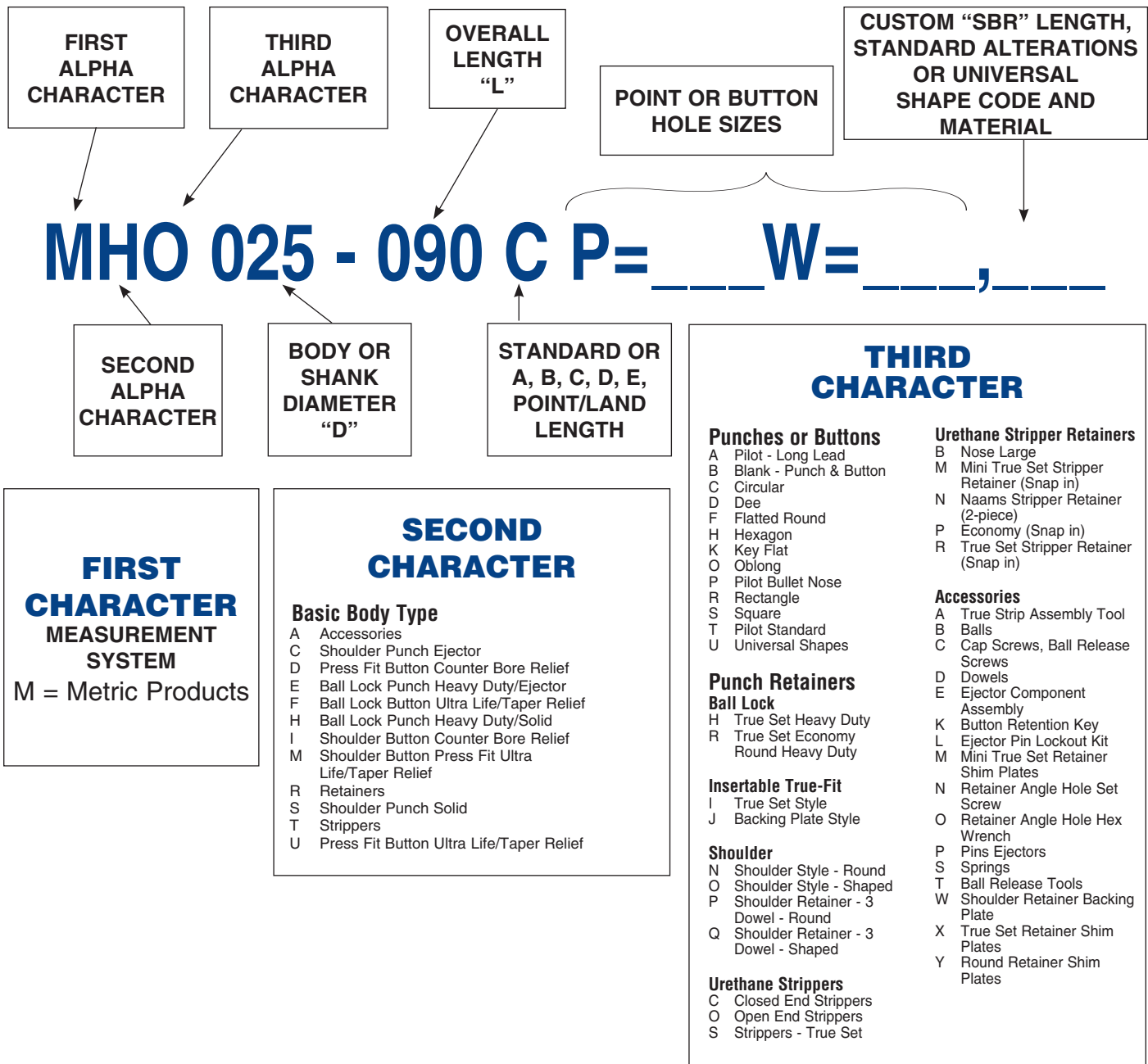
1. Catalog Standard Products with Only One Standard Alteration
2. Round Products - 20 Piece Maximum  
Shaped Products - 10 Piece Maximum
3. Coating Excluded
4. Excluded Products:
  - Nose Large Punches, Large Buttons, Urethane, Close Space or Quill Punches
  - Some Descriptive Shaped Products

**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



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

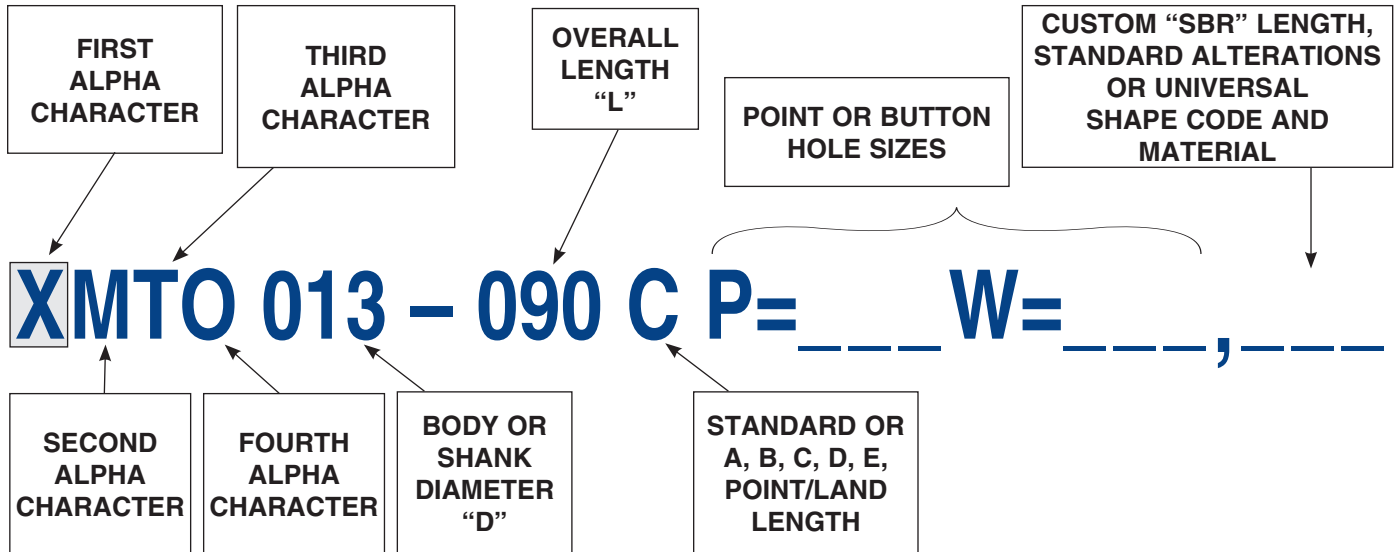
MHO 025-090 C P=22.0 W=15.3, BS@45° PM4  
**MUST SPECIFY PM4**

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



# EXTENDED PRODUCT LINE

## CATALOG NOMENCLATURE



<p><b>FIRST CHARACTER</b></p> <p>X = Extended Product Line</p>	<p><b>SECOND CHARACTER</b></p> <p>MEASUREMENT SYSTEM</p> <p>M = Metric Products</p>	<p><b>THIRD CHARACTER</b></p> <p><b>Basic Body Type</b></p> <p>A Accessories C Dura Punch Standard - Ejector R Retainers S Dura Punch Standard - Solid T Trumpet Head Punch - Solid</p>	<p><b>FOURTH CHARACTER</b></p> <p><b>Punches or Buttons</b></p> <p>B Blank C Circular D Dee F Flattened Round H Hexagon K Key Flat O Oblong R Rectangle S Square U Universal Shapes</p> <p><b>Shoulder Retainers</b></p> <p>N Dura Head - Round O Dura Head - Shaped T Trumpet Head - Round</p> <p><b>Accessories</b></p> <p>K Endmill for Trumpet Head Retainers Q Trumpet Head - Punch Retention Sleeve</p>
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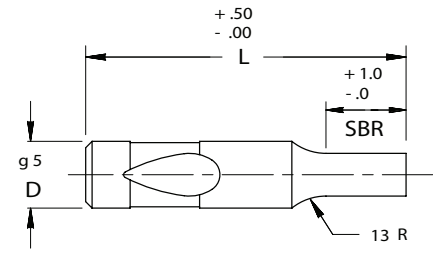
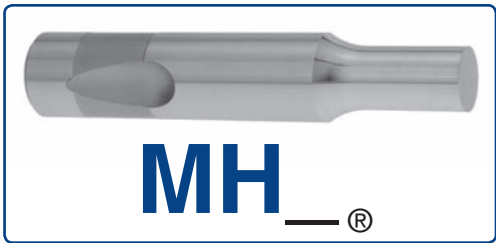
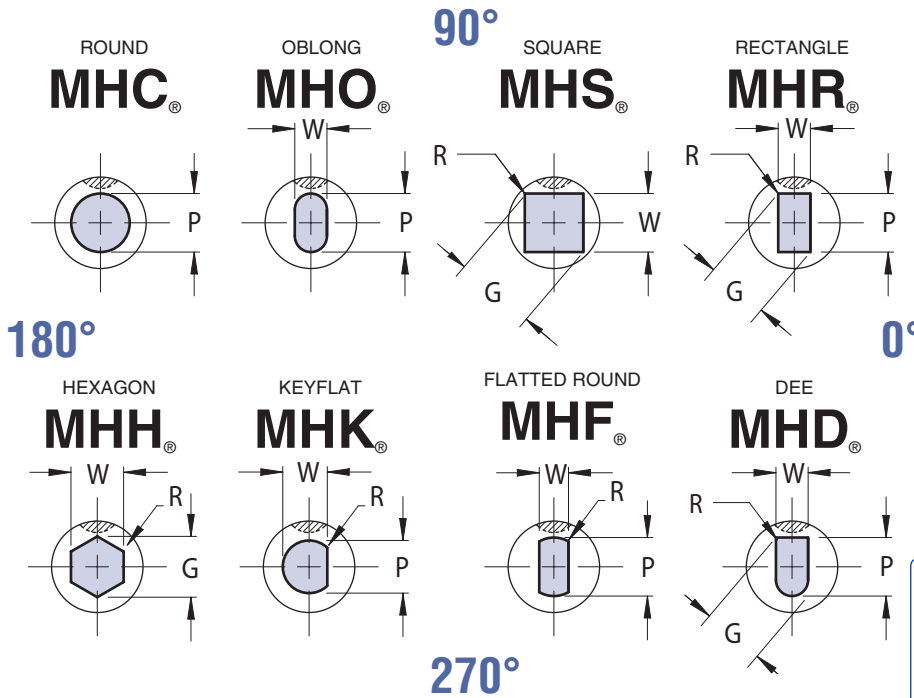
**ORDER EXAMPLE:** Trumpet head punch with oblong point and SBR length of 25, standard flat alteration rotated to 90° degrees.

XMTO 013-090 C P=8.00 W=6.25, F1@90 PM4  
**MUST SPECIFY PM4**

**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 6)  
SPECIFY: QTY: TYPE "D" "L" POINT LENGTH P(O R P&W) DIMENSIONS STEEL  
EXAMPLE: 6 MHC 013 090 C 8.0 PM4  
EXAMPLE: 6 MHO 016 080 STD 14.0 x 7.0 PM4  
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

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 51-56.

METRIC CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"					
		RANGE P	MIN W	MAX G/P	71	80	90	100	110	125
MH_010	10	2.50 - 9.98	2.50	10.00	X	X	X	X	X	X
MH_013	13	5.00 - 12.98	4.50	13.00	X	X	X	X	X	X
MH_016	16	8.00 - 15.98	6.00	16.00	X	X	X	X	X	X
MH_020	20	12.00 - 19.98	8.00	20.00	X	X	X	X	X	X
MH_025	25	16.00 - 24.98	10.00	25.00		X	X	X	X	X
MH_032	32	24.00 - 31.98	12.00	32.00		X	X	X	X	X
MH_040	40	30.00 - 39.98	14.00	40.00		X	X	X	X	X

**Material**  
Steel: PM4, HRC 60-63  
Alternate: 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

**MUST SPECIFY PM4**

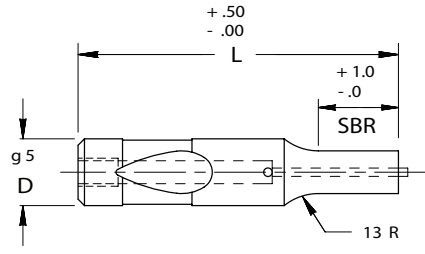
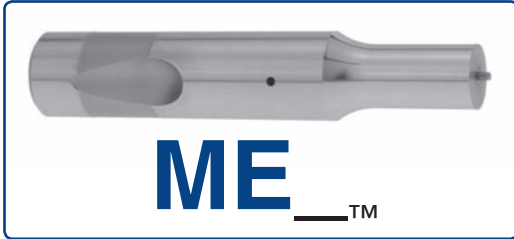
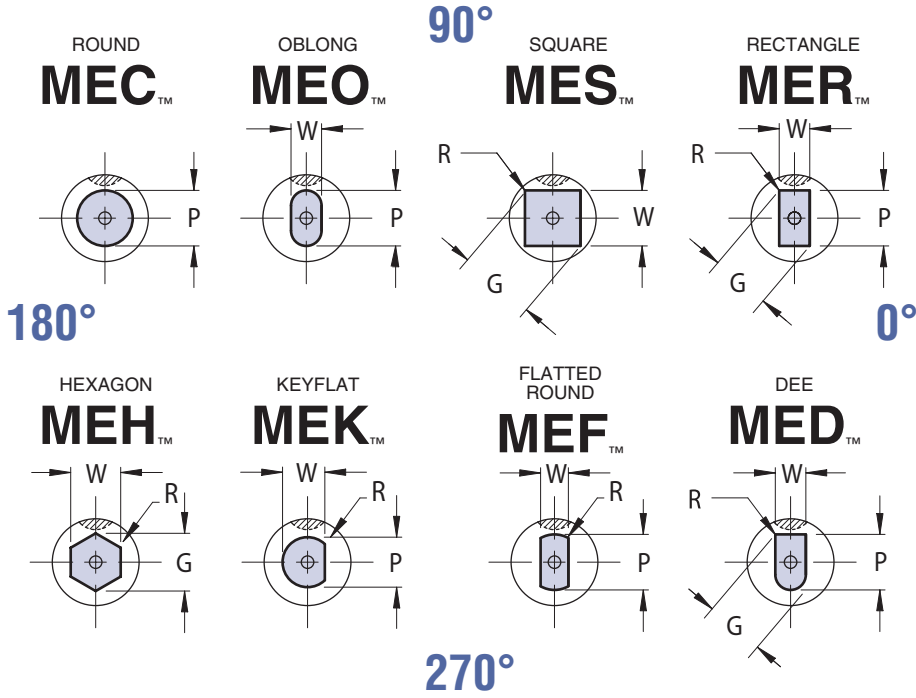
CATALOG TYPE	SHANK D	SBR		
		NAPMA STD	ALTERNATES	
			B	C
MH_010	10	19	10	—
MH_013	13	19	13	25
MH_016	16	19	13	25
MH_020	20	19	13	25
MH_025	25	19	13	25
MH_032	32	19	13	25
MH_040	40	25	19	30

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 6)  
SPECIFY: QTY: TYPE "D" "L" POINT LENGTH P(OR P&W) DIMENSIONS STEEL  
EXAMPLE: 6 MEC 010 090 B 5.0 PM4  
EXAMPLE: 6 MEO 016 080 STD 14.0 x 8.0 PM4  
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

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 51-56.

METRIC 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_010	10	2.50 - 9.98	2.50	10.00	X	X	X	X	X	X	
ME_013	13	5.00 - 12.98	4.50	13.00	X	X	X	X	X	X	X
ME_016	16	8.00 - 15.98	6.00	16.00	X	X	X	X	X	X	X
ME_020	20	12.00 - 19.98	8.00	20.00	X	X	X	X	X	X	X
ME_025	25	16.00 - 24.98	10.00	25.00			X	X	X	X	X
ME_032	32	24.00 - 31.98	12.00	32.00			X	X	X	X	X
ME_040	40	30.00 - 39.98	14.00	40.00			X	X	X	X	X

**Material**  
Steel: PM4, HRC 60-63  
Alternate: 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

**MUST SPECIFY PM4**

METRIC CATALOG TYPE	SHANK D	SBR			EJECTOR SIZE
		NAPMA STD	ALTERNATES		
			B	C	
ME_010	10	19	10	—	MAE 04
ME_013	13	19	13	25	MAE 05
ME_016	16	19	13	25	MAE 05
ME_020	20	19	13	25	MAE 06
ME_025	25	19	13	25	MAE 06
ME_032	32	19	13	25	MAE 06
ME_040	40	25	19	30	MAE 06

L=63 SBR MAX=19 XP ALTERATION NOT AVAILABLE  
L=71 SBR MAX=19 IF L=63 AND SBR=19

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

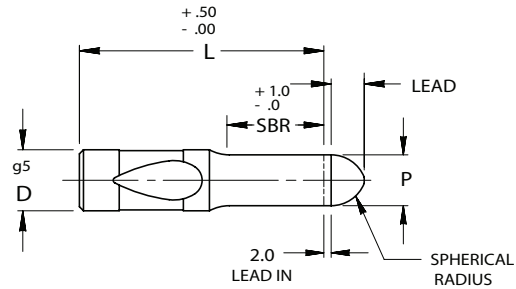
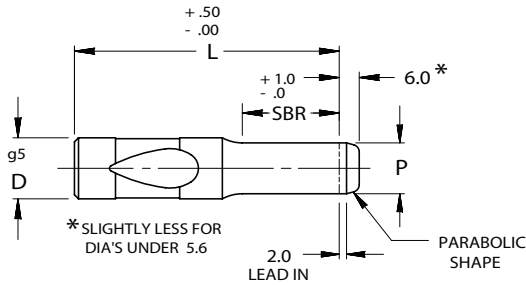
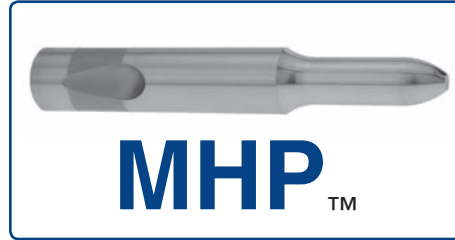
# BALL LOCK PILOTS

## HEAVY DUTY

STANDARD STYLE



BULLET NOSE STYLE



**ORDER EXAMPLE:**

(Reference page 6)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	"P" DIMENSION	STEEL
EXAMPLE:	6	MHT	020	080	B	16.0	PM4
EXAMPLE:	6	MHP	013	090	STD	9.0	PM4

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

**MUST SPECIFY PM4**

**MHP STYLE LEAD**

P DIM	LEAD
1.50-9.50	4
9.51-up	10

FOR STANDARD ALTERATIONS SEE PAGES 51-56.

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

METRIC CATALOG TYPE	SHANK DIA D	RANGE P	LENGTH "L"				
			71	80	90	100	110
MH_010	10	2.50 - 10.00	X	X	X	X	X
MH_013	13	5.00 - 13.00	X	X	X	X	X
MH_016	16	8.00 - 16.00	X	X	X	X	X
MH_020	20	12.00 - 20.00	X	X	X	X	X
MH_025	25	16.00 - 25.00		X	X	X	X
MH_032	32	24.00 - 32.00		X	X	X	X
MH_040	40	30.00 - 40.00		X	X	X	X

**Material**

Steel: PM4, HRC 60-63  
Alternate: 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

**MUST SPECIFY PM4**

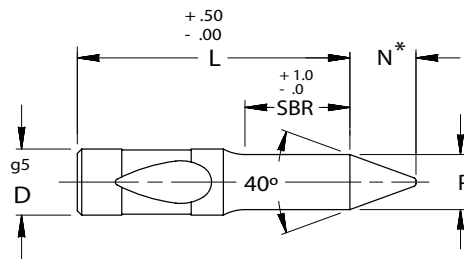
METRIC CATALOG TYPE	SHANK D	SBR		
		NAPMA STD	ALTERNATES	
			B	C
MH_010	10	19	10	—
MH_013	13	19	13	25
MH_016	16	19	13	25
MH_020	20	19	13	25
MH_025	25	19	13	25
MH_032	32	19	13	25
MH_040	40	25	19	30

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 6)  
SPECIFY: QTY: TYPE "D" "L" POINT "P"  
DIMENSION STEEL  
EXAMPLE: 6 MHA 025 100 B 20.0 PM4

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

**MUST SPECIFY PM4**

FOR STANDARD ALTERATIONS SEE PAGES 51-56.

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

METRIC CATALOG TYPE	SHANK DIA D	RANGE P	LEAD N	P BELOW SEE NOTE*	LENGTH "L"			
					80	90	100	110
MHA 010	10	5.90 - 10.00	8	5.64	X	X	X	X
MHA 013	13	9.90 - 13.00	10	7.11	X	X	X	X
MHA 016	16	12.90 - 16.00	15	10.74	X	X	X	X
MHA 020	20	15.90 - 20.00	20	14.38	X	X	X	
MHA 025	25	19.90 - 25.00	25	18.00	X	X	X	
MHA 032	32	24.90 - 32.00	30	21.67	X	X		
MHA 040	40	31.90 - 40.00	40	28.96	X			

**Material**

Steel: PM4, HRC 60-63  
Alternate: 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

**MUST SPECIFY PM4**

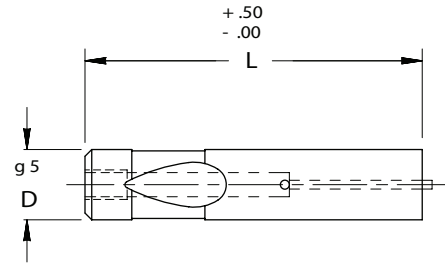
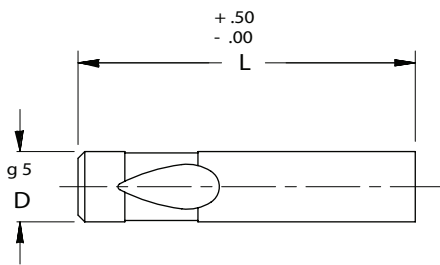
METRIC CATALOG TYPE	SHANK D	SBR	
		NAPMA	ALTERNATES
		STD	B
MHA 010	10	19	32
MHA 013	13	19	32
MHA 016	16	25	38
MHA 020	20	25	38
MHA 025	25	25	38
MHA 032	32	25	38
MHA 040	40	30	45

NOTE: MUST MAINTAIN MIN. SHANK LENGTH OF 38 MM.

# BALL LOCK PUNCH BLANKS



## HEAVY DUTY/SOLID/EJECTOR



**Material**  
 Steel: PM4, HRC 60-63  
 Alternate: M2, HRC 60-63

**MUST SPECIFY PM4**

**ORDER EXAMPLE:**

(Reference page 6)

**SPECIFY:** QTY: TYPE "D" "L" STEEL

EXAMPLE: 6 MHB 020 110 PM4

EXAMPLE: 6 MEB 016 090 PM4

**MUST SPECIFY PM4**

FOR STANDARD ALTERATIONS SEE PAGES 51-56.

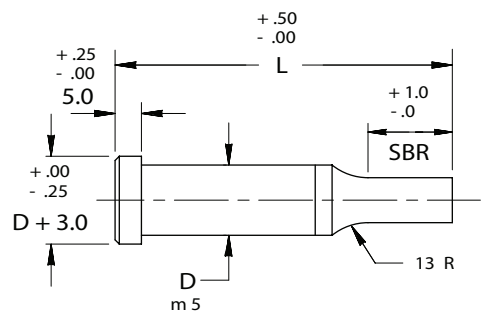
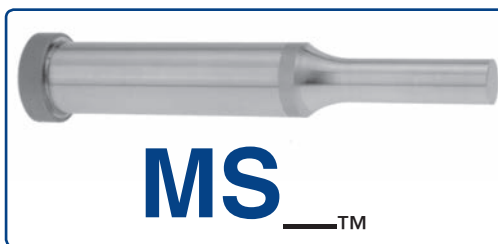
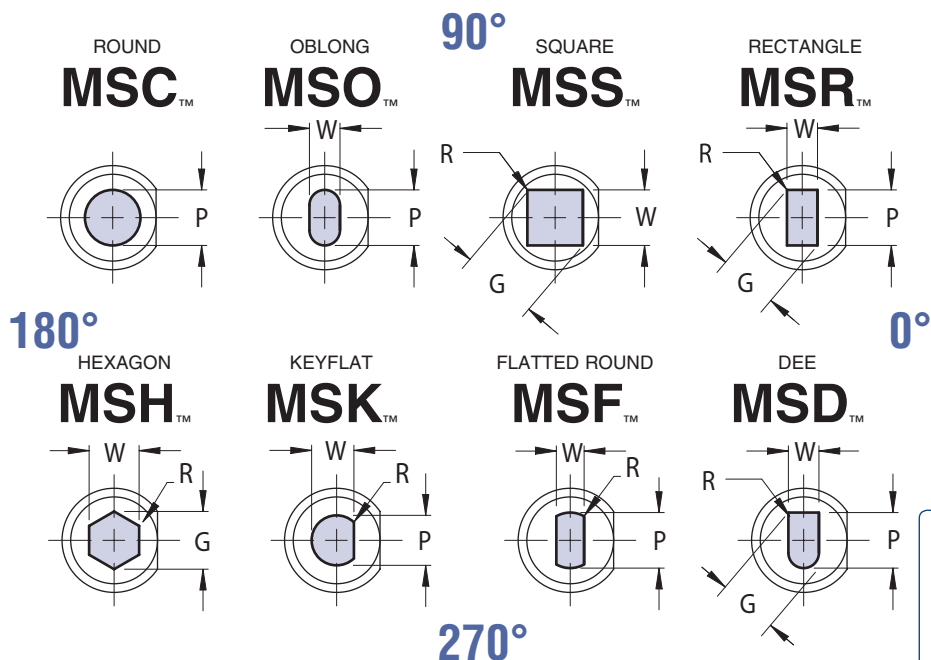
Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

METRIC CATALOG TYPE SOLID	SHANK DIA D	OVERALL LENGTH "L"					
		71	80	90	100	110	125
MHB 010	10	X	X	X	X	X	X
MHB 013	13	X	X	X	X	X	X
MHB 016	16	X	X	X	X	X	X
MHB 020	20	X	X	X	X	X	X
MHB 025	25		X	X	X	X	X
MHB 032	32		X	X	X	X	X
MHB 040	40		X	X	X	X	X

METRIC CATALOG TYPE EJECTOR	SHANK DIA D	OVERALL LENGTH "L"							EJECTOR SIZE
		63	71	80	90	100	110	125	
MEB 010	10	X	X	X	X	X	X		MAE 04
MEB 013	13	X	X	X	X	X	X	X	MAE 05
MEB 016	16	X	X	X	X	X	X	X	MAE 05
MEB 020	20	X	X	X	X	X	X	X	MAE 06
MEB 025	25			X	X	X	X	X	MAE 06
MEB 032	32			X	X	X	X	X	MAE 06
MEB 040	40			X	X	X	X	X	MAE 06

# SHOULDER PUNCHES

## SOLID



**ORDER EXAMPLE:**  
(Reference page 6)

SPECIFY:	QTY:	TYPE	"D"	LENGTH	POINT DIMENSIONS	P(OR P&W) CODE	ALTERATION	ALTERNATE POINT TOLERANCE	STEEL
EXAMPLE:	6	MSC	013	090	13	10.0	F1	T2	PM4
EXAMPLE:	6	MSO	016	080	STD	14.0 x 8.0	F1	STD	PM4

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

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 51-56.

METRIC 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_005	5	1.60 - 4.99	1.60	5.00	X	X	X	X	X	X	X	X	X	X	X
MS_006	6	1.60 - 5.99	1.60	6.00		X	X	X	X	X	X	X	X	X	X
MS_008	8	2.50 - 7.99	2.50	8.00		X	X	X	X	X	X	X	X	X	X
MS_010	10	3.20 - 9.99	3.20	10.00		X	X	X	X	X	X	X	X	X	X
MS_013	13	5.00 - 12.99	4.50	13.00		X	X	X	X	X	X	X	X	X	X
MS_016	16	8.00 - 15.99	6.00	16.00		X	X	X	X	X	X	X	X	X	X
MS_020	20	10.00 - 19.99	8.00	20.00			X	X	X	X	X	X	X	X	X
MS_025	25	12.00 - 24.99	9.00	25.00			X	X	X	X	X	X	X	X	X
MS_032	32	16.00 - 31.99	10.00	32.00					X	X	X	X	X	X	X
MS_040	40	30.00 - 39.99	14.00	40.00								X	X	X	X

**Material**  
Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: 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

**MUST SPECIFY PM4**

Alternate Point Tolerance **T2**

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

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

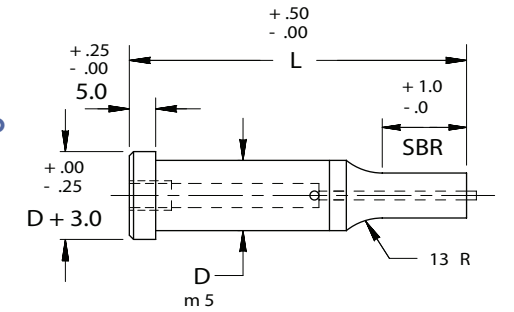
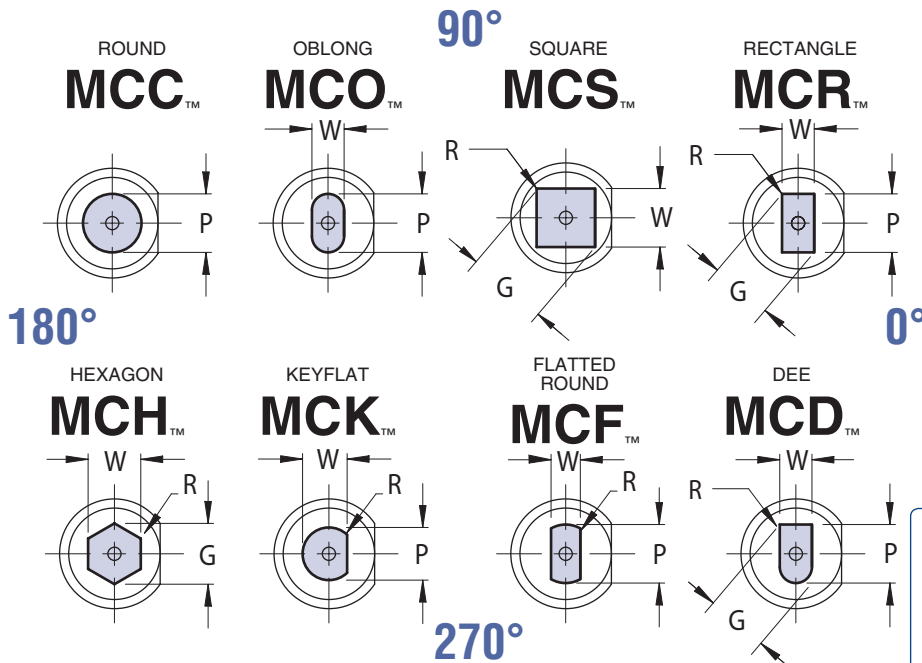
METRIC CATALOG TYPE	SHANK D	SBR		
		NAPMA	ALTERNATES	
			STD	B
MS_005	5	13	10	—
MS_006	6	13	10	—
MS_008	8	19	13	—
MS_010	10	19	13	25
MS_013	13	19	13	25
MS_016	16	19	13	25
MS_020	20	19	13	25
MS_025	25	19	13	25
MS_032	32	25	19	30
MS_040	40	25	19	30

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

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

# SHOULDER PUNCHES

## EJECTOR



**ORDER EXAMPLE:**  
(Reference page 6)

SPECIFY:	QTY:	TYPE	"D"	"L"	LENGTH	DIMENSIONS	CODE	TOLERANCE	ALTERNATE POINT	STEEL
EXAMPLE:	6	MCC	013	090	STD	10.0	F1	STD		PM4
EXAMPLE:	6	MCO	016	080	B	13.0 x 9.0	F1	T2		PM4

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

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 51-56.

METRIC 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_005	5	1.60 - 4.99	1.60	5.00	X	X	X	X	X	X	X	X	X
MC_006	6	2.50 - 5.99	2.50	6.00	X	X	X	X	X	X	X	X	X
MC_008	8	3.20 - 7.99	3.20	8.00	X	X	X	X	X	X	X	X	X
MC_010	10	4.50 - 9.99	4.50	10.00	X	X	X	X	X	X	X	X	X
MC_013	13	6.00 - 12.99	6.00	13.00	X	X	X	X	X	X	X	X	X
MC_016	16	8.00 - 15.99	7.50	16.00	X	X	X	X	X	X	X	X	X
MC_020	20	10.00 - 19.99	8.00	20.00		X	X	X	X	X	X	X	X
MC_025	25	12.00 - 24.99	9.00	25.00		X	X	X	X	X	X	X	X
MC_032	32	16.00 - 31.99	10.00	32.00				X	X	X	X	X	X
MC_040	40	30.00 - 39.99	14.00	40.00							X	X	X

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

**Material**  
Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63 **MUST SPECIFY PM4**

**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  $\begin{matrix} .008 \\ \text{Feature Control Symbol} \end{matrix}$

METRIC CATALOG TYPE	SHANK D	SBR			EJECTOR SIZE
		NAPMA	ALTERNATES		
		STD	B	C	
MC_005	5	13	10	—	MAE 02
MC_006	6	13	10	—	MAE 03
MC_008	8	19	13	—	MAE 04
MC_010	10	19	13	25	MAE 05
MC_013	13	19	13	25	MAE 05
MC_016	16	19	13	25	MAE 06
MC_020	20	19	13	25	MAE 06
MC_025	25	19	13	25	MAE 06
MC_032	32	25	19	30	MAE 06
MC_040	40	25	19	30	MAE 06

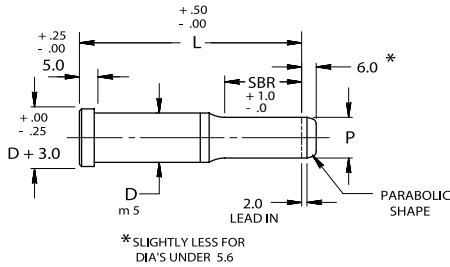
L=50 SBR MAX=13 L=60 SBR MAX=19  
L=56 SBR MAX=19 L=63 SBR MAX=25



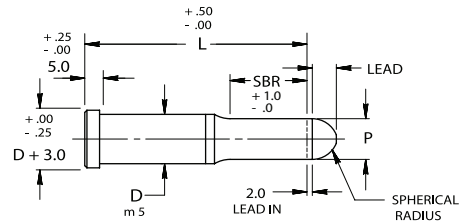
# SHOULDER PILOTS

## PILOT

STANDARD STYLE



BULLET NOSE STYLE



**ORDER EXAMPLE:**

(Reference page 6)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	"P" DIMENSION	ALTERNATE TOLERANCE	STEEL
EXAMPLE:	6	MST	013	071	STD	10.0	T2	PM4
EXAMPLE:	6	MSP	020	080	B	18.0	STD	PM4

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

FOR STANDARD ALTERATIONS SEE PAGES 51-56.

**MSP STYLE LEAD**

P DIM	LEAD
1.50-9.50	4
9.51-up	10

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

METRIC CATALOG TYPE	SHANK DIA D	RANGE P	LENGTH "L"								
			40	50	56	60	63	70	71	80	90
MS_005	5	1.55 - 5.00	X	X	X	X	X	X	X	X	X
MS_006	6	1.55 - 6.00		X	X	X	X	X	X	X	X
MS_008	8	2.45 - 8.00		X	X	X	X	X	X	X	X
MS_010	10	3.15 - 10.00		X	X	X	X	X	X	X	X
MS_013	13	4.95 - 13.00		X	X	X	X	X	X	X	X
MS_016	16	7.95 - 16.00		X	X	X	X	X	X	X	X
MS_020	20	9.95 - 20.00			X	X	X	X	X	X	
MS_025	25	11.95 - 25.00			X	X	X	X	X	X	
MS_032	32	15.95 - 32.00					X	X	X	X	

**Material**

Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

**Standard Point Tolerance**

Round P  $\begin{matrix} +.01 \\ -.00 \end{matrix}$   $\text{\textcircled{C}}$  .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  $\begin{matrix} .008 \\ \text{\textcircled{C}} \end{matrix}$

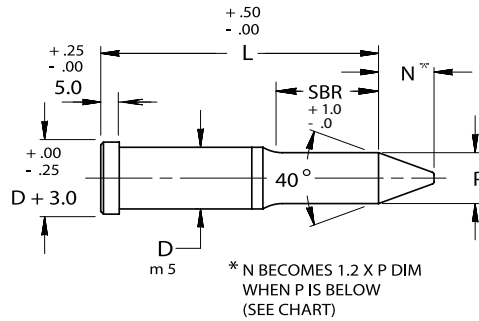
METRIC CATALOG TYPE	SHANK D	SBR		
		NAPMA	ALTERNATES	
			STD	B
MS_005	5	13	10	—
MS_006	6	13	10	—
MS_008	8	19	13	—
MS_010	10	19	13	25
MS_013	13	19	13	25
MS_016	16	19	13	25
MS_020	20	19	13	25
MS_025	25	19	13	25
MS_032	32	25	19	30

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 6)

SPECIFY:	QTY:	TYPE	"D"	"L"	LENGTH	DIMENSION	TOLERANCE	STEEL
EXAMPLE:	6	MSA	020	080	STD	17.0	STD	PM4

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

FOR STANDARD ALTERATIONS SEE PAGES 51-56.

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

METRIC CATALOG TYPE	SHANK DIA D	RANGE P	LEAD N	P BELOW SEE NOTE*	LENGTH "L"				
					63	70	71	80	90
MSA 010	10	4.85 - 10.00	8	5.64	X	X	X	X	X
MSA 013	13	6.30 - 13.00	10	7.11	X	X	X	X	
MSA 016	16	9.95 - 16.00	15	10.74		X	X	X	
MSA 020	20	13.60 - 20.00	20	14.38		X	X	X	
MSA 025	25	17.25 - 25.00	25	18.00		X	X	X	
MSA 032	32	20.85 - 32.00	30	21.67			X	X	

**Material**

Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: 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

**MUST SPECIFY PM4**

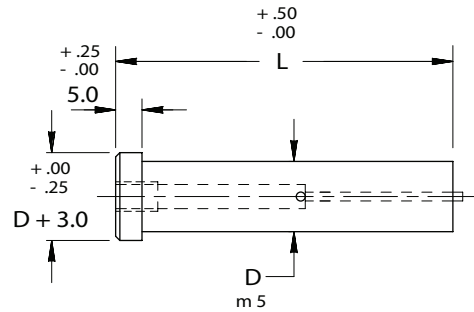
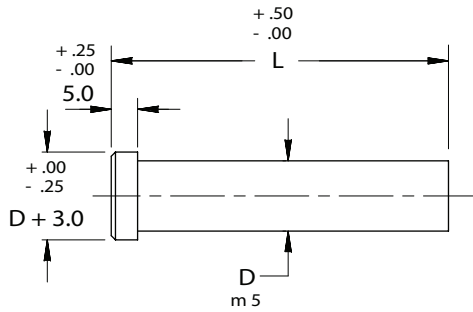
Alternate Point Tolerance **T2**

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

METRIC CATALOG TYPE	SHANK D	SBR	
		NAPMA	ALTERNATES
		STD	B
MSA 010	10	19	25
MSA 013	13	19	25
MSA 016	16	19	25
MSA 020	20	19	25
MSA 025	25	19	25
MSA 032	32	25	30

# SHOULDER PUNCH BLANKS

## SOLID/EJECTOR



**Material**

Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

**MUST SPECIFY PM4**

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

METRIC CATALOG TYPE SOLID	SHANK DIA D	OVERALL LENGTH "L"									
		40	50	56	60	63	70	71	80	90	100
MSB 005	5	X	X	X	X	X	X	X	X	X	X
MSB 006	6		X	X	X	X	X	X	X	X	X
MSB 008	8		X	X	X	X	X	X	X	X	X
MSB 010	10		X	X	X	X	X	X	X	X	X
MSB 013	13		X	X	X	X	X	X	X	X	X
MSB 016	16		X	X	X	X	X	X	X	X	X
MSB 020	20			X	X	X	X	X	X	X	X
MSB 025	25			X	X	X	X	X	X	X	X
MSB 032	32					X	X	X	X	X	X
MSB 040	40								X	X	X

**ORDER EXAMPLE:**

(Reference page 6)

SPECIFY: QTY: TYPE "D" "L" STEEL

EXAMPLE: 6 MSB 008 100 PM4

EXAMPLE: 6 MCB 016 100 PM4

**MUST SPECIFY PM4**

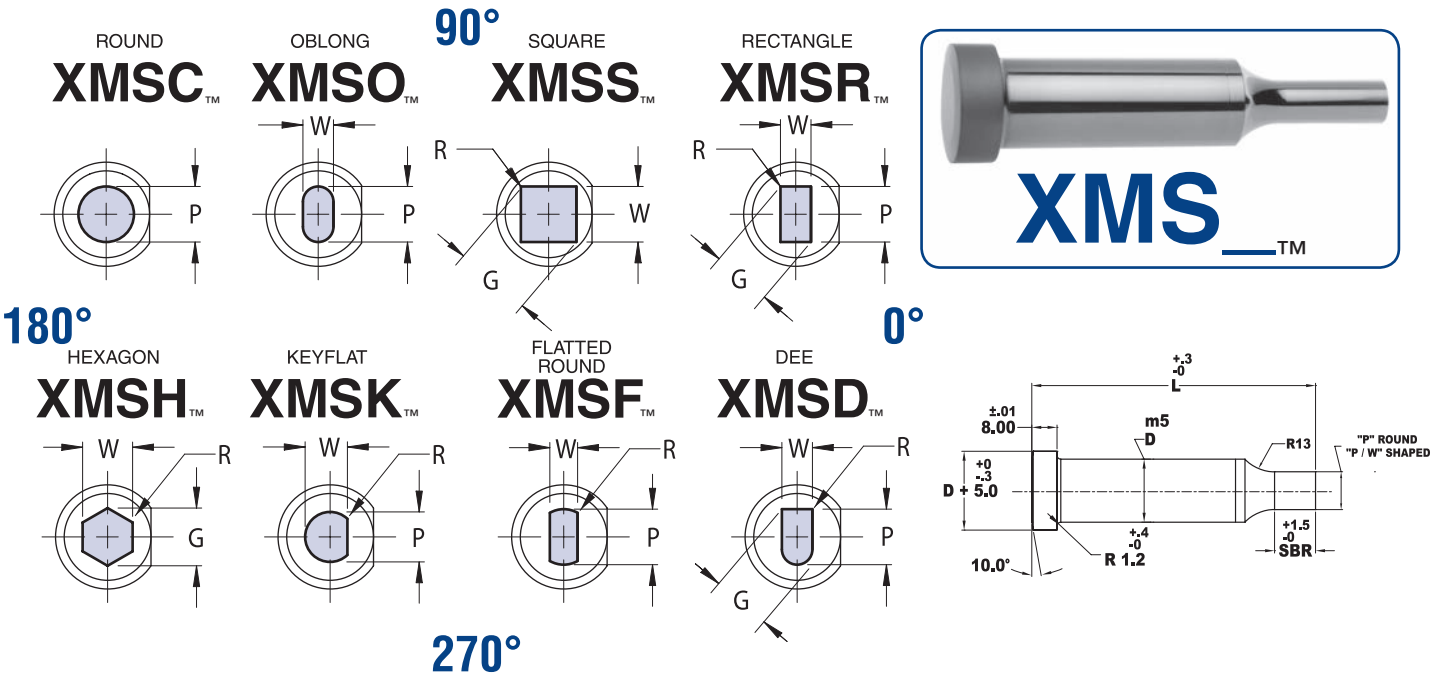
FOR STANDARD ALTERATIONS  
SEE PAGES 51-56.

METRIC CATALOG TYPE EJECTOR	SHANK DIA D	OVERALL LENGTH "L"										EJECTOR SIZE
		50	56	60	63	70	71	80	90	100		
MCB 005	5	X	X	X	X	X	X	X	X	X	X	MAE 02
MCB 006	6	X	X	X	X	X	X	X	X	X	X	MAE 03
MCB 008	8	X	X	X	X	X	X	X	X	X	X	MAE 04
MCB 010	10	X	X	X	X	X	X	X	X	X	X	MAE 05
MCB 013	13	X	X	X	X	X	X	X	X	X	X	MAE 06
MCB 016	16	X	X	X	X	X	X	X	X	X	X	MAE 06
MCB 020	20		X	X	X	X	X	X	X	X	X	MAE 06
MCB 025	25		X	X	X	X	X	X	X	X	X	MAE 06
MCB 032	32					X	X	X	X	X	X	MAE 06
MCB 040	40								X	X	X	MAE 06



# DURA PUNCHES

## SOLID



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

FOR STANDARD ALTERATIONS SEE PAGES 51-56.

METRIC CATALOG TYPE	ROUND DIA D	ROUND	SHAPE		OVERALL LENGTH "L"			
		RANGE P	MIN W	MAX G/P	70	80	90	100
XMS_008	8	3.10 - 7.99	3.10	8.00	X	X	X	X
XMS_010	10	3.20 - 9.99	3.20	10.00	X	X	X	X
XMS_013	13	5.00 - 12.99	4.50	13.00	X	X	X	X
XMS_016	16	8.00 - 15.99	6.00	16.00	X	X	X	X
XMS_020	20	10.00 - 19.99	8.00	20.00	X	X	X	X
XMS_025	25	12.00 - 24.99	9.00	25.00	X	X	X	X
XMS_032	32	16.00 - 31.99	10.00	32.00	X	X	X	X

**Material**  
Steel: PM4 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 7)

SPECIFY:	QTY:	TYPE	"D"	"L"	LENGTH	POINT DIMENSIONS	P(OR P&W)	ALTERATION CODE	STEEL
EXAMPLE:	6	XMSC	013	090	13	10.0	F1		PM4
EXAMPLE:	6	XMSO	016	080	STD	14.0 x 8.0	F1 @ 90		PM4

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

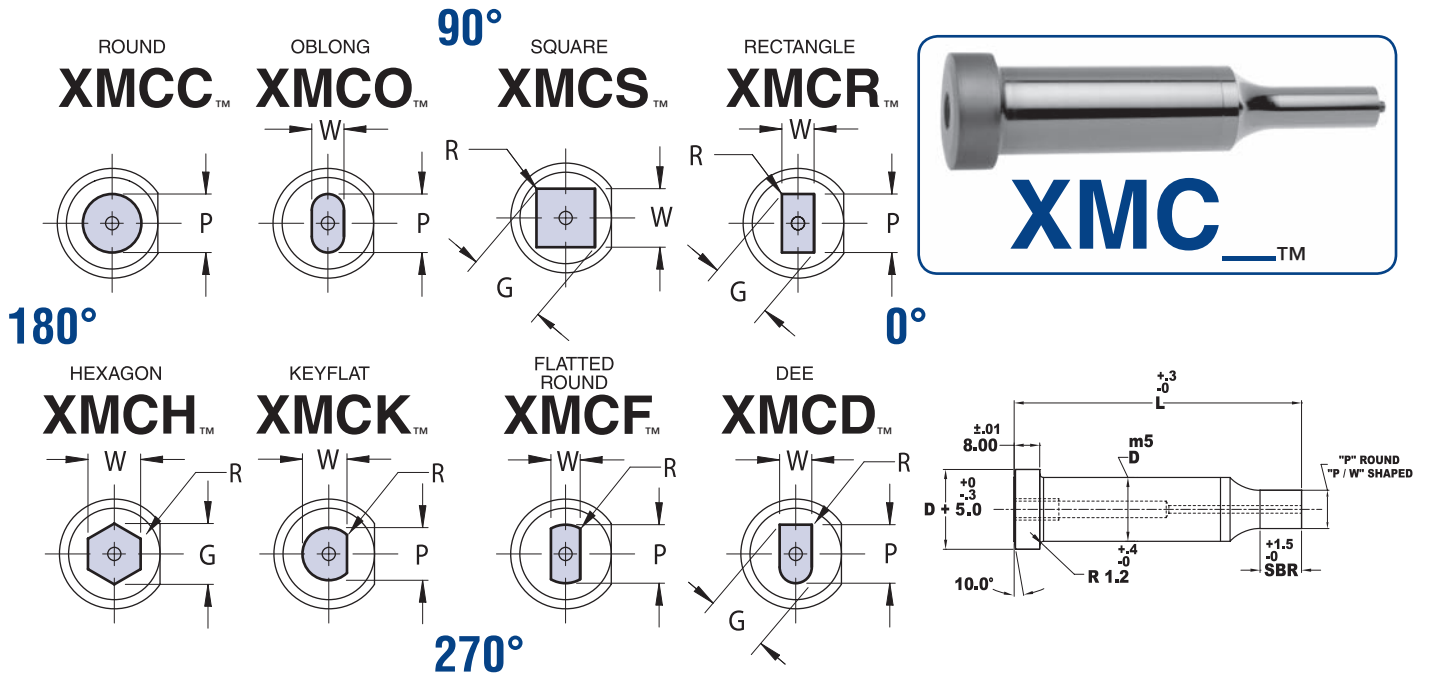
METRIC CATALOG TYPE	SHANK DIA D	SBR	
		STD	ALTERNATE B
XMS_008	8	13	19
XMS_010	10	13	19
XMS_013	13	13	19
XMS_016	16	19	25
XMS_020	20	19	25
XMS_025	25	19	25
XMS_032	32	19	25

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



# DURA PUNCHES

## EJECTOR



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

FOR STANDARD ALTERATIONS SEE PAGES 51-56.

METRIC CATALOG TYPE	SHANK DIA D	ROUND	SHAPE		OVERALL LENGTH "L"			
		RANGE P	MIN W	MAX G/P	70	80	90	100
XMC_008	8	4.00 - 7.99	4.00	8.00	X	X	X	X
XMC_010	10	4.50 - 9.99	4.50	10.00	X	X	X	X
XMC_013	13	6.00 - 12.99	6.00	13.00	X	X	X	X
XMC_016	16	8.00 - 15.99	7.50	16.00	X	X	X	X
XMC_020	20	10.00 - 19.99	8.00	20.00	X	X	X	X
XMC_025	25	12.00 - 24.99	9.00	25.00	X	X	X	X
XMC_032	32	16.00 - 31.99	10.00	32.00	X	X	X	X

**Material**  
Steel: PM4 HRC 60-62  
Heads HRC 40-55

**Standard Point Tolerance**

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

Shape P, W  $\pm .01$

	.01	P to D
	.025	P to D

**ORDER EXAMPLE:**  
(Reference page 7)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT DIMENSIONS	P(OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	6	XMCC	013	090	13	10.0	F1	PM4
EXAMPLE:	6	XMCO	016	080	STD	14.0 x 8.0	F1 @ 90	PM4

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

METRIC CATALOG TYPE	SHANK D	SBR		EJECTOR SIZE
		STD	ALTERNATE B	
XMC_008	8	13	19	MAE 04
XMC_010	10	13	19	MAE 05
XMC_013	13	13	19	MAE 05
XMC_016	16	19	25	MAE 06
XMC_020	20	19	25	MAE 06
XMC_025	25	19	25	MAE 06
XMC_032	32	19	25	MAE 06

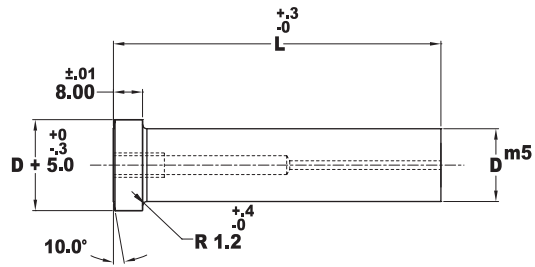
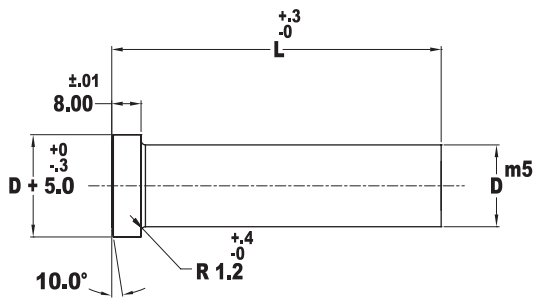
STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.



# DURA PUNCH BLANKS



## SOLID/EJECTOR



### Material

Steel: PM4 HRC 60-62  
Heads HRC 40-55

FOR STANDARD ALTERATIONS  
SEE PAGES 51-56.

METRIC CATALOG TYPE SOLID	SHANK DIA D	OVERALL LENGTH "L"			
		70	80	90	100
XMSB 008	8	X	X	X	X
XMSB 010	10	X	X	X	X
XMSB 013	13	X	X	X	X
XMSB 016	16	X	X	X	X
XMSB 020	20	X	X	X	X
XMSB 025	25	X	X	X	X
XMSB 032	32	X	X	X	X

### ORDER EXAMPLE:

(Reference page 7)

SPECIFY: QTY: TYPE "D" "L" STEEL

EXAMPLE: 6 XMSB 008 100 PM4

EXAMPLE: 6 XMCB 016 090 PM4

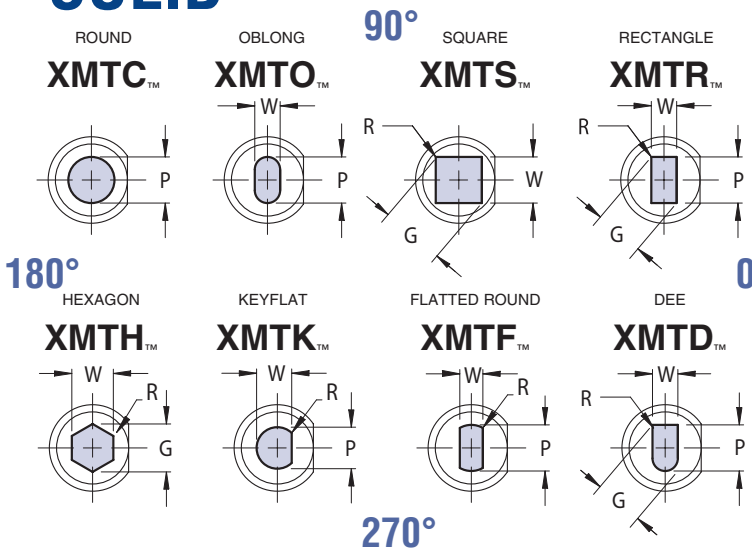
Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

METRIC CATALOG TYPE EJECTOR	SHANK DIA D	OVERALL LENGTH "L"				EJECTOR SIZE
		70	80	90	100	
XMCB 008	8	X	X	X	X	MAE 04
XMCB 010	10	X	X	X	X	MAE 05
XMCB 013	13	X	X	X	X	MAE 05
XMCB 016	16	X	X	X	X	MAE 06
XMCB 020	20	X	X	X	X	MAE 06
XMCB 025	25	X	X	X	X	MAE 06
XMCB 032	32	X	X	X	X	MAE 06



# TRUMPET HEAD PUNCHES

## SOLID

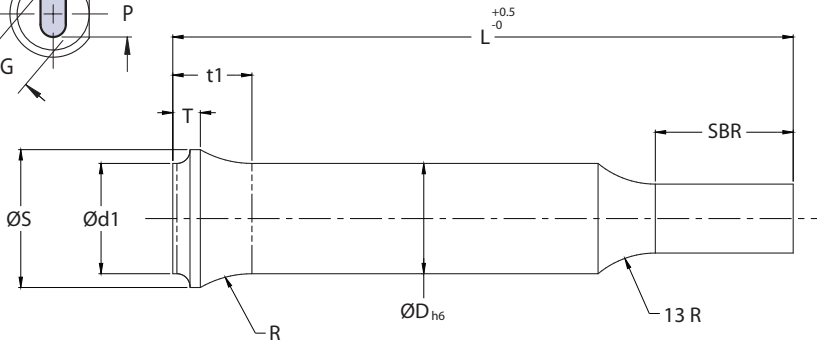


**ORDER EXAMPLE:**  
(Reference page 7)

SPECIFY:	QTY:	TYPE	"D"	"L"	LENGTH	P(OR P&W)	DIMENSIONS	ALTERATION	CODE	STEEL
EXAMPLE:	6	XMTC	013	090	13	10.0	F1	PM4		
EXAMPLE:	6	XMTO	016	080	STD	14.0 x 8.0	F1 @ 90	PM4		

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

FOR STANDARD ALTERATIONS SEE PAGES 51-56.



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

METRIC CATALOG TYPE	ØD	ØS	Ød1	t1	T	R	ROUND	SHAPE		OVERALL LENGTH "L"			
							RANGE P	MIN. W	MAX P/G	71	80	90	100
XMT_005	5	7	5	8.36	4	10	1.60-4.99	1.60	5.00	X	X	X	X
XMT_006	6	9	6	9.27	4	10	1.60-5.99	1.60	6.00	X	X	X	X
XMT_008	8	11	8	9.81	4	12	2.50-7.99	2.50	8.00	X	X	X	X
XMT_010	10	14	10	11.48	4	15	3.20-9.99	3.20	10.00	X	X	X	X
XMT_013	13	17	13	11.48	4	15	5.00-12.99	4.50	13.00	X	X	X	X
XMT_016	16	20	16	11.48	4	15	8.00-15.99	6.00	16.00	X	X	X	X
XMT_020	20	25	20	12.29	4	15	10.00-19.99	8.00	20.00	X	X	X	X

**Material**  
Steel: PM4 HRC 62-66  
Heads HRC 45-55

**Standard Point Tolerance**

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

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

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

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

P to D  $\ .008 \ \text{⊙}$

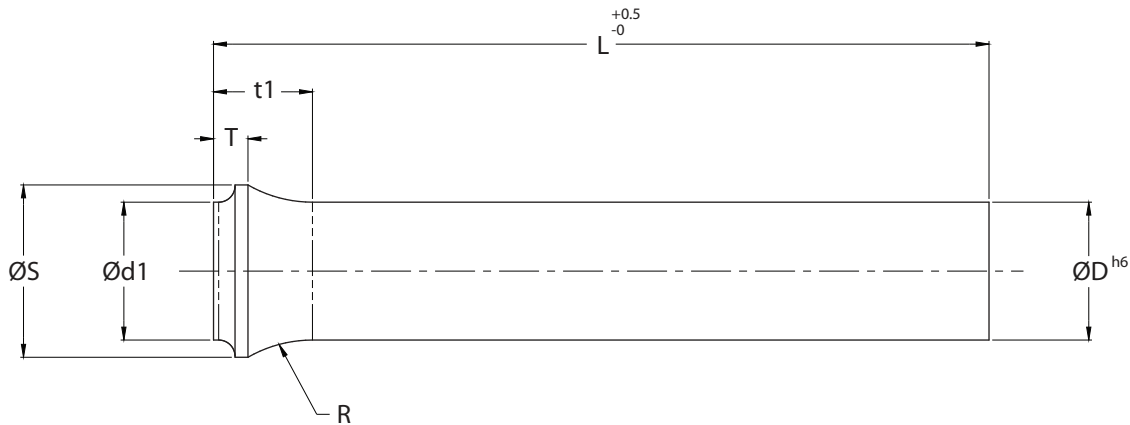
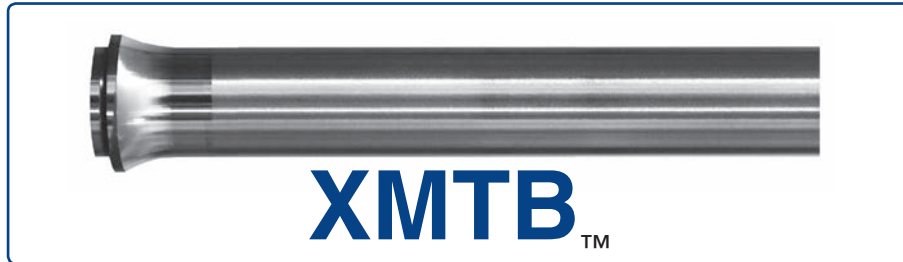
STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.  
SEE PAGE 18 OF METRIC CATALOG.

METRIC CATALOG TYPE	SHANK D	STD.	SBR	
			B	C
XMT_005	5	13	10	-
XMT_006	6	13	10	-
XMT_008	8	19	13	-
XMT_010	10	19	13	25
XMT_013	13	19	13	25
XMT_016	16	19	13	25
XMT_020	20	19	13	25



# TRUMPET HEAD PUNCH BLANKS

## SOLID



FOR STANDARD ALTERATIONS  
SEE PAGES 51-56.

**Material**  
Steel: PM4 HRC 62-66  
Heads HRC 45-55

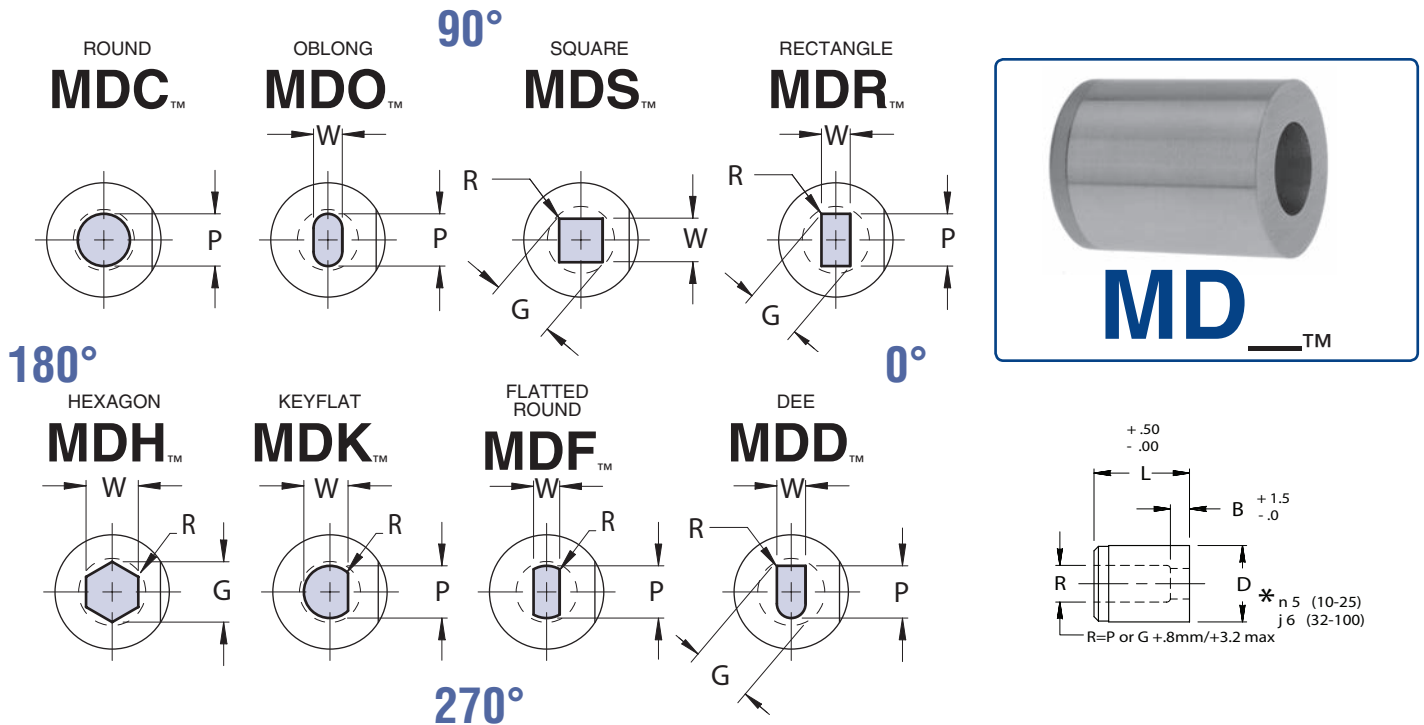
**ORDER EXAMPLE:**  
(Reference page 7)  
SPECIFY: QTY: TYPE "D" "L" STEEL  
EXAMPLE: 6 XMTB 013 090 PM4  
EXAMPLE: 6 XMTB 016 080 PM4  
Note: When ordering, standard quantity breaks  
are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

METRIC CATALOG TYPE	SHANK DIA						OVERALL LENGTH "L"			
	ØD	ØS	Ød1	t1	T	R	71	80	90	100
XMTB 005	5	7	5	8.36	4	10	X	X	X	X
XMTB 006	6	9	6	9.27	4	10	X	X	X	X
XMTB 008	8	11	8	9.81	4	12	X	X	X	X
XMTB 010	10	14	10	11.48	4	15	X	X	X	X
XMTB 013	13	17	13	11.48	4	15	X	X	X	X
XMTB 016	16	20	16	11.48	4	15	X	X	X	X
XMTB 020	20	25	20	12.29	4	15	X	X	X	X



# 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)

METRIC CATALOG TYPE	BODY DIA D	LAND LENGTH "B"		MAX DIA R	ROUND RANGE P	SHAPE		OVERALL LENGTH "L"							
		STD	ALT A			MIN W	MAX G/P	20	22	25	28	30	32	35	
MD_008	8	4.0	8.0	4.0	1.50 - 3.20	1.50	3.20	X	X	X	X	X	X	X	X
MD_010	10	4.0	8.0	5.6	1.60 - 5.00	1.60	5.00	X	X	X	X	X	X	X	X
MD_013	13	5.0	8.0	8.0	1.80 - 7.20	1.80	7.20	X	X	X	X	X	X	X	X
MD_016	16	5.0	8.0	9.5	5.00 - 8.80	2.50	8.80	X	X	X	X	X	X	X	X
MD_020	20	5.0	12.0	12.0	5.50 - 11.00	3.20	11.00	X	X	X	X	X	X	X	X
MD_022	22	6.0	12.0	15.0	7.50 - 14.00	4.00	14.00	X	X	X	X	X	X	X	X
MD_025	25	6.0	12.0	17.5	9.50 - 16.50	4.80	16.50	X	X	X	X	X	X	X	X
MD_032	32	6.0	12.0	20.6	13.00 - 20.00	5.50	20.00	X	X	X	X	X	X	X	X
MD_038	38	8.0	12.0	27.0	16.00 - 26.00	6.40	26.00	X	X	X	X	X	X	X	X
MD_040	40	8.0	12.0	27.0	16.60 - 26.00	6.40	26.00	X	X	X	X	X	X	X	X

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

**Standard Point Tolerance**

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

Shape P, W  $+ .02$   
 $- .0$  .02 P to D

**MUST SPECIFY M2**

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

**ORDER EXAMPLE:**  
(Reference page 6)

SPECIFY: QTY: TYPE "D" "L" "B" DIMENSIONS ALTERNATION CODE STEEL

EXAMPLE: 6 MDC 020 030 A 9.0 F2 M2

EXAMPLE: 6 MDO 013 020 STD 6.0 x 3.0 F2 M2

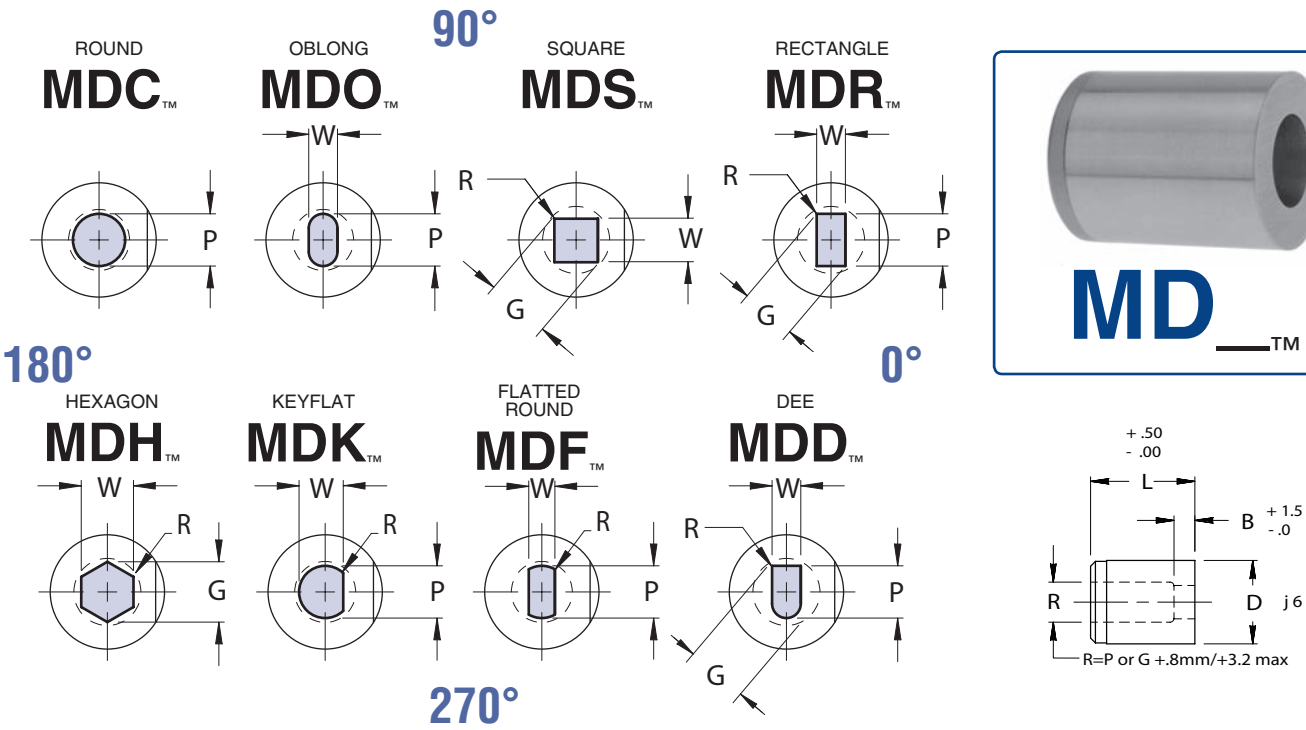
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

**MUST SPECIFY M2**

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 51-56.

# 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)

METRIC 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	22	25	28	30	32	35
									X	X	X	X	X	X
MD_045	45	8.0	12.0	20.0	36.0	17.50 - 35.00	7.50	35.00	X	X	X	X	X	X
MD_050	50	8.0	12.0	20.0	41.0	20.00 - 40.00	8.00	40.00	X	X	X	X	X	X
MD_056	56	8.0	12.0	20.0	46.0	22.50 - 45.00	9.00	45.00	X	X	X	X	X	X
MD_063	63	8.0	12.0	20.0	51.0	25.00 - 50.00	10.00	50.00	X	X	X	X	X	X
MD_071	71	8.0	12.0	20.0	57.0	27.50 - 56.00	11.00	56.00	X	X	X	X	X	X

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

**Standard Point Tolerance**

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

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

**MUST SPECIFY M2**

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

**ORDER EXAMPLE:**  
(Reference page 6)

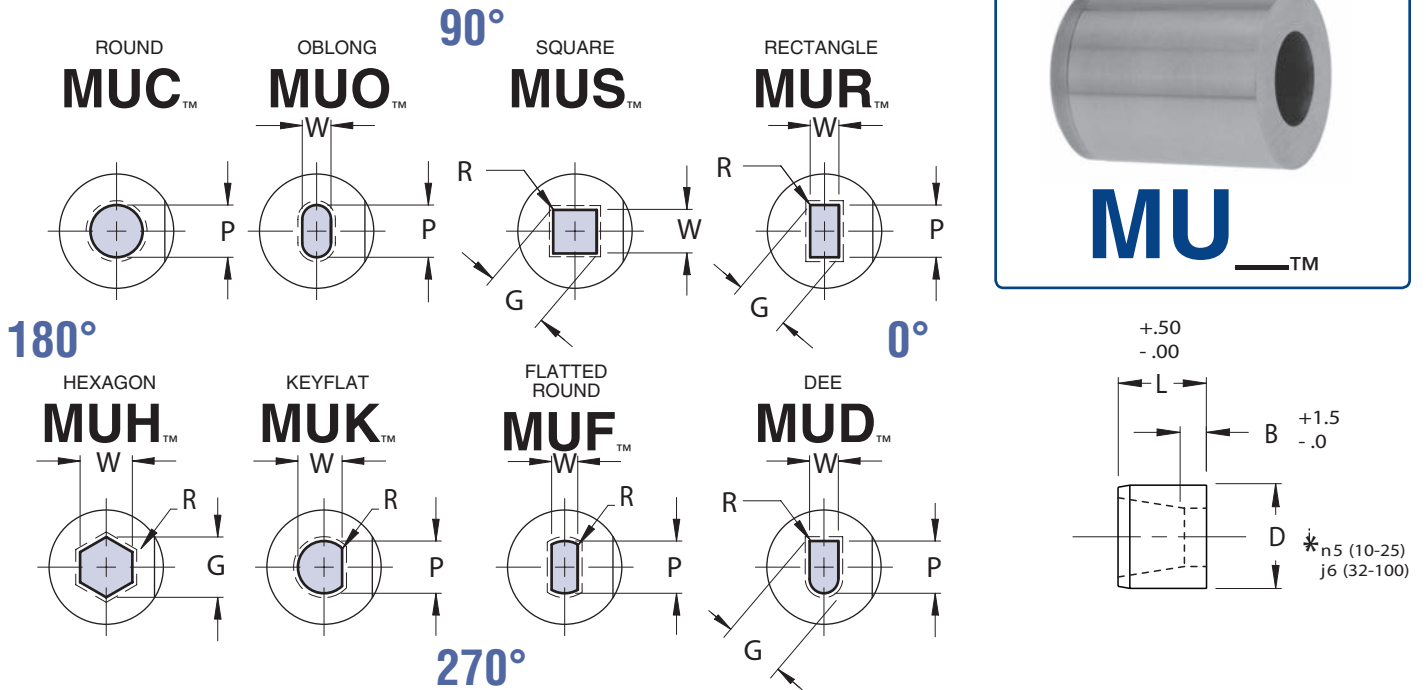
SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	LAND LENGTH DIMENSIONS	P(OR P&W)	ALTERATION CODE	STEEL
EXAMPLE:	6	MDC	050	030	A	35.0	F2	M2	
EXAMPLE:	6	MDO	063	025	STD	42.5 x 18.3	F2	M2	

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY M2**

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 51-56.

# 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.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

METRIC 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_008	8	4.0	8.0		3.0	1.5 - 3.20	1.5	3.20	X	X	X	X	X	X	X	X	
MU_010	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_013	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_016	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_020	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_022	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_025	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_032	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_038	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_040	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: M2, HRC 60-63  
Alternate: 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

**MUST SPECIFY M2**

Alternate Point Tolerance **T2**

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

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

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 6)

SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	LAND LENGTH DIMENSIONS	P(OR P&W)	ALTERNATE TOLERANCE	ALTERATION CODE	STEEL
EXAMPLE:	6	MUC	025	030	A	15.0		T2	F2	M2
EXAMPLE:	6	MUO	020	030	STD	10.0 x 5.0		STD	F2	M2

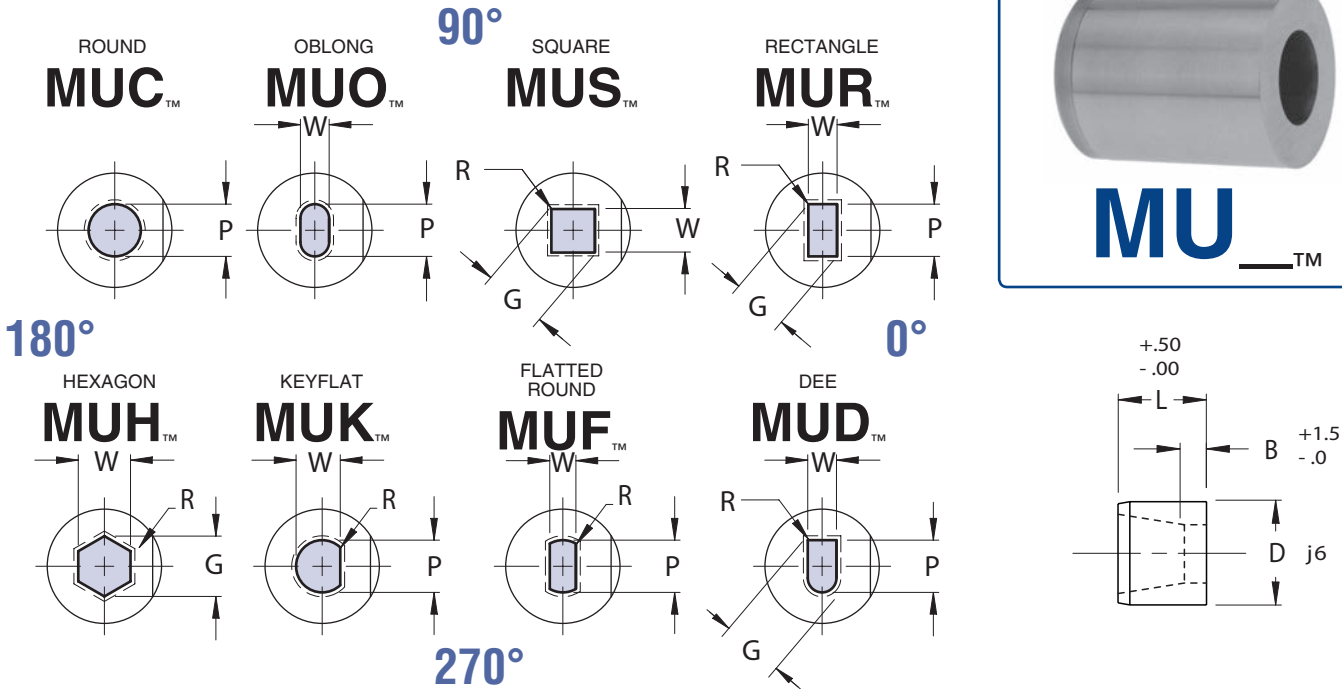
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

**MUST SPECIFY M2**

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 51-56.

# 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)

METRIC CATALOG TYPE	BODY DIA D	LAND LENGTH "B"				ROUND RANGE P	SHAPE		OVERALL LENGTH "L"				
		NAPMA		ALTERNATES			MIN W	MAX G/P	25	28	30	32	35
		STD	A	B	C								
MU_045	45	8.0	12.0	20.0	3.0	22.0 - 31.0	7.5	31.0	X	X	X	X	X
MU_050	50	8.0	12.0	20.0	3.0	24.0 - 34.0	8.0	34.0	X	X	X	X	X
MU_056	56	8.0	12.0	20.0	3.0	26.0 - 38.0	8.5	38.0	X	X	X	X	X
MU_063	63	8.0	12.0	20.0	3.0	30.0 - 43.0	9.0	43.0	X	X	X	X	X
MU_071	71	8.0	12.0	20.0	3.0	34.0 - 48.0	9.5	48.0	X	X	X	X	X
MU_076	76	8.0	12.0	20.0	3.0	36.0 - 52.0	10.0	52.0					X
MU_085	85	8.0	12.0	20.0	3.0	40.0 - 58.0	11.0	58.0					X
MU_090	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: M2, HRC 60-63  
Alternate: 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

**MUST SPECIFY M2**

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

### ORDER EXAMPLE:

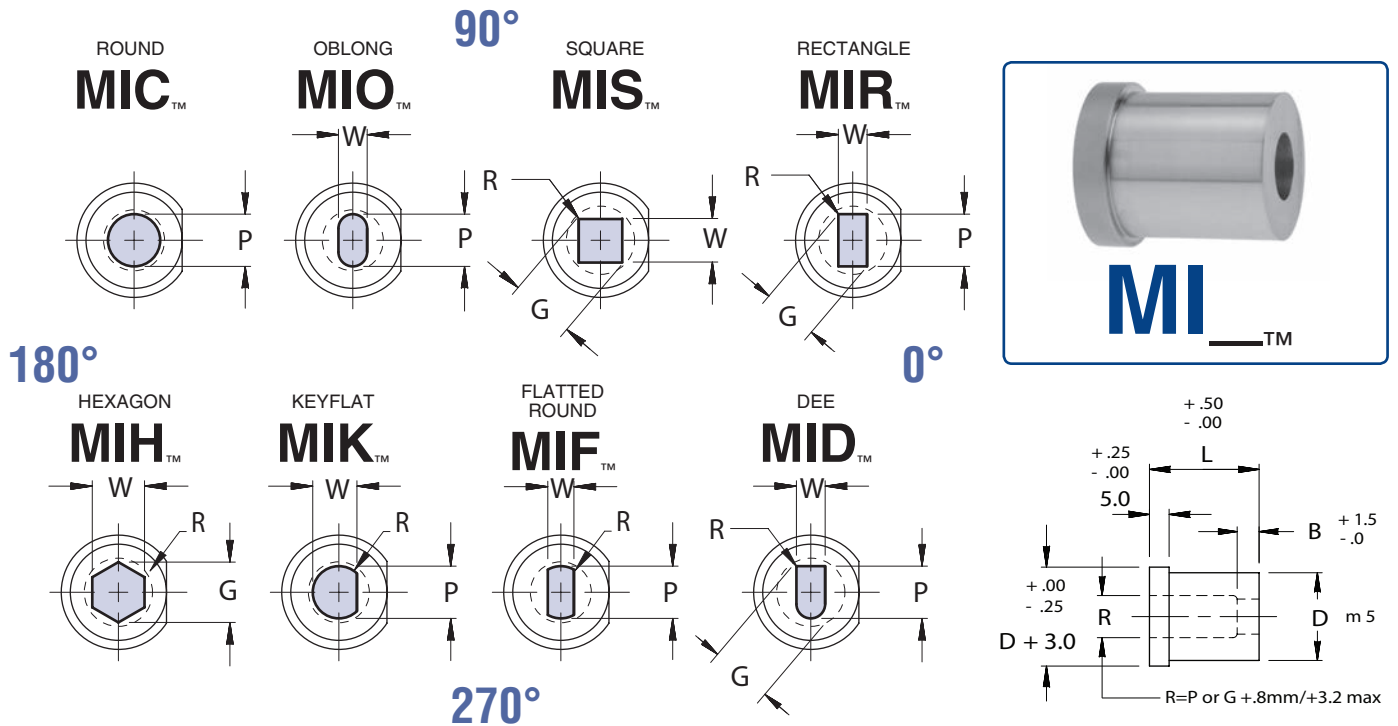
(Reference page 6)  
SPECIFY: QTY: TYPE "D" "L" "B" "P(OR P&W) DIMENSIONS" ALTERATION CODE STEEL  
EXAMPLE: 6 MUC 050 030 A 35.0 F2 M2  
EXAMPLE: 6 MUD 063 025 STD 42.5 x 18.3 F2 M2

Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY M2**

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 51-56.

# 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)

METRIC CATALOG TYPE	BODY DIA D	LAND LENGTH "B"		MAX DIA R	ROUND RANGE P	SHAPE		OVERALL LENGTH "L"							
		STD	ALT A			MIN W	MAX G/P	20	22	25	28	30	32	35	
MI_008	8	4.0	8.0	4.0	1.50 - 3.20	1.50	3.20	X	X	X	X	X	X	X	X
MI_010	10	4.0	8.0	5.6	1.60 - 5.00	1.60	5.00	X	X	X	X	X	X	X	X
MI_013	13	5.0	8.0	8.0	1.80 - 7.20	1.80	7.20	X	X	X	X	X	X	X	X
MI_016	16	5.0	8.0	9.5	5.00 - 8.80	2.50	8.80	X	X	X	X	X	X	X	X
MI_020	20	5.0	12.0	12.0	5.50 - 11.00	3.20	11.00	X	X	X	X	X	X	X	X
MI_022	22	6.0	12.0	15.0	7.50 - 14.00	4.00	14.00	X	X	X	X	X	X	X	X
MI_025	25	6.0	12.0	17.5	9.50 - 16.50	4.80	16.50	X	X	X	X	X	X	X	X
MI_032	32	6.0	12.0	20.6	13.00 - 20.00	5.50	20.00	X	X	X	X	X	X	X	X
MI_038	38	8.0	12.0	27.0	16.00 - 26.00	6.40	26.00	X	X	X	X	X	X	X	X
MI_040	40	8.0	12.0	27.0	16.00 - 26.00	6.50	26.30	X	X	X	X	X	X	X	X

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

---

**Standard Point Tolerance**

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

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

**ORDER EXAMPLE:**  
(Reference page 6)

SPECIFY: QTY: TYPE "D" "L" "B" DIMENSIONS CODE STEEL

EXAMPLE: 6 MIC 013 025 A 6.0 F1 M2

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

**MUST SPECIFY M2**

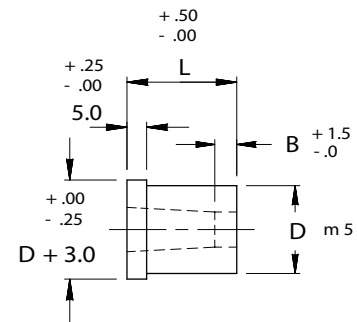
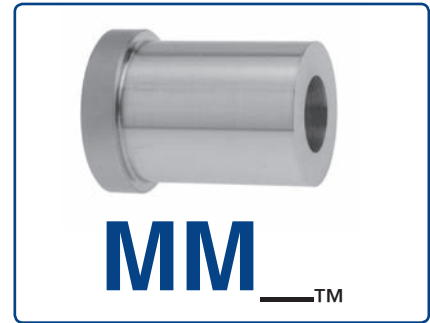
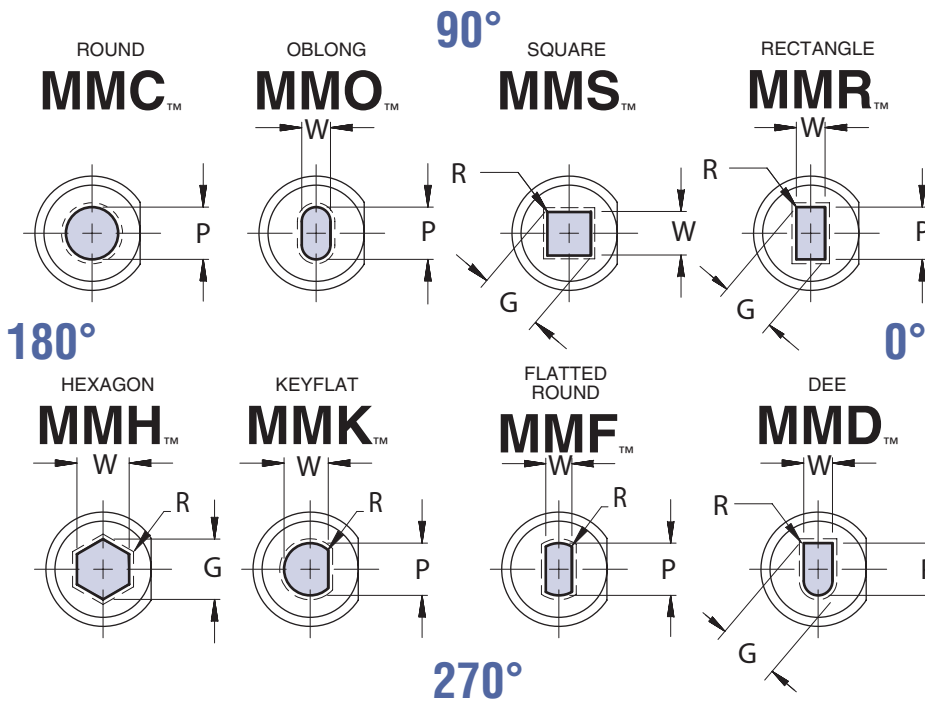
FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 51-56.

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

**MUST SPECIFY M2**

# 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)

METRIC 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_008	8	4.0	8.0		3.0	1.50-3.20	1.50	3.20	X	X	X	X	X	X	X
MM_010	10	4.0	8.0		3.0	1.60-5.00	1.60	5.00	X	X	X	X	X	X	X
MM_013	13	5.0	8.0		3.0	1.80-7.20	1.80	7.20	X	X	X	X	X	X	X
MM_016	16	5.0	8.0		3.0	5.00-8.80	2.50	8.80	X	X	X	X	X	X	X
MM_020	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_022	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_025	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_032	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_038	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_040	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_045	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  $\begin{matrix} +.01 \\ -.00 \end{matrix}$   .01 P to D

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

Alternate Hole Tolerance **T2**

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

P to D  .008

**ORDER EXAMPLE:**  
(Reference page 6)

SPECIFY:	QTY:	TYPE	"D"	"L"	"B"	DIMENSIONS	TOLERANCE	ALTERNATE	ALTERATION	CODE	STEEL
EXAMPLE:	6	MMC	013	025	C	6.0	STD	F1	M2		
EXAMPLE:	6	MMS	020	030	A	9.0	T2	F1	M2		

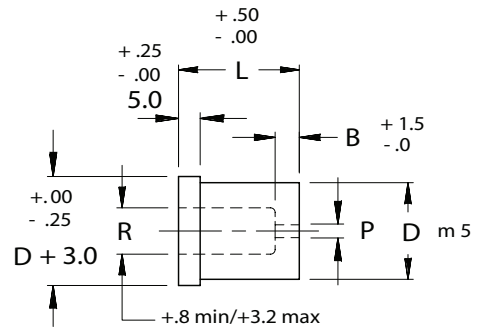
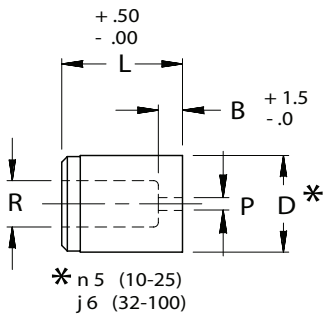
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

FOR SLUG CONTROL AND STANDARD ALTERATIONS SEE PAGES 51-56.

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

# BUTTON BLANKS

## WITH COUNTER BORE RELIEF



### Material

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

**MUST SPECIFY M2**

### ORDER EXAMPLE:

(Reference page 6)

SPECIFY: QTY: TYPE "D" "L" STEEL

EXAMPLE: 6 MDB 016 028 M2

EXAMPLE: 6 MIB 025 030 M2

**MUST SPECIFY M2**

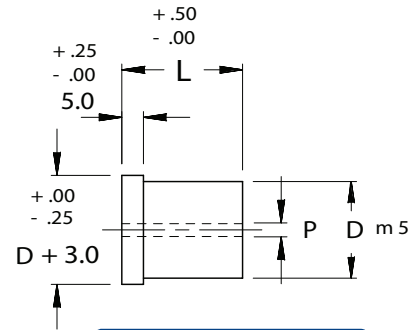
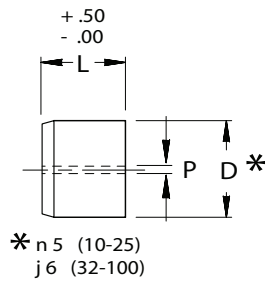
Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

STANDARD ALTERATIONS SEE PAGES 51-56.

METRIC CATALOG TYPE	BODY DIA D	DIE LAND B	RLF DIA R	DRILL SIZE P	OVERALL LENGTH "L"						
					20	22	25	28	30	32	35
M_B 008	8	4.0	4.0	1.2	X	X	X	X	X	X	X
M_B 010	10	4.0	5.6	1.2	X	X	X	X	X	X	X
M_B 013	13	5.0	8.0	1.4	X	X	X	X	X	X	X
M_B 016	16	5.0	9.5	2.0	X	X	X	X	X	X	X
M_B 020	20	5.0	12.0	2.4	X	X	X	X	X	X	X
M_B 022	22	6.0	15.0	2.4	X	X	X	X	X	X	X
M_B 025	25	6.0	17.5	2.4	X	X	X	X	X	X	X
M_B 032	32	6.0	20.6	3.2	X	X	X	X	X	X	X
M_B 038	38	8.0	27.0	3.2		X	X	X	X	X	X
M_B 040	40	8.0	27.0	3.2		X	X	X	X	X	X

# BUTTON BLANKS

## WITH STRAIGHT THRU HOLE



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

**ORDER EXAMPLE:**  
(Reference page 6)  
SPECIFY: QTY: TYPE "D" "L" STEEL  
EXAMPLE: 6 MUB 040 030 M2  
EXAMPLE: 6 MMB 020 032 M2  
**MUST SPECIFY M2**

**MUST SPECIFY M2**

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

STANDARD ALTERATIONS SEE PAGES 51-56.

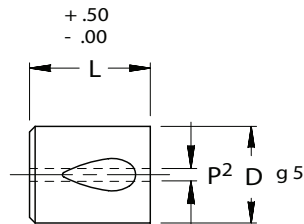
METRIC CATALOG TYPE	BODY DIA D	DRILL SIZE P	OVERALL LENGTH "L"						
			20	22	25	28	30	32	35
M_B 008	8	1.2	X	X	X	X	X	X	X
M_B 010	10	1.2	X	X	X	X	X	X	X
M_B 013	13	1.4	X	X	X	X	X	X	X
M_B 016	16	2.0	X	X	X	X	X	X	X
M_B 020	20	2.4	X	X	X	X	X	X	X
M_B 022	22	2.4	X	X	X	X	X	X	X
M_B 025	25	2.4	X	X	X	X	X	X	X
M_B 032	32	2.4	X	X	X	X	X	X	X
M_B 038	38	2.4	X	X	X	X	X	X	X
M_B 040	40	2.4	X	X	X	X	X	X	X
M_B 045	45	2.4			X	X	X	X	X
MUB 050*	50	2.4			X	X	X		X
MUB 056*	56	2.4			X	X	X		X
MUB 063*	63	2.4			X	X	X		X
MUB 071*	71	2.4			X	X	X		X
MUB 076*	76	2.4			X	X	X		X
MUB 085*	85	2.4			X	X	X		X
MUB 090*	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 STRAIGHT THRU HOLE



### Material

Steel: M2, HRC 60-63

### ORDER EXAMPLE:

(Reference page 6)

SPECIFY: QTY: TYPE "D" "L" STEEL

EXAMPLE: 6 MFB 020 032 M2

STANDARD ALTERATIONS SEE PAGES 51-56.

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

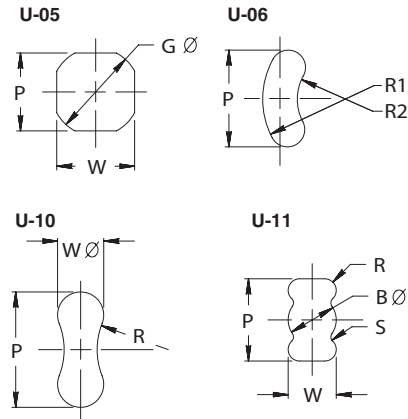
METRIC CATALOG TYPE	BODY DIA D	DRILL SIZE P2	OVERALL LENGTH "L"
			32
MFB 013	13	1.2	X
MFB 016	16	1.6	X
MFB 020	20	2.0	X
MFB 025	25	2.4	X
MFB 032	32	2.4	X

# UNIVERSAL SHAPES

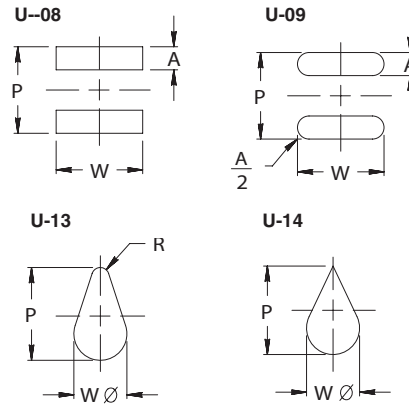
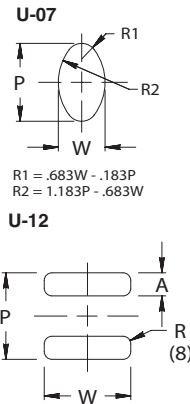
Views are shown looking through the shank of punch and top of button, as in true die position. Standard ballseat location is at 90°, standard flat location is at 0°. Points are centered on shanks unless noted by drawing. Female corners on buttons will be furnished with a .2 radius to facilitate wire 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 032-090 P=24.5 W=16.6 R=1.5, U-17

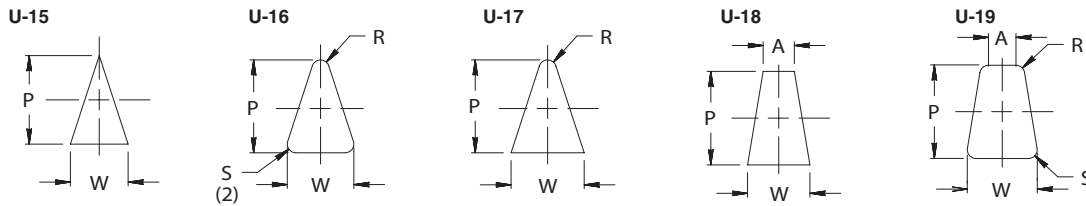
## MISCELLANEOUS



## 90°

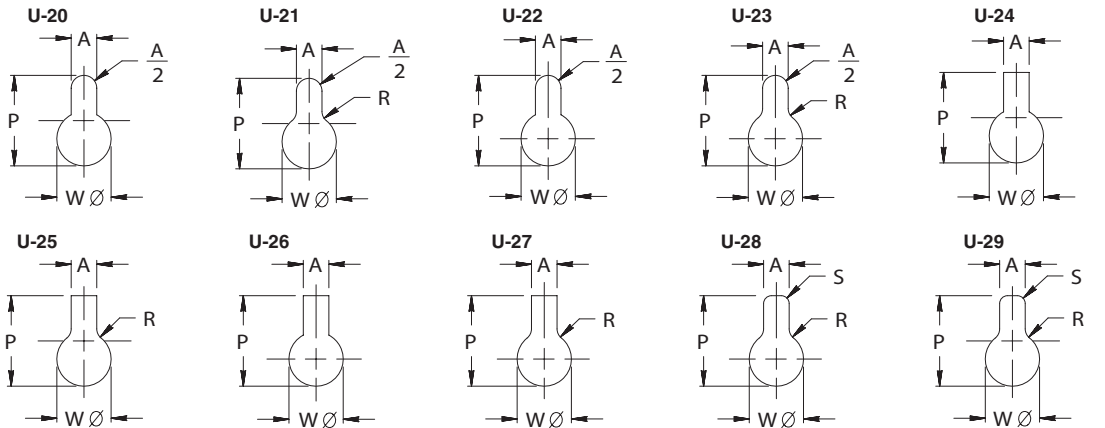


## TRIANGLES/TRAPEZOIDS



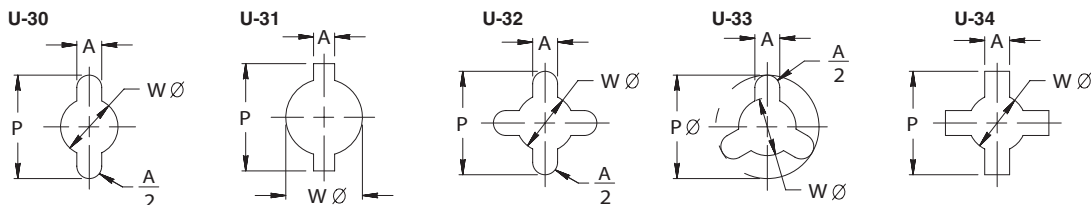
## MONO LOBES

180°



0°

## MULTI LOBES



270°

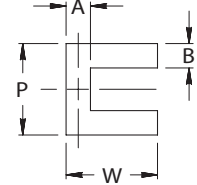
# UNIVERSAL SHAPES

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.

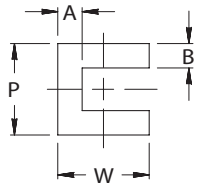
ORDER EXAMPLE: MHU 032-090 P=24.5 W=16.6 B=5.5 A=5.5, U-38

## U's

U-35

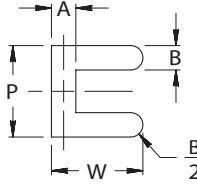


U-36

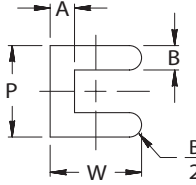


## 90°

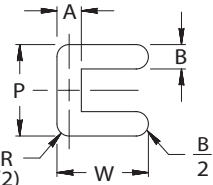
U-37



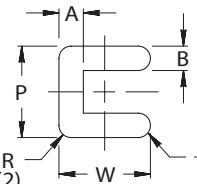
U-38



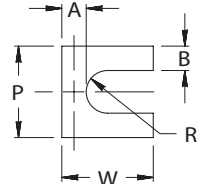
U-39



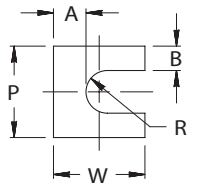
U-40



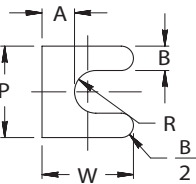
U-41



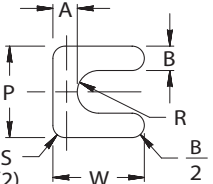
U-42



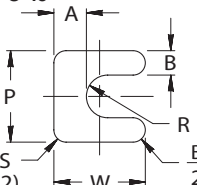
U-43



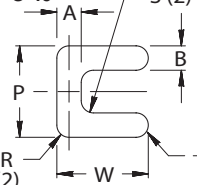
U-44



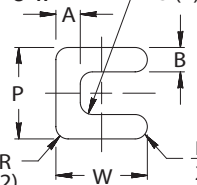
U-45



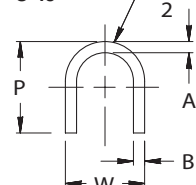
U-46



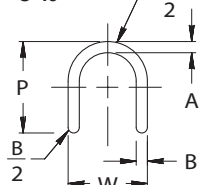
U-47



U-48



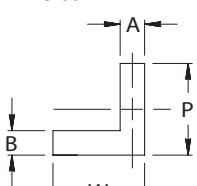
U-49



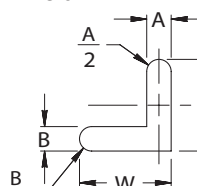
## L's

## 180°

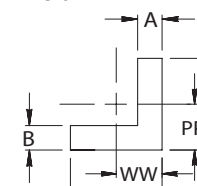
U-50



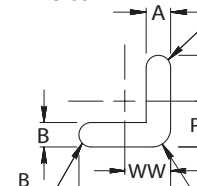
U-51



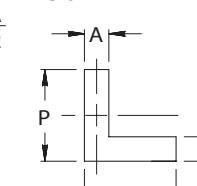
U-52



U-53

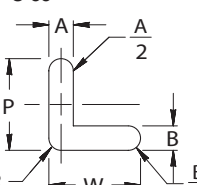


U-54

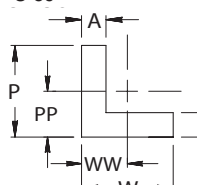


## 0°

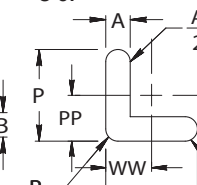
U-55



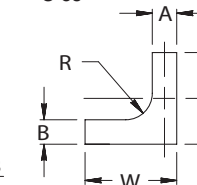
U-56



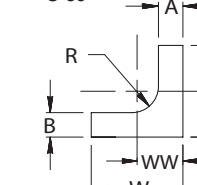
U-57



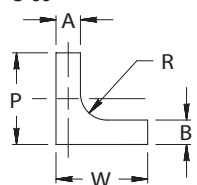
U-58



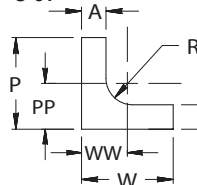
U-59



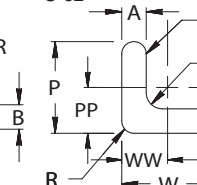
U-60



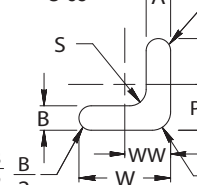
U-61



U-62



U-63



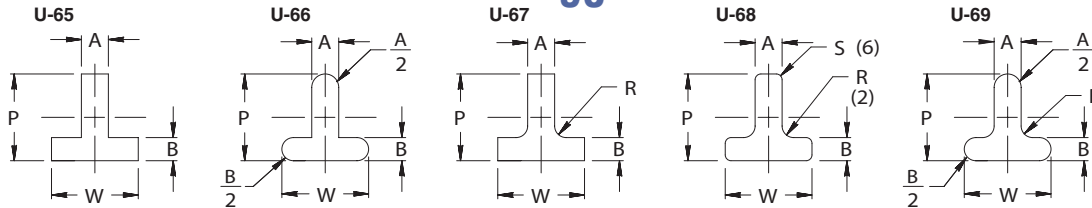
## 270°

# 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.

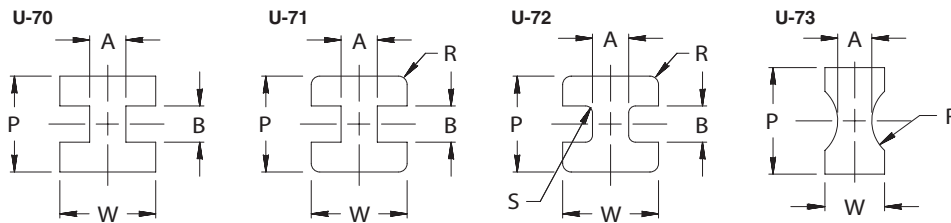
ORDER EXAMPLE: MHU 025-100 P=23.5 W=16 R=1.5, U-81

## T's

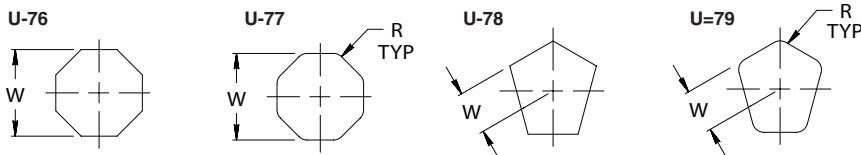


## 90°

## DUO TEES



## POLYGONS



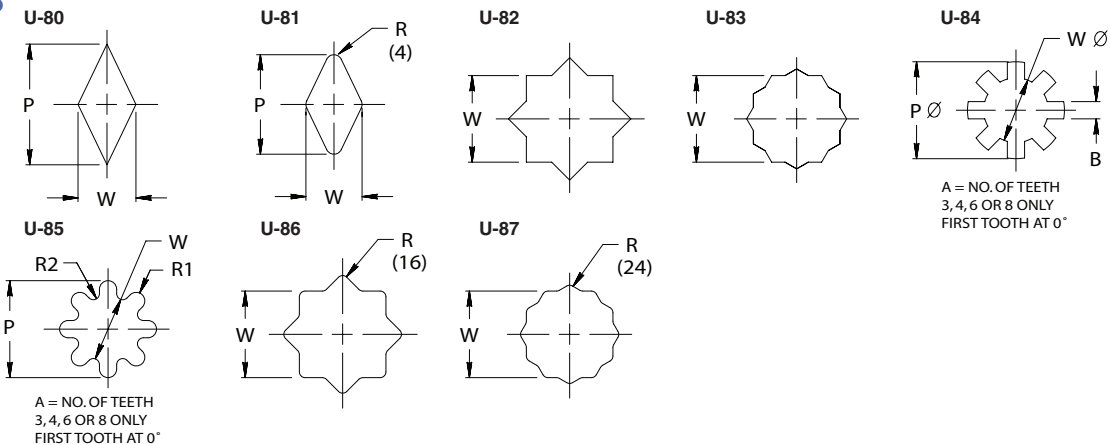
A = EVEN NO. OF SIDES

A = EVEN NO. OF SIDES

A = ODD NO. OF SIDES

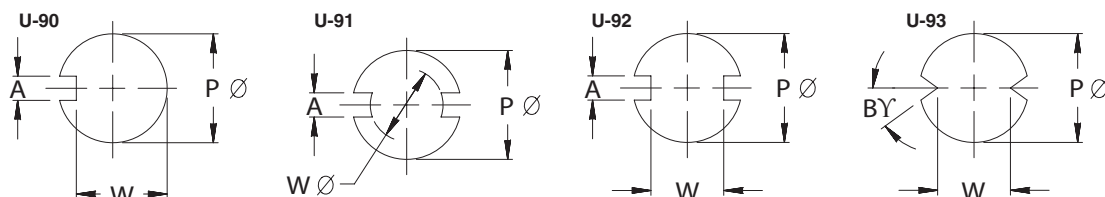
A = ODD NO. OF SIDES

## 180°



## 0°

## KEYS

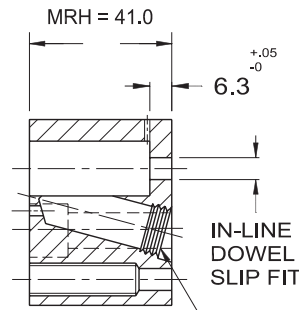
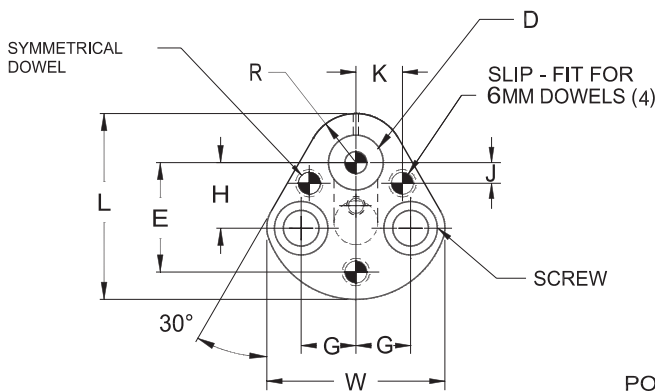


## 270°



# 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 48-49.



- 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

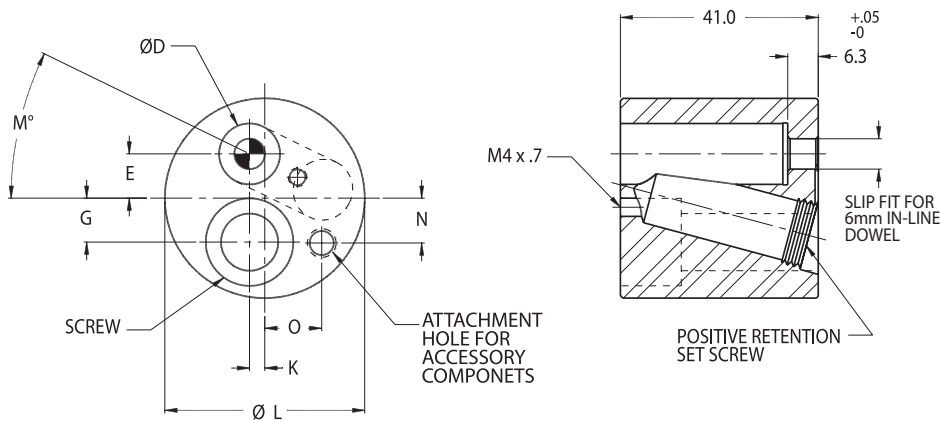
Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

METRIC CATALOG TYPE	D	±.01 E	G	L	W	R	H	±.01 J	±.01 K	IN-LINE DOWEL	SCREW SIZE
MRH 010A	10	26.924	11.12	44.5	39.9	9.5	19.05	7.50	9.00	6	M8
MRH 013A	13	29.972	14.27	50.8	48.3	12.7	19.05	6.50	12.00	6	M8
MRH 016A	16	31.750	15.87	54.0	51.6	14.3	19.05	6.00	13.50	6	M8
MRH 020A	20	33.528	17.47	60.3	58.2	17.5	19.05	5.00	16.50	6	M10
MRH 025A	25	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRH 032A	32	40.640	19.84	69.9	66.5	22.2	23.82	7.00	22.00	6	M12
MRH 040A	40	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 48-49.

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

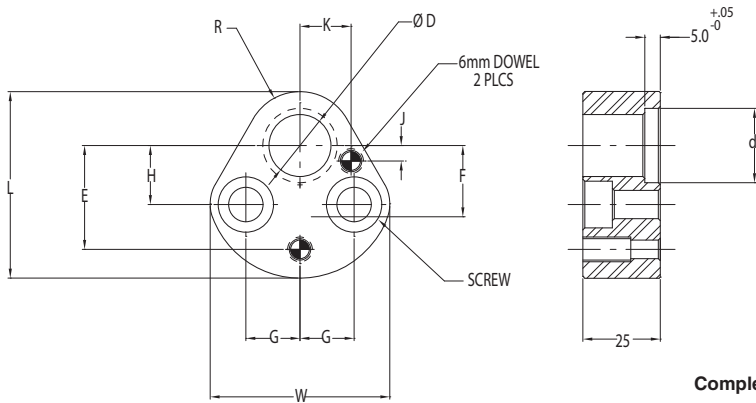
METRIC CATALOG TYPE	ØD	ØL	E	G	K	M	N	O	SCREW SIZE	IN-LINE DOWEL	ATTACHMENT HOLE
MRR 010	10	38.1	9.86	7.10	2.65	20.5°	4.47	12.72	M12	6	M6 x 1.0
MRR 013	13	41.3	9.25	9.17	3.18	26°	9.35	11.88	M12	6	M6 x 1.0
MRR 016	16	44.5	9.10	11.07	1.93	33.5°	10.21	13.16	M12	6	M6 x 1.0
MRR 020	20	57.2	12.20	14.30	0	30°	9.35	19.40	M16	6	M8 x 1.25
MRR 025	25	63.5	12.51	17.50	0	30°	14.27	20.17	M16	6	M8 x 1.25
MRR 032	32	76.2	15.67	20.83	0	30°	15.46	26.12	M20	6	M8 x 1.25
MRR 040	40	82.6	15.39	23.55	0	30°	15.46	26.12	M20	6	M8 x 1.25



# SHOULDER PUNCH RETAINERS

## TRUE SET MRN STYLE

For Round  
Punches

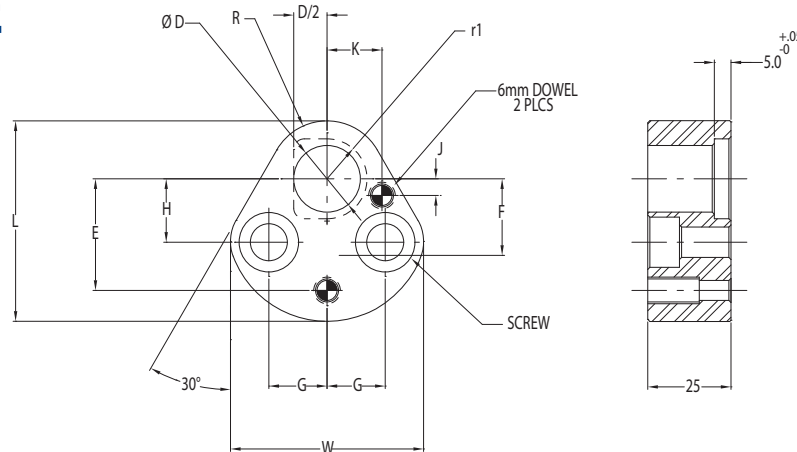


FOR ACCESSORIES AND BACKING PLATES  
SEE PAGE 49.

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

METRIC CATALOG TYPE	D	d1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRN 010	10	14.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRN 013	13	17.0	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRN 016	16	20.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRN 020	20	24.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRN 025	25	29.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRN 032	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)

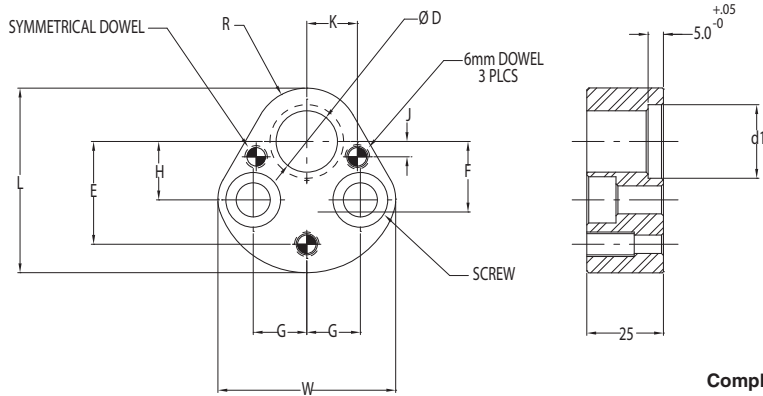
METRIC CATALOG TYPE	D	r1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRO 010	10	7.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRO 013	13	8.5	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRO 016	16	10.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRO 020	20	12.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRO 025	25	14.5	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRO 032	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

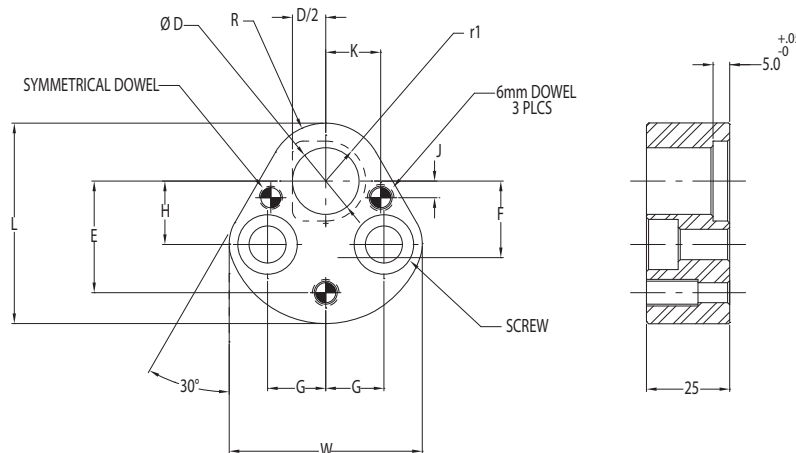


FOR ACCESSORIES AND BACKING PLATES  
SEE PAGE 49.

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

METRIC CATALOG TYPE	D	d1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRP 010	10	14.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRP 013	13	17.0	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRP 016	16	20.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRP 020	20	24.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRP 025	25	29.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRP 032	32	36.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRP 040	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)

METRIC CATALOG TYPE	D	r1	L	W	R	H	±.01 J	±.01 K	G	±.01 E	F	SCREW SIZE
MRQ 010	10	7.0	44.5	39.9	9.5	19.05	7.50	9.00	11.12	26.924	16.00	M8
MRQ 013	13	8.5	50.8	48.3	12.7	19.05	6.50	12.00	14.27	29.972	16.00	M8
MRQ 016	16	10.0	54.0	51.6	14.3	19.05	6.00	13.50	15.87	31.750	16.00	M8
MRQ 020	20	12.0	60.3	58.2	17.5	19.05	5.00	16.50	17.47	33.528	23.00	M10
MRQ 025	25	14.5	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRQ 032	32	18.0	69.9	66.5	22.2	23.82	7.00	22.00	19.84	40.640	30.00	M12
MRQ 040	40	22.0	77.4	77.8	26.0	27.00	10.00	26.00	24.00	43.993	33.35	M12

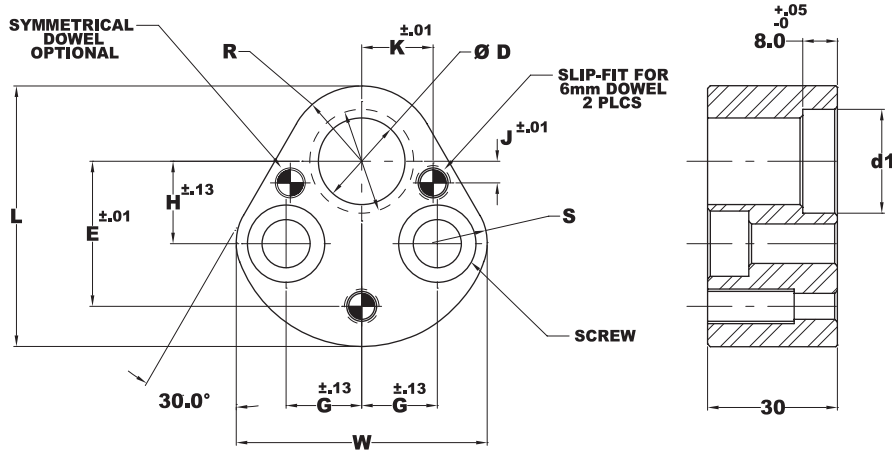




# DURA PUNCH RETAINERS

## XMRN STYLE

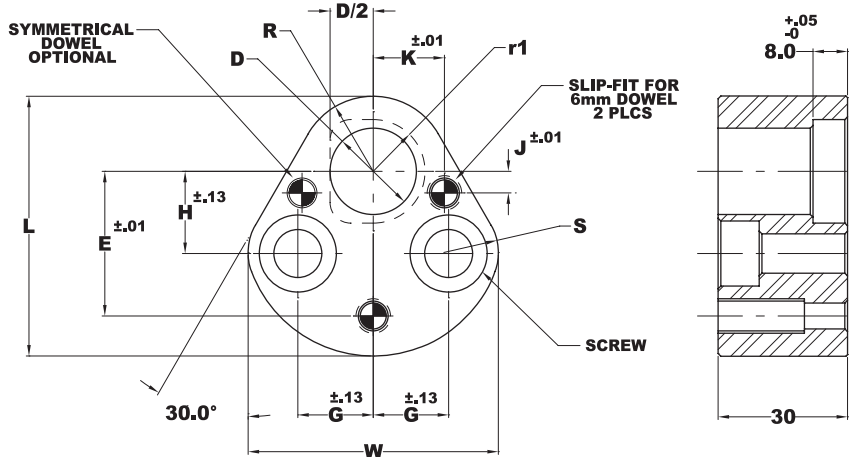
For Round Punches



METRIC CATALOG TYPE	D	d1	L	W	R	H	J	K	S	G	E	SCREW SIZE
XMRN 010	10	15.5	44.5	43.7	9.5	19.0	7.5	9.0	12.0	11.1	26.925	M8
XMRN 013	13	18.5	50.8	50.0	12.7	19.0	6.5	12.0	15.2	14.3	29.970	M8
XMRN 016	16	21.5	54.0	53.2	14.3	19.0	6.0	13.5	16.8	15.9	31.750	M8
XMRN 020	20	25.5	60.3	59.5	17.5	19.0	5.0	16.5	20.0	17.5	33.530	M10
XMRN 025	25	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



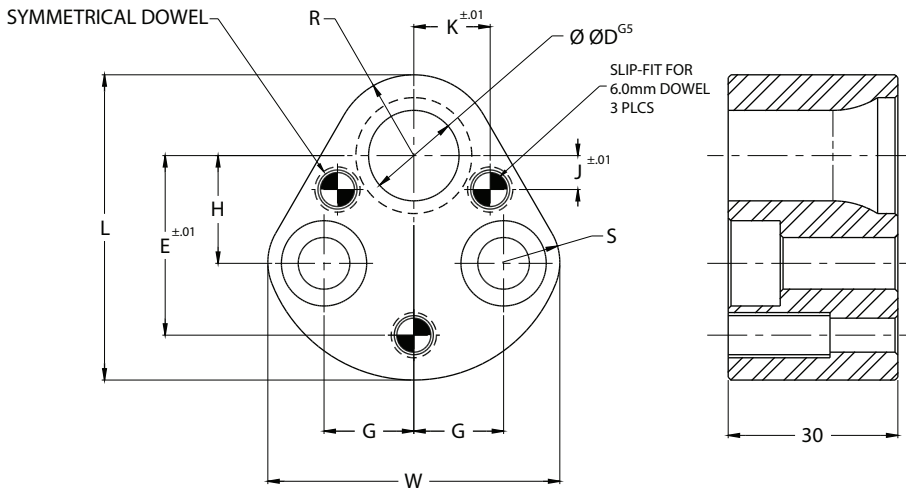
METRIC CATALOG TYPE	D	r1	L	W	R	H	J	K	S	G	E	SCREW SIZE
XMRO 010	10	7.75	44.5	43.7	9.5	19.0	7.5	9.0	12.0	11.1	26.925	M8
XMRO 013	13	9.25	50.8	50.0	12.7	19.0	6.5	12.0	15.2	14.3	29.970	M8
XMRO 016	16	10.75	54.0	53.2	14.3	19.0	6.0	13.5	16.8	15.9	31.750	M8
XMRO 020	20	12.75	60.3	59.5	17.5	19.0	5.0	16.5	20.0	17.5	33.530	M10
XMRO 025	25	15.25	69.9	69.1	22.2	23.8	7.0	22.0	24.7	19.8	40.640	M12



# TRUMPET HEAD PUNCH RETAINER

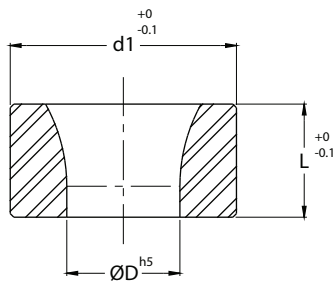


## RETAINER & ACCESSORIES

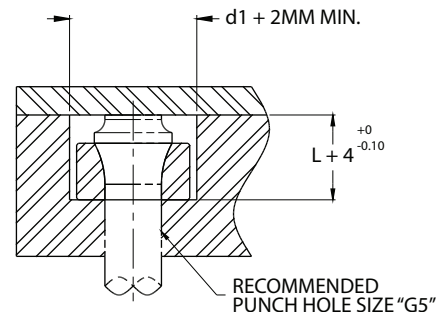


METRIC CATALOG TYPE	D	L	W	R	H	J	K	S	G	E	SCREW SIZE
XMRT 010	10	44.5	43.7	9.5	19.0	7.5	9.0	12.0	11.1	26.925	M8
XMRT 013	13	50.8	50.0	12.7	19.0	6.5	12.0	15.2	14.3	29.970	M8
XMRT 016	16	54.0	53.2	14.3	19.0	6.0	13.5	16.8	15.9	31.750	M8
XMRT 020	20	60.3	59.5	17.5	19.0	5.0	16.5	20.0	17.5	33.530	M10

## TRUMPET HEAD PUNCH RETENTION SLEEVE

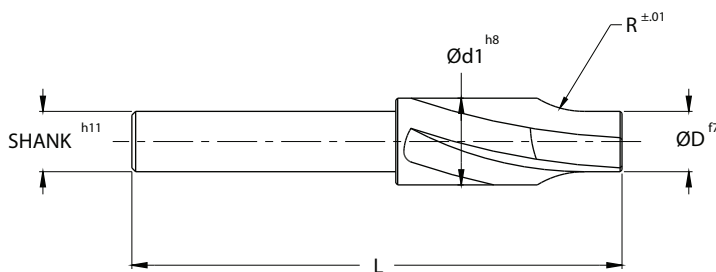


METRIC CATALOG TYPE	D	d1	L
XMAQ 005	5	9	7
XMAQ 006	6	11	7
XMAQ 008	8	13	8
XMAQ 010	10	16	9
XMAQ 013	13	19	9
XMAQ 016	16	22	9
XMAQ 020	20	27	10



RECOMMENDED RETAINER DIMENSIONS FOR TRUMPET HEAD RETENTION SLEEVE

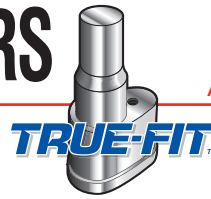
## ENDMILL FOR TRUMPET HEAD RETAINERS



METRIC CATALOG TYPE	D	d1	R	SHANK	L
XMAK 005	5	7.4	10	7.4	71
XMAK 006	6	9.5	10	9.5	71
XMAK 008	8	11.5	12	11.5	71
XMAK 010	10	14.5	15	13	71
XMAK 013	13	17.5	15	13	71
XMAK 016	16	20.5	15	13	71
XMAK 020	20	25.5	15	16	71

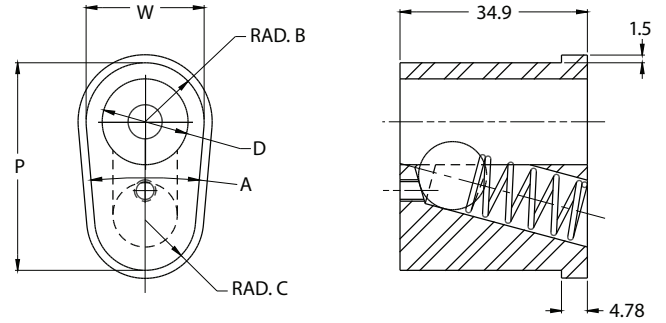
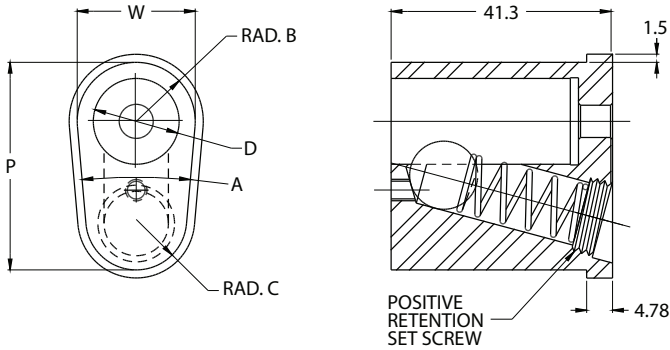
# INSERTABLE PUNCH RETAINERS

## TRUE-FIT



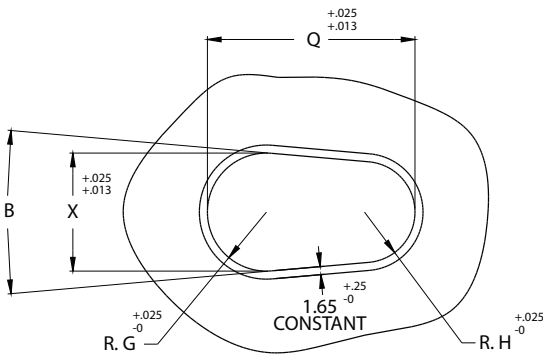
### MRI TRUE-SET STYLE

### MRJ BACKING PLATE STYLE



METRIC CATALOG TYPE	D	P	W	A	RAD. B	RAD. C
MR_010	10	29.48	15.88	5°	7.94	7.32
MR_013	13	36.04	19.05	5°	9.53	8.75
MR_016	16	39.21	22.23	10°	11.11	9.49
MR_020	20	42.39	25.4	10°	12.70	11.08
MR_025	25	48.74	31.75	30°	15.88	9.94
MR_032	32	55.09	38.10	30°	19.05	13.12
MR_040	40	63.69	48.00	30°	24.00	18.52

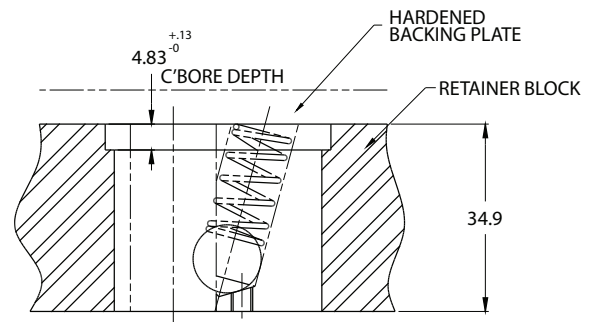
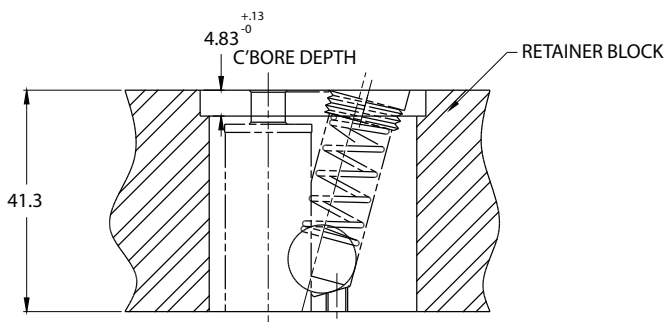
## HOLE DIMENSIONS FOR TRUE-FIT INSERTS



PUNCH SHANK Ø	Q	X	B	RAD. G	RAD. H
10	29.494	15.885	5°	7.943	7.323
13	36.048	19.060	5°	9.530	8.755
16	39.223	22.235	10°	11.118	9.497
20	42.398	25.410	10°	12.705	11.085
25	48.748	31.760	30°	15.880	9.949
32	55.098	38.110	30°	19.055	13.124
40	63.699	48.010	30°	24.005	18.526

### MRI TRUE-SET STYLE

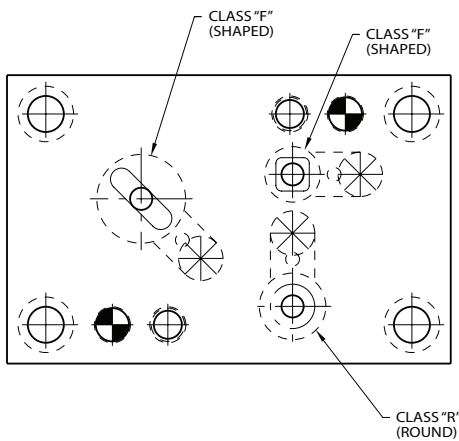
### MRJ BACKING PLATE STYLE



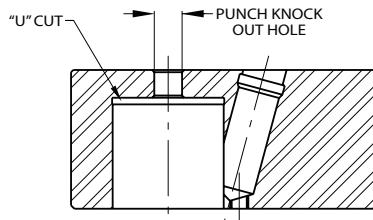
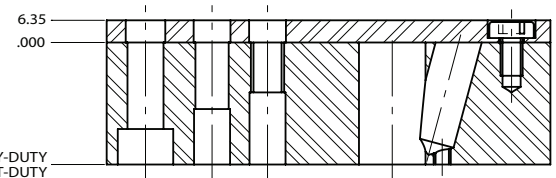
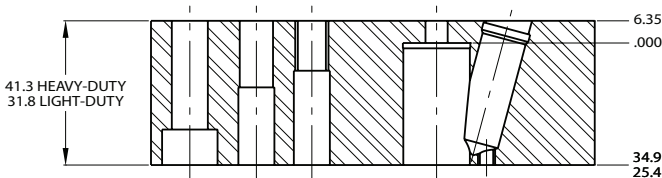
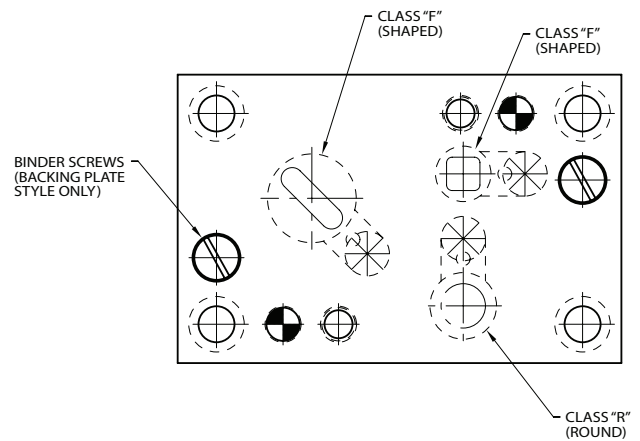
# SPECIAL MULTI HOLE BALL LOCK RETAINERS

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

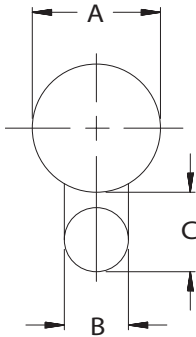
## TOLERANCES ALL TYPES

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'

## BALL LOCK SPACE REQUIREMENTS

### True-Set Style Ball Lock Space Requirements



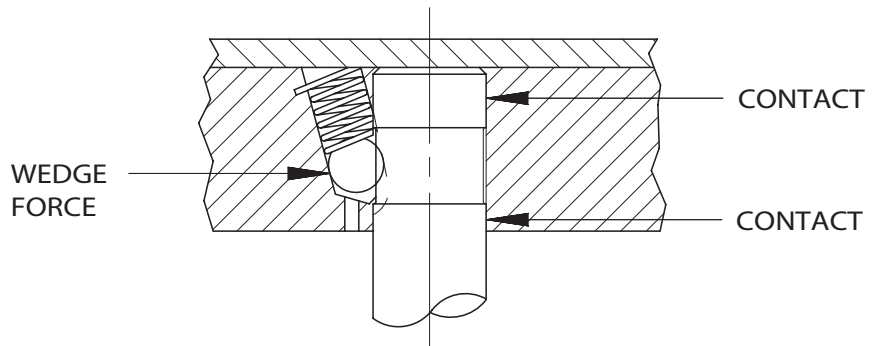
LIGHT-DUTY DIE BUTTON			HEAVY-DUTY PUNCH - TRUE-SET STYLE FOR PIERCING STOCK UP TO 10.0		
DIE BUTTON O.D. A	BALL DIA. B	CLEARANCE C	DIA. PUNCH SHANK A	BALL DIA. B	CLEARANCE C
13	8.0	12.9	10	10.0	15.7
16	8.0	12.9	13	12.0	18.4
20	8.0	12.9	16	12.0	18.4
25	8.0	12.9	20	12.0	18.4
32	8.0	12.9	25	12.0	18.4
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

### Backing Plate Style Ball Lock Space Requirements

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

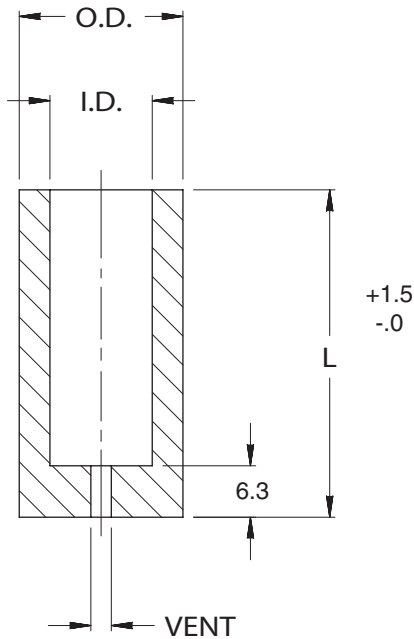
### Body Band Ball Relief

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).



# URETHANE STRIPPERS

## CLOSED END



CATALOG TYPE	I.D.	O.D.	LENGTH L	APPROXIMATE PRESSURE AVAILABLE AT DEFLECTION OF		
				3.0	6.5	9.5
MTC 006-045	06	19	45	1324	2256	—
MTC 006-053			53	1079	1863	—
MTC 006-071			71	686	1079	1765
MTC 008-045	08	21	45	1471	2207	—
MTC 008-053			53	1324	1961	2942
MTC 008-071			71	981	1618	2648
MTC 010-045	10	23	45	1716	2795	—
MTC 010-053			53	1422	2452	3187
MTC 010-056			56	1422	2452	3187
MTC 010-071			71	1128	2010	2697
MTC 013-045	13	26	45	2109	3334	—
MTC 013-053			53	1471	2354	3432
MTC 013-056			56	1471	2354	2942
MTC 013-071			71	1275	1961	2452
MTC 016-045	16	30	45	2354	3825	—
MTC 016-053			53	2158	3531	4511
MTC 016-056			56	2158	3431	4511
MTC 016-071			71	1814	2942	3825
MTC 020-045	20	38	45	2452	3923	—
MTC 020-053			53	2158	3629	5590
MTC 020-071			71	1618	2942	4658
MTC 025-045	25	50	45	9317	14318	—
MTC 025-053			53	7355	11572	15985
MTC 025-071			71	4904	8336	13485

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

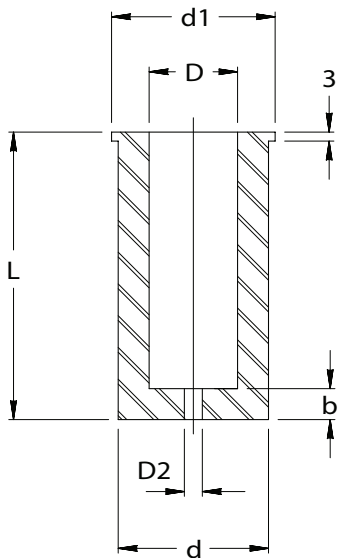
**CLOSED END** urethane strippers are shaped to suit the punch point by closing the die – without the material – the point and the die cavity provide the shearing action to shape the closed end.

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 Type	Punch Shank	Press Fit D	d	L	d1	d2	b
MTS010 - 044	10	9.75	18	44	21	1.6	6
MTS010 - 054	10	9.75	18	54	21	1.6	6
MTS010 - 064	10	9.75	18	64	21	1.6	6
MTS010 - 074	10	9.75	18	74	21	1.6	6
MTS013 - 044	13	12.75	23	44	26	3.0	6
MTS013 - 054	13	12.75	23	54	26	3.0	6
MTS013 - 064	13	12.75	23	64	26	3.0	6
MTS013 - 074	13	12.75	23	74	26	3.0	6
MTS016 - 044	16	15.75	28	44	31	3.0	6
MTS016 - 054	16	15.75	28	54	31	3.0	6
MTS016 - 064	16	15.75	28	64	31	3.0	6
MTS016 - 074	16	15.75	28	74	31	3.0	6
MTS020 - 044	20	19.75	33	44	36	3.0	7
MTS020 - 054	20	19.75	33	54	36	3.0	7
MTS020 - 064	20	19.75	33	64	36	3.0	7
MTS020 - 074	20	19.75	33	74	36	3.0	7
MTS025 - 044	25	24.75	40	44	43	3.0	7
MTS025 - 054	25	24.75	40	54	43	3.0	7
MTS025 - 064	25	24.75	40	64	43	3.0	7
MTS025 - 074	25	24.75	40	74	43	3.0	7
MTS032 - 044	32	31.70	50	44	55	3.0	7
MTS032 - 054	32	31.70	50	54	55	3.0	7
MTS032 - 064	32	31.70	50	64	55	3.0	7
MTS032 - 074	32	31.70	50	74	55	3.0	7
MTS040 - 044	40	39.70	60	44	65	3.0	8
MTS040 - 054	40	39.70	60	54	65	3.0	8
MTS040 - 064	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.

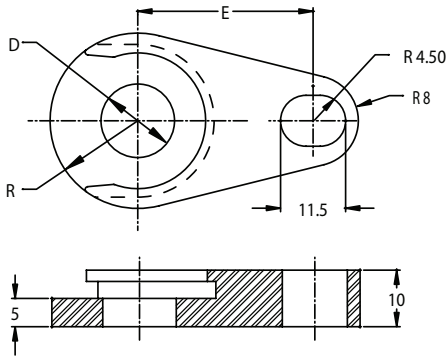
# TRUE SET STRIPPER RETAINERS



- 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

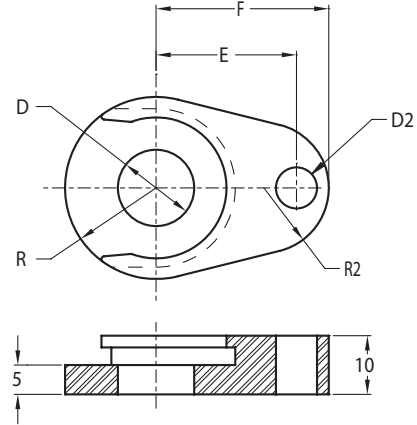
(To be used with Standard MRH True Set Retainer)



CATALOG TYPE	D	R	E
MTR 010	10	13	28
MTR 013	13	15.5	31
MTR 016	16	18	32.9
MTR 020	20	20.5	34.8
MTR 025	25	24	39.8
MTR 032	32	31	41.3
MTR 040	40	36	45

## MTP STYLE STRIPPER RETAINER

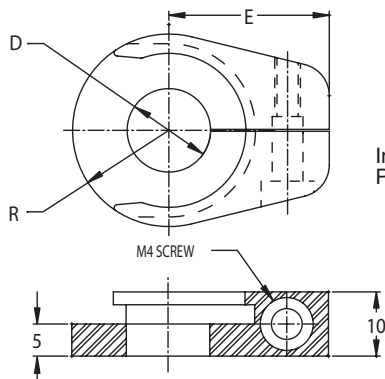
(To be used with the Round MRR True Set Retainer)



CATALOG TYPE	D	R	E	F	D2	R2
MTP 010	10	13.0	21.0	26.5	7	10.0
MTP 013	13	15.5	23.9	29.4	7	11.0
MTP 016	16	18.0	24.5	30.0	7	12.8
MTP 020	20	20.5	29.0	36.0	9	11.8
MTP 025	25	24.0	33.5	40.5	9	12.9
MTP 032	32	31.0	40.6	49.3	9	8.0
MTP 040	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 TYPE	D	R	E
MTM 010	10	13	22.5
MTM 013	13	15.5	25
MTM 016	16	18	27.5
MTM 020	20	20.5	30
MTM 025	25	24	35.5
MTM 032	32	31	37.5
MTM 040	40	36	42.3

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



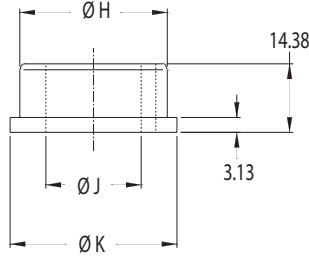
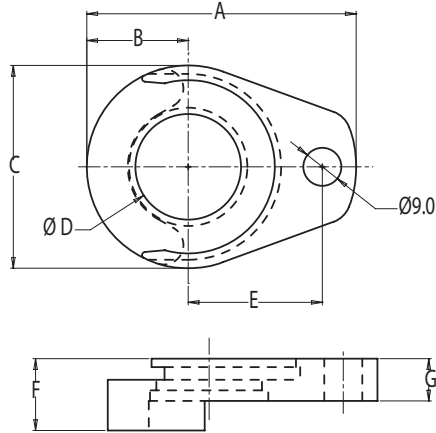
# NOSE LARGE STRIPPER RETAINERS

- 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



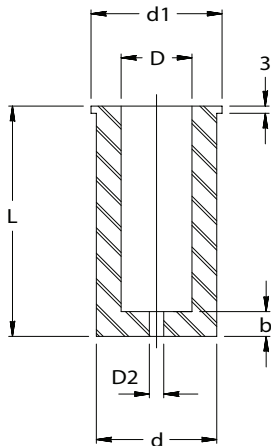
## NOSE LARGE STRIPPER RETAINER

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



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

CATALOG TYPE	SHANK Ø	MAX P/G	A	B	C	D	E	F	G	H	J	K	*USE WITH URETHANE
MTB010-016	10	15.75	53.18	18.0	36	16	26.93	17	10	15.75	10	19	MTS016-XXX
MTB013-020	13	19.75	58.60	20.5	41	20	29.97	17	10	19.75	13	23	MTS020-XXX
MTB016-025	16	24.75	63.75	24.0	48	25	31.75	17	10	24.75	16	28	MTS025-XXX
MTB020-032	20	31.75	73.86	31.0	62	32	33.53	17	10	31.70	20	34	MTS032-XXX
MTB025-040	25	39.75	83.63	36.0	72	40	40.64	17	10	39.70	25	44	MTS040-XXX
MTB032-040	32	39.75	83.63	36.0	72	40	40.64	18	10	39.70	32	44	MTS040-XXX



## 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
*MTS016-XXX TO BE USE ON MTB010-016	10	44	15.75	31	28	6	3
		54					
		64					
*MTS020-XXX TO BE USE ON MTB013-020	13	44	19.75	36	33	7	3
		54					
		64					
*MTS025-XXX TO BE USE ON MTB016-025	16	44	24.75	43	40	7	3
		54					
		64					
*MTS032-XXX TO BE USE ON MTB020-032	20	44	31.7	55	50	7	3
		54					
		64					
*MTS040-XXX TO BE USE ON MTB025-040	25	44	39.7	65	60	8	3
		54					
		64					
*MTS040-XXX TO BE USE ON MTB032-040	32	44	39.7	65	60	8	3
		54					
		64					

# 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 010	MAC 08-45 M8 x 45	MAD 06-20 6mm x 20	MAB 10 10mm	MAS 10 (W/CLIP)	MAC 04-20 M4 X 20	MAN 10	
	MRH 013			MAS 10T (W/SCREW) 10mm	MAB 12 12mm		MAS 12 (W/CLIP) MAS 12T (W/SCREW) 12mm 13mm/40mm	MAN 12
	MRH 016							
	MRH 020	MAC 10-50 M10 x 50						
	MRH 025	MAC 12-50 M12 x 50						
	MRH 032							
	MRH 040							

### BOOSTER SPRINGS

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

### SPECIAL BACKING PLATE RETAINER ACCESSORIES

	SPRINGS	BALLS
6 DIA.	MAS 06S	MAB 06
8 DIA.	MAS 08S	MAB 08
10 DIA.	MAS 10S	MAB 10
12 DIA.	MAS 12S	MAB 12

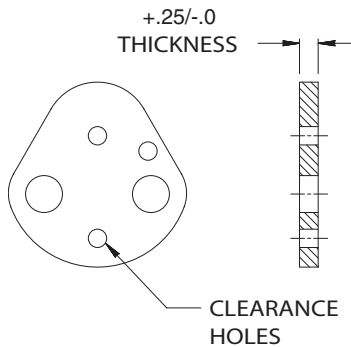
## ECONOMY ROUND TRUE SET RETAINER COMPONENTS

TRUE SET ROUND RETAINER	SOC. HD. CAP SCREW	DOWELS	BALL	SPRING	BALL RELEASE SCREW	ANGLE HOLE SET SCREW
MRR 010	MAC 12-50 TL M12-1.75 x 50mm	MAD 06-20 6mm X 20	MAB 10 10mm	MAS 10T 10 mm	MAC 04-20 4mm X 20	MAN 10
MRR 013			MAB 12 12mm	MAS 12T 12mm		MAN 12
MRR 016						
MRR 020	MAC 16-50 TL M16-2.0 x 50mm					
MRR 025						
MRR 032	MAC 20-50 TL M20-2.5 x 50mm					
MRR 040						

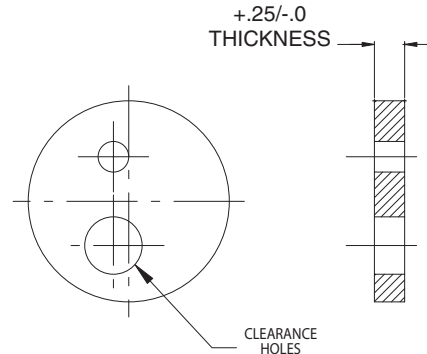
## SHOULDER TRUE SET RETAINER COMPONENTS

TRUE SET DURA PUNCH RETAINER	TRUE SET SHOULDER RETAINER	SOC. HD. CAP SCREW	DOWELS	TRUE SET DURA PUNCH RETAINER	TRUE SET SHOULDER RETAINER	SOC. HD. CAP SCREW	DOWELS
XMRN 010	MRN 010	MAC 08-35 M8 X 35	MAD 06-20 6mm x 20	XMRO 010	MRO 010	MAC 08-35 M8 X 35	MAD 06-20 6mm x 20
XMRN 013	MRN 013			XMRO 013	MRO 013		
XMRN 016	MRN 016			XMRO 016	MRO 016		
XMRN 020	MRN 020	MAC 10-40 M10 X 40		XMRO 020	MRO 020	MAC 10-40 M10 X 40	
XMRN 025	MRN 025	MAC 12-40 M12 X 40		XMRO 025	MRO 025	MAC 12-40 M12 X 40	
XMRN 032	MRN 032			XMRO 032	MRO 032		

## 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 TYPE
MAX 010-
MAX 013-
MAX 016-
MAX 020-
MAX 025-
MAX 032-
MAX 040-

INSERT SHIM THICKNESS

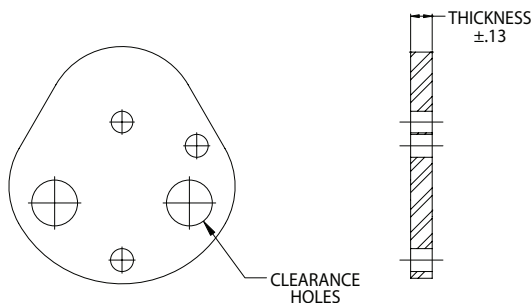
ORDERING EXAMPLE  
MAX 013-031

CATALOG TYPE
MAY 010-
MAY 013-
MAY 016-
MAY 020-
MAY 025-
MAY 032-
MAY 040-

INSERT SHIM THICKNESS

ORDERING EXAMPLE  
MAY 013-031

## TRUE SET SHOULDER RETAINER BACKING PLATES



CATALOG TYPE
MAW 010-
MAW 013-
MAW 016-
MAW 020-
MAW 025-
MAW 032-
MAW 040-

Available Thickness	Ordering Number
4.75	047
6.35	063

INSERT BACKING PLATE THICKNESS

HARDENED TO R/C 50-52

ORDERING EXAMPLE  
MAW 013-047

## 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



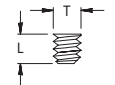
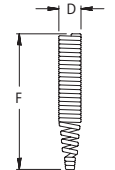
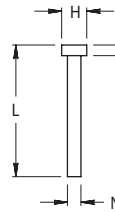
# EJECTOR COMPONENTS

## PUNCH EJECTOR COMPONENTS

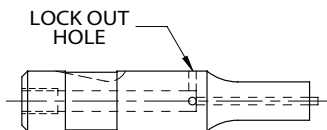
### Ejector Punch Dimensional Specifications

SHANK DIA. D	EJECTOR SPECIFICATION	DRILL PIN HOLE	SIZE SPRING HOLE	SCREW SIZE	CROSS HOLE SIZE	PIN EXTENSION
5.0 SHOULDER	MAE 02	.64	2.18	M2.6	.81	.81±.25
6.0 ALL	MAE 03	.79	2.64	M3	.81	.81±.25
8.0 SHOULDER 10.0 BALL-LOCK	MAE 04	1.17	3.45	M4	1.57	1.57±.38
10.0 SHOULDER 13.0 ALL 16.0 BALL-LOCK	MAE 05	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 06	2.36	5.18	M6	1.57 — —	1.57±.38
CONSULT FACTORY	MAE 12	3.18	7.13	M8 X 1.25	—	

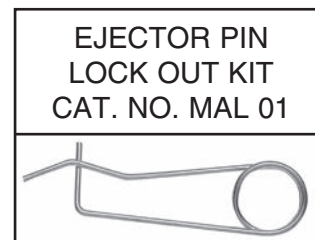
### Ejector Component Specifications

PART DESCRIPTION	SPEC. DESCRIPTION	MAE 02	MAE 03	MAE 04	MAE 05	MAE 06	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 02	MAE 02P	MAE 02S	MAE 02C
MAE 03	MAE 03P	MAE 03S	MAE 03C
MAE 04	MAE 04P	MAE 04S	MAE 04C
MAE 05	MAE 05P	MAE 05S	MAE 05C
MAE 06	MAE 06P	MAE 06S	MAE 06C
MAE 12	MAE 12P	MAE 12S	MAE 12C



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



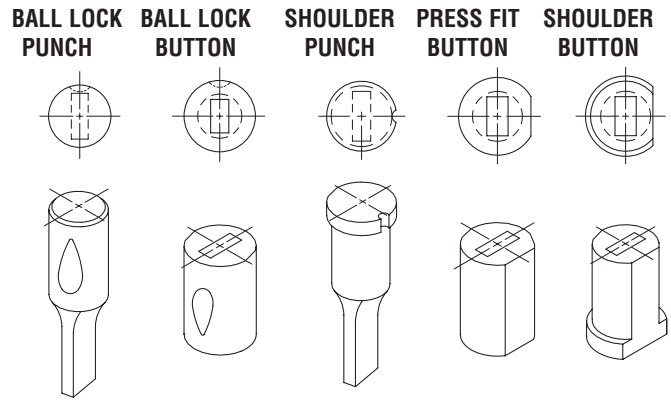
Set includes 12 pcs. of each size.

# 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 @ \_\_\_\_°.

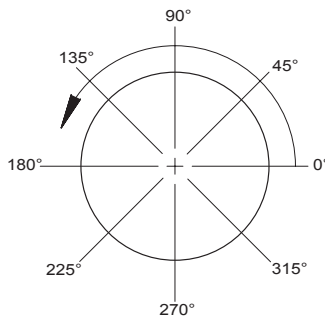
Ball lock punch example: MHR 013-080 P=6.0 W=5.5 B/S @ 0°  
Button flat example: MDO 025-032 P=13.0 W=10.5 F1@90°



## 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°.

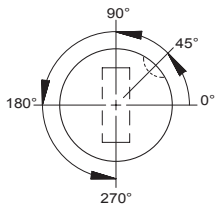
Note: Parts are viewed in die position looking from above the die. Punches are viewed looking through the shanks. Buttons are viewed through top face.



## TYPICAL EXAMPLES:

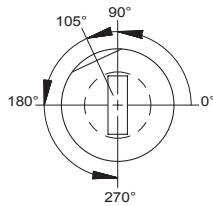
CUSTOM BALL SEAT LOCATION PUNCH

**BS@45°**

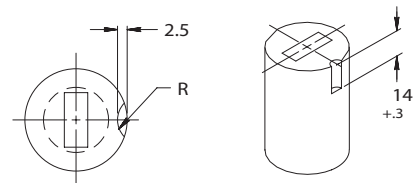


CUSTOM FLAT LOCATION DIE BUTTON

**F2@105°**



## WINDSOR LOCK



**W6**

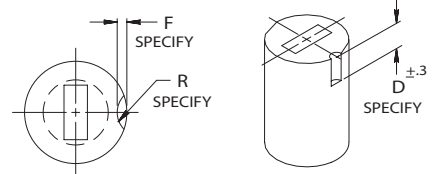
6.0 WINDSOR LOCK R = 3.0 RAD

**W10**

10.0 WINDSOR LOCK R = 5.0 RAD

**W13**

13.0 WINDSOR LOCK R = 6.5 RAD

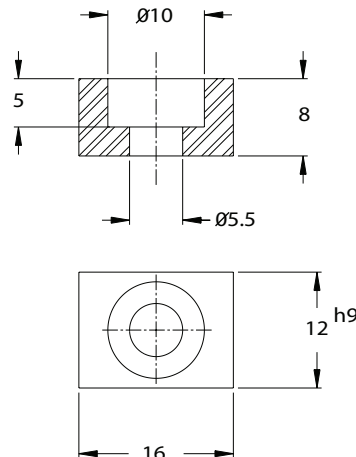


**WX**

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

## BUTTON RETENTION KEY

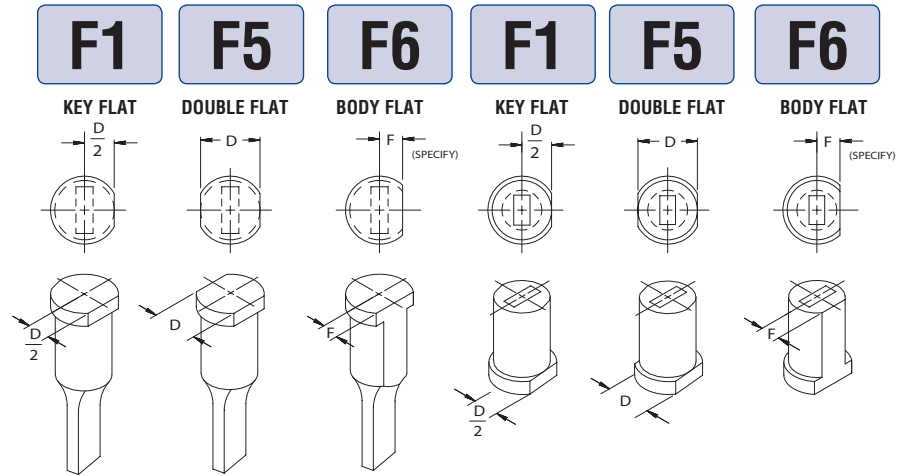
**MAK-01**



# LOCATING DEVICES

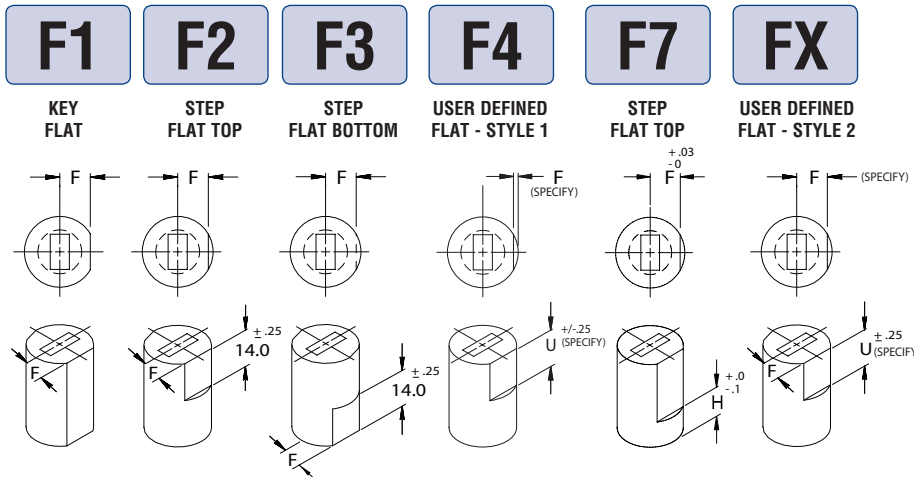
## FLATS ON SHOULDER PRODUCTS

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

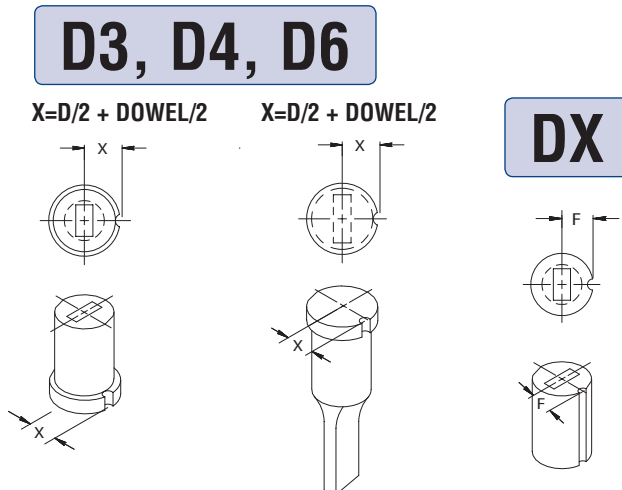
F1 uses "F" dimension as defined in chart unless an alternate "F" dimension is specified with order. F2 and F3 use "F" dimension as defined in chart. F4 and FX are user defined flats and require an "F" and "U" dimension specified with order.



BODY DIA	F1, F2, F3		F7	
	"F" DIM +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

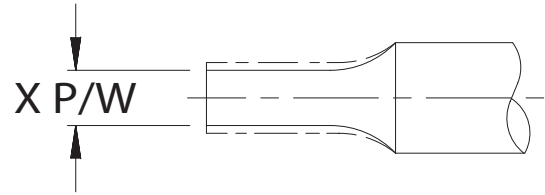
# STANDARD ALTERATIONS

**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		
		13	19	25
SHANK D	MIN P ROUNDS			
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		
		13	19	25
SHANK D	MIN W SHAPES			
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	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	

### HEAVY DUTY EJECTOR PUNCHES

		MAX S.B.R		
		13	19	25
		63.0 MIN O.A.L.	63.0 MIN O.A.L.	71.0 MIN O.A.L.
SHANK D	MIN P ROUNDS			
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		
		13	19	25
		63.0 MIN O.A.L.	63.0 MIN O.A.L.	71.0 MIN O.A.L.
SHANK D	MIN W SHAPES			
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		
		13	19	25
		63.0 MIN O.A.L.	63.0 MIN O.A.L.	71.0 MN O.A.L.
SHANK D	MIN P ROUNDS			
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		
		13	19	25
		63.0 MIN O.A.L.	63.0 MIN O.A.L.	71.0 MN O.A.L.
SHANK D	MIN W SHAPES			
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

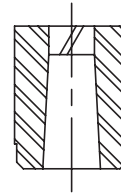
### PRESS FIT ULTRA LIFE TAPER RELIEF

CATALOG TYPE	MIN P	MIN W	MAX P/G
MU_008	1.50	1.50	3.60
MU_010	1.60	1.60	5.80
MU_013	1.80	1.80	8.00
MU_016	2.50	2.50	10.00
MU_020	2.80	2.80	13.00
MU_022	3.10	3.10	16.00
MU_025	3.20	3.20	18.50
MU_032	3.20	3.20	22.00
MU_038	3.20	3.20	29.00
MU_040	3.20	3.20	30.00
MU_045	3.20	3.20	34.00
MU_050	3.20	3.20	37.00
MU_056	3.20	3.20	41.00
MU_063	3.20	3.20	47.00
MU_071	3.20	3.20	52.00
MU_076	3.20	3.20	56.00
MU_085	3.20	3.20	62.00
MU_090	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_008	1.50	1.50	3.60
MM_010	1.60	1.60	5.80
MM_013	1.80	1.80	8.00
MM_016	2.50	2.50	10.00
MM_020	2.80	2.80	13.00
MM_022	3.10	3.10	16.00
MM_025	3.20	3.20	18.50
MM_032	3.20	3.20	22.00
MM_038	3.20	3.20	29.00
MM_040	3.20	3.20	30.00
MM_045	3.20	3.20	34.00

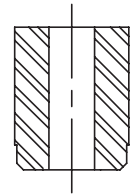
## XS SLUG CONTROL ALTERATION



NOTE: Advise material thickness and die clearance, per side at time of order.  
Order Example:  
XS MT=2 C=0.20

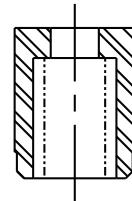
## XR

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



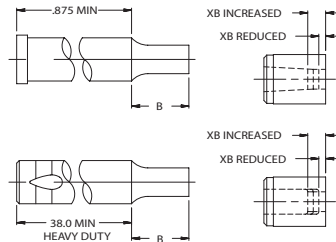
## XO OPEN RELIEF

To accommodate XP  
or XG alteration.



## XB ALTERED POINT LENGTH OR LAND DIMENSION

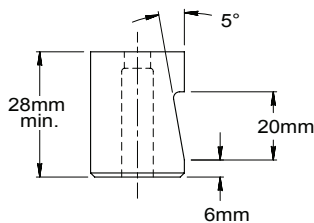
This is a customer specific alteration and a dimension must be supplied.



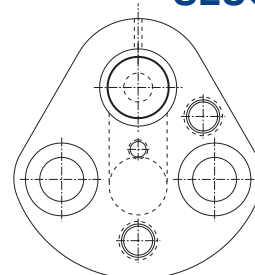
## AE AIR EJECTOR APPLICATION

Filled cross pin hole with  
no ejector components.

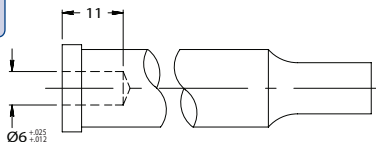
## W1 WHISTLE NOTCH BUTTONS



## 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.

## GB BALL SEAT

BALL SEAT  
GRIND CHARGE

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

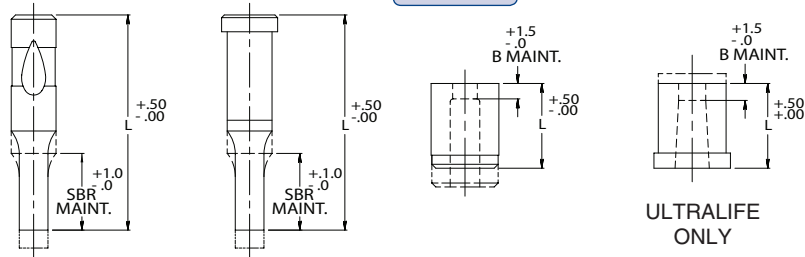


# STANDARD ALTERATIONS

## OVERALL LENGTH REDUCTIONS

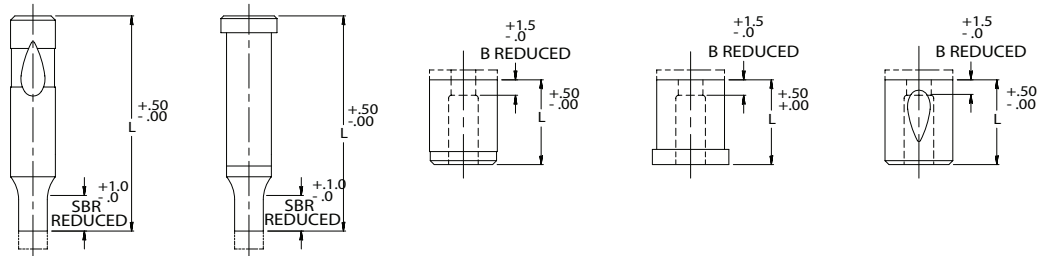
Reduces punch or button length maintaining "B" point or land length. Not available in counter bore style on shoulder or ball lock buttons.

### X1



### X2

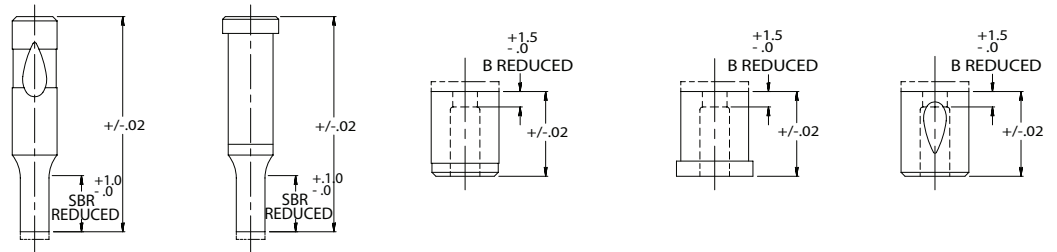
Reduces punch or button length but also reduces "B" dimension or land length.



### X3

Provides a precision overall length of +/- .02

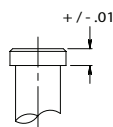
Note: .5 maximum stock removal



## HEAD ALTERATIONS

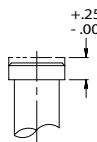
### X4

Provides a precision head length but reduces overall length



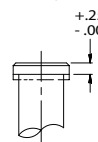
### X5

Reduces head length but reduces overall length



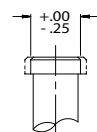
### X6

Reduces head length while maintaining overall length



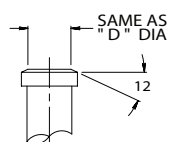
### X7

Reduces head diameter



### X8

Angle on head face to improve strength



# SPECIAL ALTERATIONS

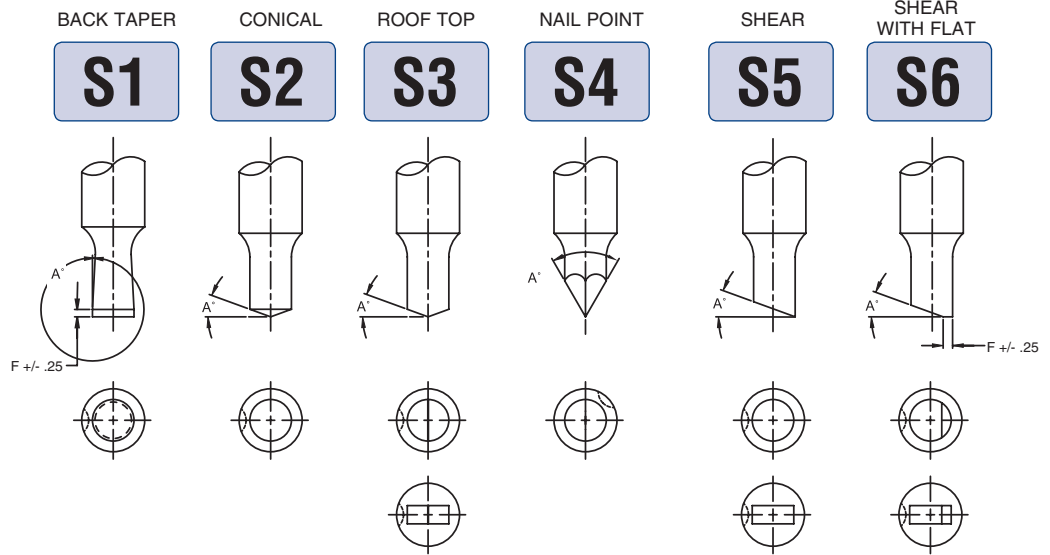
## SHEAR ANGLES

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°.

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

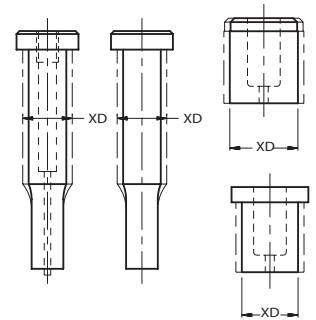


## XD REDUCTION OF SHANK DIMENSION

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

Example: MDO 020-032  
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

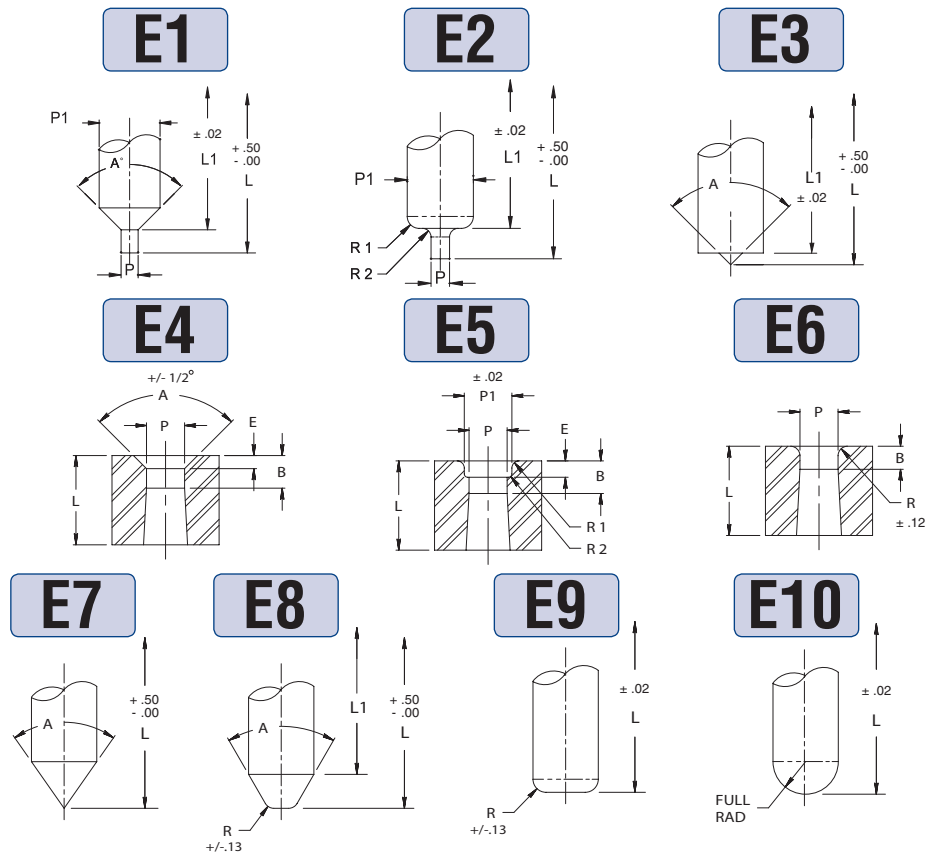


## EXTRUSION TOOLS

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.



Policies, Terms & Conditions .....58  
 Delivery Schedule .....59  
 Catalog Nomenclature and Ordering Example .....60  
 Extended Product Line Catalog Nomenclature  
 and Ordering Example .....61

**BALL LOCK PUNCHES HEAVY DUTY**

IH\_ Solid with Standard Point .....62  
 IE\_ Ejector with Standard Point .....63  
 IH\_ Pilots .....64  
 I\_B Blanks .....65

**SHOULDER PUNCHES BASIC**

IS\_ Solid with Standard Point.....66  
 IC\_ Ejector with Standard Point .....67  
 IS\_ Pilots .....68  
 I\_B Blanks .....69

**SHOULDER PUNCHES SELECTIVE**

IP\_ Solid with Standard Point.....70  
 IY\_ Ejector with Standard Point .....71  
 IP\_ Pilots .....72  
 I\_B Blanks .....73

**DURA PUNCHES**

XIS\_ Solid with Standard Point.....74  
 XIC\_ Ejector with Standard Point .....75  
 XI\_B Blanks .....76

**PRESS FIT BUTTONS**

ID\_ Counter Bore Relief with Standard Hole.....77  
 ID\_ Counter Bore Relief/Extended Range .....78  
 IU\_ Ultra Life/Taper Relief with Standard Hole .....79  
 IU\_ Ultra Life/Taper Relief/Extended Range .....80

**SHOULDER BUTTONS**

II\_ Counter Bore Relief with Standard Hole .....81  
 II\_ Ultra Life/Taper Relief with Standard Hole .....82

**BALL LOCK BUTTONS**

IF\_ Counter Bore Relief with Standard Hole .....83

**BUTTON BLANKS**

I\_B Blanks with Counter Bore Relief .....84  
 I\_B Blanks with Straight Thru Hole .....85  
 IFB Ball Lock Blanks with Straight Thru Hole.....86

**UNIVERSAL SHAPES**

I\_U .....87, 88, 89

**RETAINERS**

IR\_ True Set Ball Lock .....90  
 IRR Ball Lock Economy Round True Set.....91  
 IR\_ Shoulder True Set.....92  
 XMR\_Dura Punch Retainers.....93  
 IR\_ True-Fit Insertable Punch Retainers .....94  
 Multi Hole .....95

**URETHANE STRIPPERS AND ACCESSORIES**

ITO Strippers Open End .....97  
 ITC Strippers Closed End .....98

**RETAINER ACCESSORIES / COMPONENTS**

Retainer Components .....99  
 Retainer Accessories .....100  
 IAX True Set Retainer Shims .....100  
 IAY Economy Round True Set Retainer Shims.....100

**STANDARD ALTERATIONS / LOCATING DEVICES**

Locating Devices .....102, 103  
 Out of Range “P” “W” or “B” .....104, 105  
 Button Slug Control .....105  
 Overall Length or Head Dimension .....106

**SPECIAL ALTERATIONS**

Shears, Extrusions, Shank Reduction.....107

**TECHNICAL TOPICS**

Ball Lock Space Requirements .....96  
 Ejector Specifications .....101  
 Performance Enhancement Coatings .....108, 109

# 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, 1 $\frac{1}{2}$ % 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.

**STANDARD DELIVERY**

**SAME DAY / 1 DAY:**

- Punch and Button Blanks, Standard Shoulder and Ball Lock 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
- Standard Dura Punch Retainers

**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:**

- See pages 108-109 for a complete list of coatings  
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:**

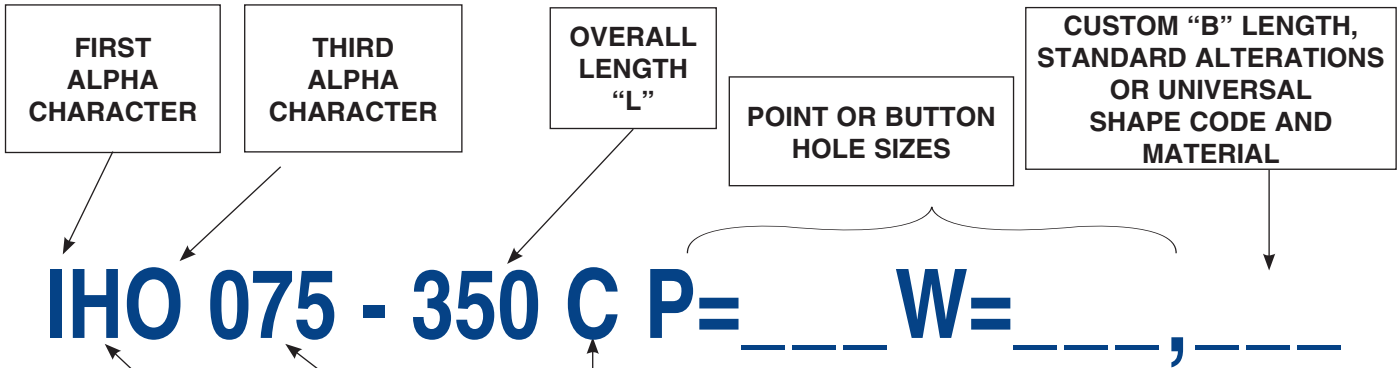
1. Catalog Standard Products with Only One Standard Alteration
2. Round Products - 20 Piece Maximum  
Shaped Products - 10 Piece Maximum
3. Coating Excluded
4. Excluded Products:
  - Nose Large Punches, Large Buttons, Urethane, Close Space or Quill Punches
  - Some Descriptive Shaped Products

**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

**SECOND CHARACTER**

**Basic Body Type**

- A Accessories
- C Shoulder Punch Basic/Ejector
- D Press Fit Button Counter Bore Relief
- E Ball Lock Punch Heavy Duty/Ejector
- F Ball Lock Button Ultra Life/Taper Relief
- H Ball Lock Punch Heavy Duty/Solid
- I Shoulder Button Counter Bore Relief
- M Shoulder Button Press Fit Ultra Life/Taper Relief
- P Shoulder Punch Selective/Solid
- R Retainers
- S Shoulder Punch Basic/Solid
- T Strippers
- U Press Fit Button Ultra Life/Taper Relief
- Y Shoulder Punch Selective/Ejector

**THIRD CHARACTER**

**Punches or Buttons**

- A Pilot - Long Lead
- B Blank - Punch & Button
- C Circular
- D Dee
- F Flatted Round
- H Hexagon
- K Key Flat
- O Oblong
- P Pilot Bullet Nose
- R Rectangle
- S Square
- T Pilot Standard
- U Universal Shapes

**Punch Retainers**

**Ball Lock**

- H True Set Heavy Duty
- L True Set Light Duty
- R Economy Round Heavy Duty

**Insertable True-Fit**

- I True Set Style
- J Backing Plate Style

**Shoulder**

- N Shoulder Style Round
- O Shoulder Style Shaped

**Urethane Strippers**

- C Closed End Strippers
- O Open End Strippers

**Accessories**

- A True Strip Assembly Tool
- B Balls
- C Cap Screws, Ball Release Screws
- D Dowels
- E Ejector Component Assembly
- L Ejector Pin Lockout Kit
- N Retainer Angle Hole Set Screw
- O Retainer Angle Hole Hex Wrench
- P Pins Ejectors
- S Springs
- T Ball Release Tools
- W Shoulder Retainer Backing Plate
- X True Set Retainer Shim Plates
- Y Round Retainer Shim Plates

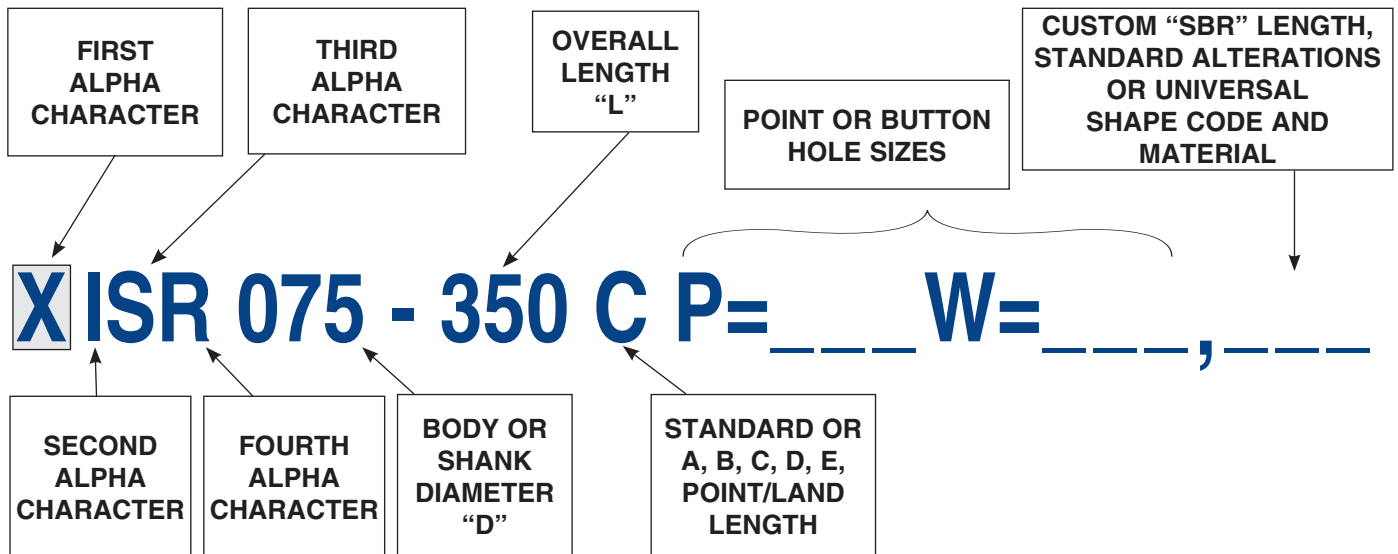
**ORDER EXAMPLE:** Ball lock punch heavy duty with oblong point and B Length of 1.00, standard alteration of ballseat rotated to 45° degrees

IHO 075-350C P=.625 W=.325 BS@45° PM4  
**MUST SPECIFY PM4**

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

# EXTENDED PRODUCT LINE

## CATALOG NOMENCLATURE



<p><b>FIRST CHARACTER</b></p> <p>X = Extended Product Line</p>	<p><b>SECOND CHARACTER</b></p> <p>MEASUREMENT SYSTEM</p> <p>I = Inch Products</p>	<p><b>THIRD CHARACTER</b></p> <p><b>Basic Body Type</b></p> <ul style="list-style-type: none"> <li>A Accessories</li> <li>C Dura Punch Standard - Ejector</li> <li>R Retainers</li> <li>S Dura Punch Standard - Solid</li> </ul>	<p><b>FOURTH CHARACTER</b></p> <p><b>Point Shape</b></p> <ul style="list-style-type: none"> <li>B Blank</li> <li>C Circular</li> <li>D Dee</li> <li>F Flattened Round</li> <li>H Hexagon</li> <li>K Key Flat</li> <li>O Oblong</li> <li>R Rectangle</li> <li>S Square</li> <li>U Universal Shapes</li> </ul> <p><b>Shoulder Retainers</b></p> <ul style="list-style-type: none"> <li>N Dura Head - Round</li> <li>O Dura Head - Shaped</li> </ul>
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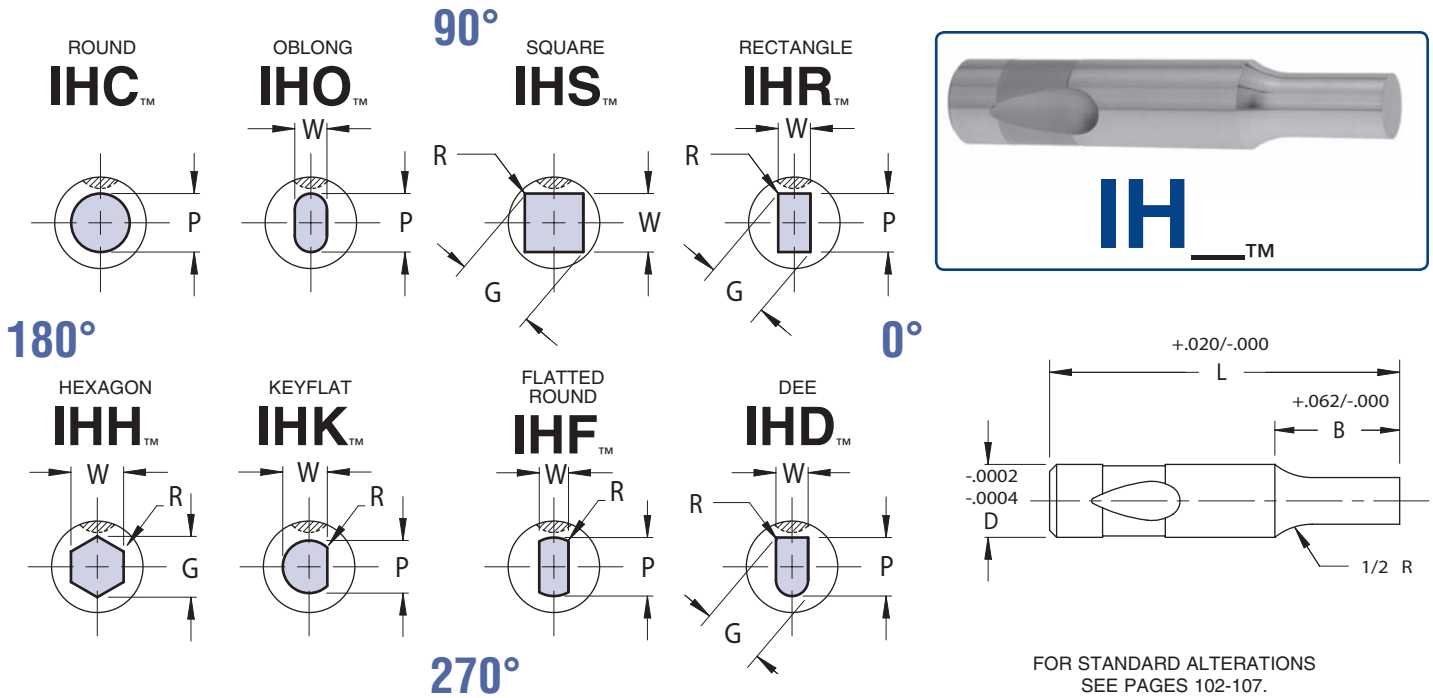
**ORDER EXAMPLE:** Dura punch with rectangle point and SBR length of 1.00, standard flat alteration at standard 0° degrees.

XISR 075-350 C P=.675 W=0.400, R=.125 F1 PM4  
**MUST SPECIFY PM4**

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

# BALL LOCK PUNCHES

## HEAVY DUTY/SOLID



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)

INCH CATALOG TYPE	SHANK D	ROUND	SHAPE		OVERALL LENGTH "L"										
		RANGE P	MIN W	MAX G/P	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
IH_037	.375	.125-.374	.125	.375	X	X	X	X	X	X	X	X	X	X	X
IH_050	.500	.187-.499	.187	.500	X	X	X	X	X	X	X	X	X	X	X
IH_062	.625	.312-.624	.250	.625	X	X	X	X	X	X	X	X	X	X	X
IH_075	.750	.437-.749	.312	.750	X	X	X	X	X	X	X	X	X	X	X
IH_087	.875	.625-.874	.375	.875		X	X	X	X	X	X	X	X	X	X
IH_100	1.000	.750-.999	.437	1.000			X	X	X	X	X	X	X	X	X
IH_125	1.250	1.000-1.249	.500	1.250			X	X	X	X	X	X	X	X	X

### Material

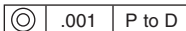
Steel: PM4, HRC 60-63  
Alternate: M2, HRC 60-63

### Standard Point Tolerance

Round P +.0005  
-.0000



Shape P, W ± .0005



**MUST SPECIFY PM4**

### ORDER EXAMPLE:

(Reference page 60)

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

EXAMPLE: 4 IH\_050 500 1.00 .435 X1=4.85 PM4

EXAMPLE: 8 IHO 087 450 .75 .750 x .625 B/S @ 45 PM4

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

**MUST SPECIFY PM4**

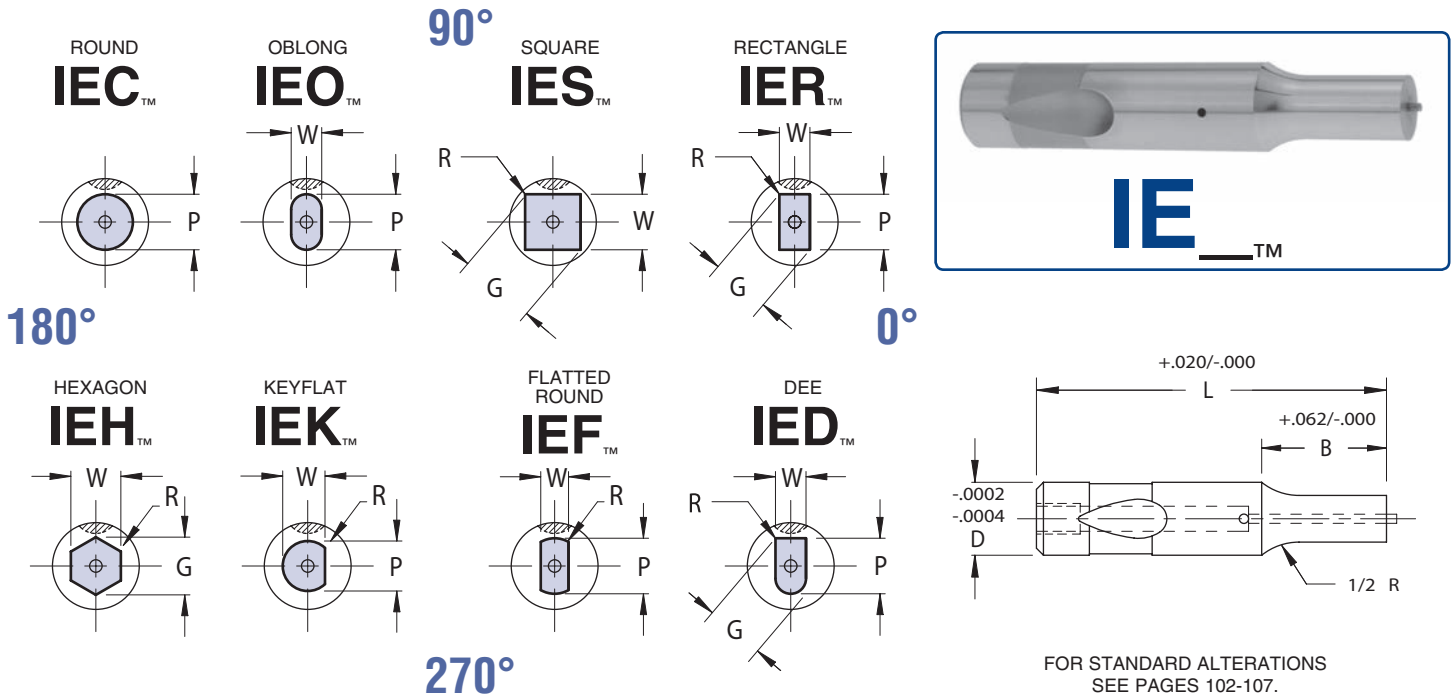
INCH CATALOG TYPE	SHANK D	POINT LENGTH "B"				
		NAPMA	ALTERNATES			
		STD	B	C	D	E
IH_037	.375	.62	.75	1.00		
IH_050	.500	.81	.75	1.00	1.25	
IH_062	.625	.94	.75	1.00	1.25	
IH_075	.750	1.06	.75	1.00	1.25	1.50
IH_087	.875	1.18	.75	1.00	1.25	1.50
IH_100	1.000	1.25	.75	1.00	1.25	1.50
IH_125	1.250	1.44	.75	1.00	1.25	1.50

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



# BALL LOCK PUNCHES

## HEAVY DUTY/EJECTOR



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)

INCH CATALOG TYPE	SHANK DIA D	ROUND RANGE P	SHAPE		OVERALL LENGTH "L"											
			MIN W	MAX G/P	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	
IE_037	.375	.125-.374	.125	.375	X	X	X	X	X	X	X	X	X	X	X	X
IE_050	.500	.187-.499	.187	.500	X	X	X	X	X	X	X	X	X	X	X	X
IE_062	.625	.312-.624	.250	.625	X	X	X	X	X	X	X	X	X	X	X	X
IE_075	.750	.437-.749	.312	.750	X	X	X	X	X	X	X	X	X	X	X	X
IE_087	.875	.625-.874	.375	.875		X	X	X	X	X	X	X	X	X	X	X
IE_100	1.000	.750-.999	.437	1.000			X	X	X	X	X	X	X	X	X	X
IE_125	1.250	1.000-1.249	.500	1.250			X	X	X	X	X	X	X	X	X	X

**Material**  
Steel: PM4, HRC 60-63  
Alternate: M2, HRC 60-63

**Standard Point Tolerance**  
Round P +.0005  
                  -.0000  
Shape P, W ± .0005

⊙	.0005	P to D
⊙	.001	P to D

**MUST SPECIFY PM4**

**ORDER EXAMPLE:**  
(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P(OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	5	IEC	062	300	.75	.552	X2 = 2.98	PM4
EXAMPLE:	7	IEO	087	450	1.25	.790 x .685	B/S @ 0	PM4

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

**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK DIA D	POINT LENGTH "B"					EJECTOR SIZE
		NAPMA STD	ALTERNATES				
			B	C	D	E	
			MIN L=2.50	MIN L=2.75	MIN L=3.00	MIN L=3.25	
IE_037	.375	.62	.75	1.00			IAE 04
IE_050	.500	.81	.75	1.00	1.25		IAE 06
IE_062	.625	.94	.75	1.00	1.25		IAE 06
IE_075	.750	1.06	.75	1.00	1.25	1.50	IAE 09
IE_087	.875	1.18	.75	1.00	1.25	1.50	IAE 09
IE_100	1.000	1.25	.75	1.00	1.25	1.50	IAE 09
IE_125	1.250	1.44	.75	1.00	1.25	1.50	IAE 09

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

# BALL LOCK PILOTS

## HEAVY DUTY

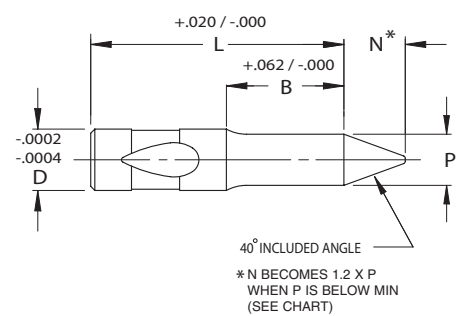
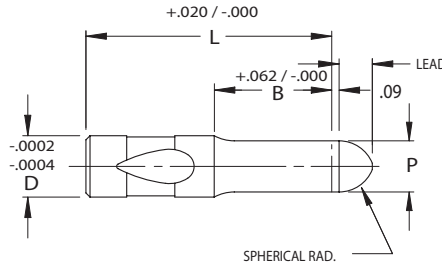
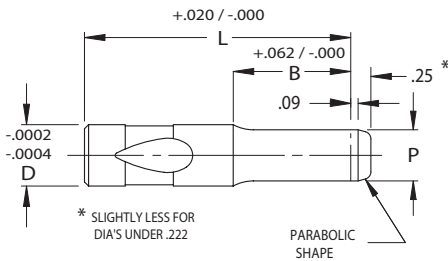
STANDARD STYLE



BULLET NOSE STYLE



LONG LEAD STYLE



P DIM	LEAD
.060-.374	5/32
.375-UP	13/32

FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

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

INCH CATALOG TYPE	SHANK DIA D	RANGE P	LEAD N	P BELOW SEE NOTE*	LENGTH "L"								
					2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50
IH_037	.375	.125-.375	.37	.262	X	X	X	X	X	X	X	X	X
IH_050	.500	.187-.500	.50	.357	X	X	X	X	X	X	X	X	X
IH_062	.625	.312-.625	.62	.444	X	X	X	X	X	X	X	X	
IH_075	.750	.437-.750	.75	.539	X	X	X	X	X	X	X	X	
IH_087	.875	.625-.875	.87	.626		X	X	X	X	X	X		
IH_100	1.000	.750-1.000	1.00	.721			X	X	X	X	X		
IH_125	1.250	1.000-1.250	1.25	.903			X	X	X	X			

### Material

Steel: PM4, HRC 60-63  
Alternate: M2, HRC 60-63

### Standard Point Tolerance

Round P +.0005  
-.0000

	.0005	P to D
--	-------	--------

Shape P, W ± .0005

	.001	P to D
--	------	--------

**MUST SPECIFY PM4**

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P(OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	6	IHT	050	450	1.00	.435	X1 = 4.35	PM4
EXAMPLE:	2	IHA	087	400	.75	.770		PM4

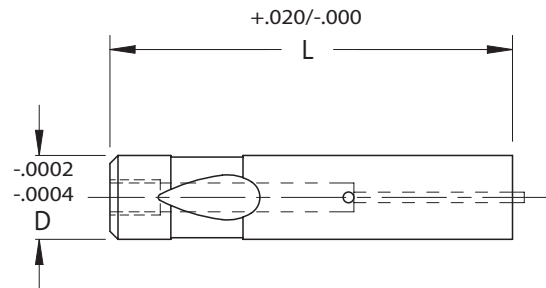
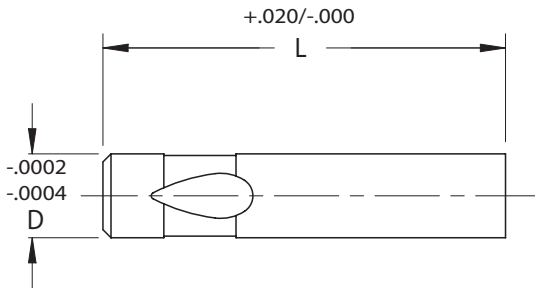
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK DIA D	POINT LENGTH "B"				
		NAPMA STD	ALTERNATES			
			B MIN L=2.50	C MIN L=2.75	D MIN L=3.00	E MIN L=3.25
IH_037	.375	.62	.75	1.00		
IH_050	.500	.81	.75	1.00	1.25	
IH_062	.625	.94	.75	1.00	1.25	
IH_075	.750	1.06	.75	1.00	1.25	1.50
IH_087	.875	1.18	.75	1.00	1.25	1.50
IH_100	1.000	1.25	.75	1.00	1.25	1.50
IH_125	1.250	1.44	.75	1.00	1.25	1.50

# BALL LOCK PUNCH BLANKS

## HEAVY DUTY/SOLID/EJECTOR



**Material**

Steel: PM4, HRC 60-63  
Alternate: M2, HRC 60-63

**MUST SPECIFY PM4**

**ORDER EXAMPLE:**

(Reference page 60)

**SPECIFY: QTY: TYPE "D" "L" STEEL**  
EXAMPLE: 4 IHB 050 500 PM4  
EXAMPLE: 6 IEB 087 450 PM4  
**MUST SPECIFY PM4**

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

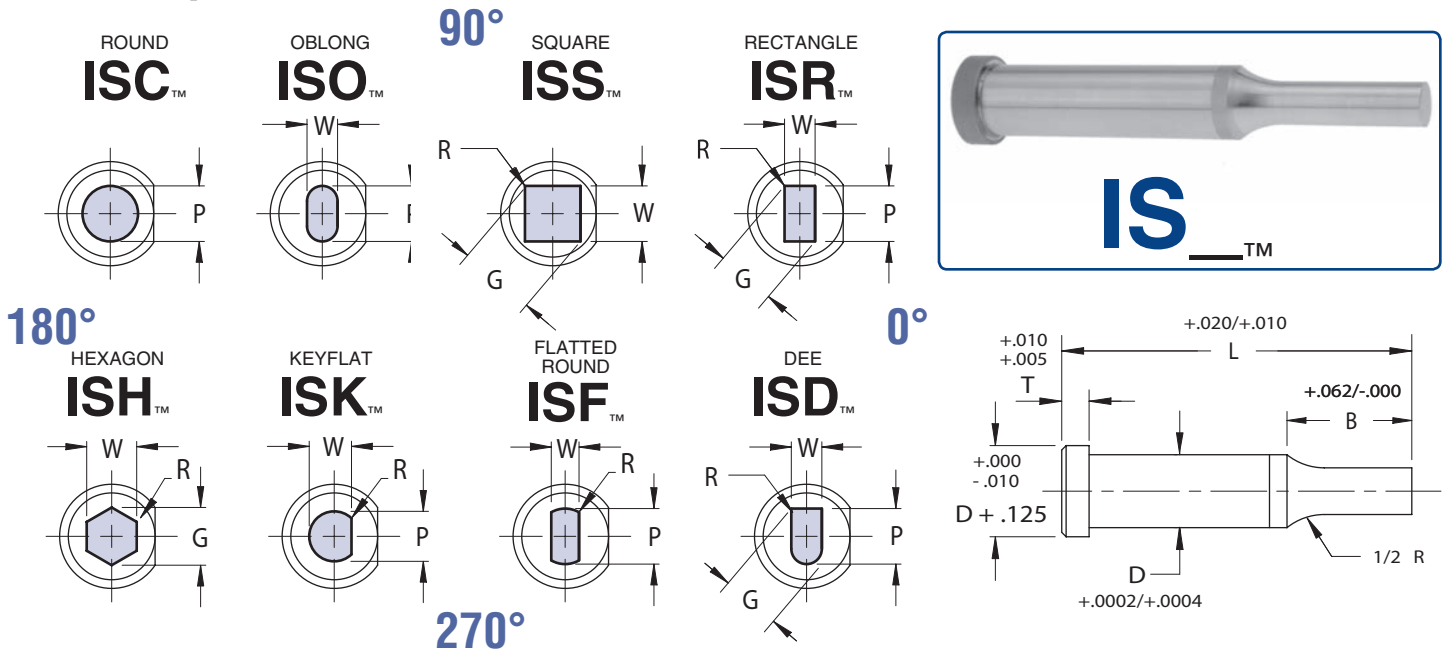
FOR STANDARD ALTERATIONS SEE PAGES 102-107.

INCH CATALOG TYPE SOLID	SHANK DIA D	OVERALL LENGTH "L"										
		2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
IHB 037	.375	X	X	X	X	X	X	X	X	X	X	X
IHB 050	.500	X	X	X	X	X	X	X	X	X	X	X
IHB 062	.625	X	X	X	X	X	X	X	X	X	X	X
IHB 075	.750	X	X	X	X	X	X	X	X	X	X	X
IHB 087	.875		X	X	X	X	X	X	X	X	X	X
IHB 100	1.000			X	X	X	X	X	X	X	X	X
IHB 125	1.250			X	X	X	X	X	X	X	X	X

INCH CATALOG TYPE EJECTOR	SHANK DIA D	OVERALL LENGTH "L"											EJECTOR SIZE
		2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	
IEB 037	.375	X	X	X	X	X	X	X	X	X			IAE 04
IEB 050	.500	X	X	X	X	X	X	X	X	X	X	X	IAE 06
IEB 062	.625	X	X	X	X	X	X	X	X	X	X	X	IAE 06
IEB 075	.750	X	X	X	X	X	X	X	X	X	X	X	IAE 09
IEB 087	.875		X	X	X	X	X	X	X	X	X	X	IAE 09
IEB 100	1.000			X	X	X	X	X	X	X	X	X	IAE 09
IEB 125	1.250			X	X	X	X	X	X	X	X	X	IAE 09

# SHOULDER PUNCHES

## BASIC/SOLID



VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY. FOR STANDARD ALTERATIONS SEE PAGES 102-107. Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

INCH CATALOG TYPE	SHANK	ROUND RANGE	SHAPE		OVERALL LENGTH "L"														
			MIN	MAX	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
IS_018	.1875	.062-.1874	.062	.1875	X	X	X	X	X	X	X	X	X	X	X				
IS_025	.2500	.078-.2499	.078	.2500	X	X	X	X	X	X	X	X	X	X					
IS_031	.3125	.093-.3124	.093	.3125	X	X	X	X	X	X	X	X	X	X					
IS_037	.3750	.125-.3749	.125	.3750		X	X	X	X	X	X	X	X	X	X	X	X	X	
IS_043	.4375	.187-.4374	.187	.4375		X	X	X	X	X	X	X	X	X	X	X	X	X	
IS_050	.5000	.250-.4999	.187	.5000			X	X	X	X	X	X	X	X	X	X	X	X	
IS_062	.6250	.375-.6249	.250	.6250			X	X	X	X	X	X	X	X	X	X	X	X	
IS_075	.7500	.500-.7499	.312	.7500				X	X	X	X	X	X	X	X	X	X	X	
IS_087	.8750	.562-.8749	.312	.8750				X	X	X	X	X	X	X	X	X	X	X	
IS_100	1.0000	.687-.9999	.375	1.0000				X	X	X	X	X	X	X	X	X	X	X	

**Material**  
Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

**Standard Point Tolerance**  
Round P  $+0.0005$  /  $-0.0000$     .0005 P to D  
Shape P, W  $\pm 0.0005$     .001 P to D

**MUST SPECIFY PM4**

**ORDER EXAMPLE:**  
(Reference page 60)

SPECIFY:	QTY:	TYPE:	"D":	"L":	POINT LENGTH:	P(OR P&W) DIMENSIONS:	ALTERATION CODE:	STEEL:
EXAMPLE:	4	ISC	050	500	1.00	.435	X1 = 4.85	PM4
EXAMPLE:	8	ISO	087	450	.75	.750 x .625	F1 @ 45	PM4

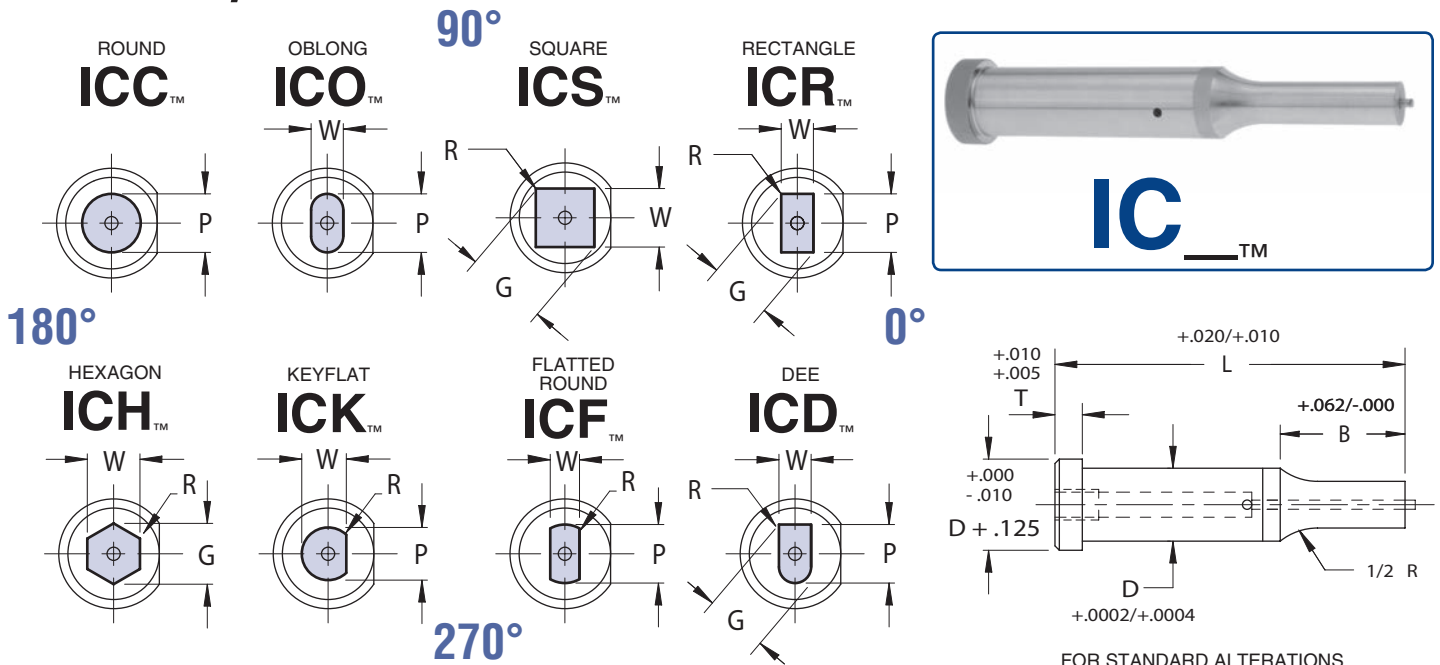
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK D	HEAD DIM T	POINT LENGTH "B"				
			ALTERNATES				
			NAPMA STD	B MIN L=1.75	C MIN L=2.00	D MIN L=2.25	E MIN L=2.50
IS_018	.1875	.125	.44	.75	1.00		
IS_025	.2500	.125	.50	.75	1.00		
IS_031	.3125	.125	.56	.75	1.00	1.25	1.50
IS_037	.3750	.188	.62	.75	1.00	1.25	1.50
IS_043	.4375	.188	.75	.75	1.00	1.25	1.50
IS_050	.5000	.188	.81	.75	1.00	1.25	1.50
IS_062	.6250	.250	.93	.75	1.00	1.25	1.50
IS_075	.7500	.250	1.06	.75	1.00	1.25	1.50
IS_087	.8750	.250	1.12	.75	1.00	1.25	1.50
IS_100	1.000	.250	1.25	.75	1.00	1.25	1.50

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

# SHOULDER PUNCHES

## BASIC/EJECTOR



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 102-107.

INCH CATALOG TYPE	SHANK D	ROUND RANGE P	SHAPE		OVERALL LENGTH "L"														
			MIN W	MAX G/P	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
IC_018	.1875	.062-.1874	.062	.1875	X	X	X	X	X	X	X	X	X	X					
IC_025	.2500	.078-.2499	.078	.2500	X	X	X	X	X	X	X	X	X	X					
IC_031	.3125	.125-.3124	.125	.3125	X	X	X	X	X	X	X	X	X	X					
IC_037	.3750	.187-.3749	.187	.3750		X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_043	.4375	.187-.4374	.187	.4375		X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_050	.5000	.250-.4999	.187	.5000			X	X	X	X	X	X	X	X	X	X	X	X	X
IC_062	.6250	.375-.6249	.250	.6250			X	X	X	X	X	X	X	X	X	X	X	X	X
IC_075	.7500	.500-.7499	.312	.7500				X	X	X	X	X	X	X	X	X	X	X	X
IC_087	.8750	.562-.8749	.312	.8750					X	X	X	X	X	X	X	X	X	X	X
IC_100	1.0000	.687-.9999	.375	1.0000					X	X	X	X	X	X	X	X	X	X	X

### Material

Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

### Standard Point Tolerance

Round P  $\pm .0005$  .0005 P to D  
Shape P, W  $\pm .0005$  .001 P to D

**MUST SPECIFY PM4**

### ORDER EXAMPLE:

(Reference page 60)  
SPECIFY: QTY: TYPE "D" "L" POINT LENGTH P(OR P&W) DIMENSIONS ALTERATION CODE STEEL  
EXAMPLE: 5 ICC 062 300 .75 .552 X2=2.98 PM4  
EXAMPLE: 7 ICO 087 450 1.25 .790 x .685 F6 F= .390 PM4  
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99  
**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK D	HEAD DIM T	POINT LENGTH "B"					EJECTOR SIZE
			NAPMA STD	ALTERNATES				
				B MIN L=1.75	C MIN L=2.00	D MIN L=2.25	E MIN L=2.50	
IC_018	.1875	.125	.43	.75	1.00			IAE 02
IC_025	.2500	.125	.50	.75	1.00			IAE 03
IC_031	.3125	.125	.56	.75	1.00	1.25	1.50	IAE 04
IC_037	.3750	.188	.62	.75	1.00	1.25	1.50	IAE 06
IC_043	.4375	.188	.75	.75	1.00	1.25	1.50	IAE 06
IC_050	.5000	.188	.81	.75	1.00	1.25	1.50	IAE 06
IC_062	.6250	.250	.94	.75	1.00	1.25	1.50	IAE 09
IC_075	.7500	.250	1.06	.75	1.00	1.25	1.50	IAE 09
IC_087	.8750	.250	1.12	.75	1.00	1.25	1.50	IAE 09
IC_100	1.0000	.250	1.25	.75	1.00	1.25	1.50	IAE 09

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

# SHOULDER PILOTS

## BASIC/PILOT

STANDARD STYLE



**IST™**

BULLET NOSE STYLE

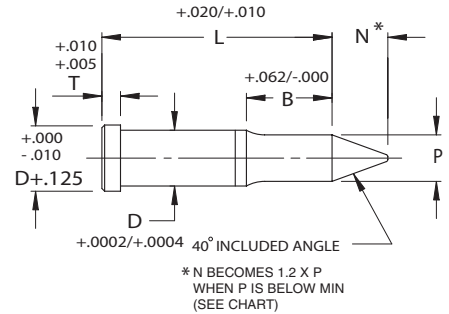
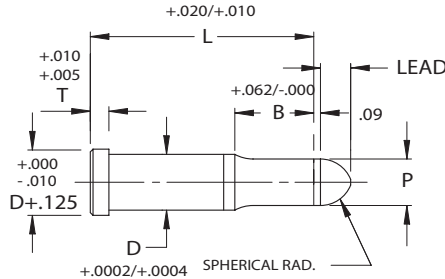
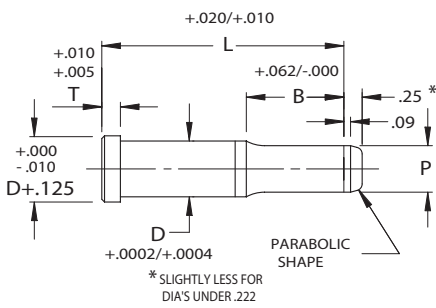


**ISP™**

LONG LEAD STYLE



**ISA™**



P DIM	LEAD
.062-.374	5/32
.375-UP	13/32

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

FOR STANDARD ALTERATIONS SEE PAGES 102-107.

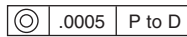
INCH CATALOG TYPE	SHANK DIA D	POINT RANGE P	N	P BELOW SEE NOTE*	LENGTH "L"												
					1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50
IS_018	.1875	.062-.1875	.18	.124	X	X	X	X	X	X	X	X	X	X			
IS_025	.2500	.078-.2500	.25	.175	X	X	X	X	X	X	X	X	X	X			
IS_031	.3125	.093-.3125	.31	.219	X	X	X	X	X	X	X	X	X				
IS_037	.3750	.125-.3750	.37	.262		X	X	X	X	X	X	X	X	X	X	X	X
IS_043	.4375	.187-.4375	.43	.306		X	X	X	X	X	X	X	X	X	X	X	X
IS_050	.5000	.250-.5000	.50	.357			X	X	X	X	X	X	X	X	X	X	X
IS_062	.6250	.375-.6250	.62	.444			X	X	X	X	X	X	X	X	X	X	
IS_075	.7500	.500-.7500	.75	.539				X	X	X	X	X	X	X	X		
IS_087	.8750	.562-.8750	.87	.630					X	X	X	X	X	X			
IS_100	1.0000	.687-1.0000	1.00	.721								X	X	X	X		

### Material

Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

### Standard Point Tolerance

Round P +.0005  
-.0000



**MUST SPECIFY PM4**

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P DIMENSION	ALTERATION CODE	STEEL
EXAMPLE:	6	IST	050	400	1.00	.435	X1 = 3.85	PM4
EXAMPLE:	2	ISA	087	350	.75	.770		PM4

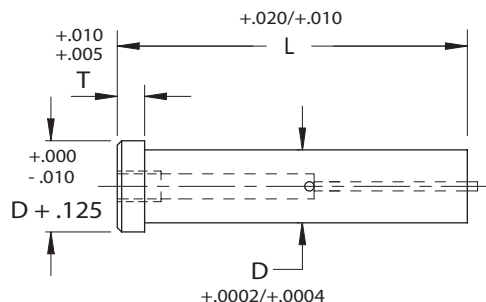
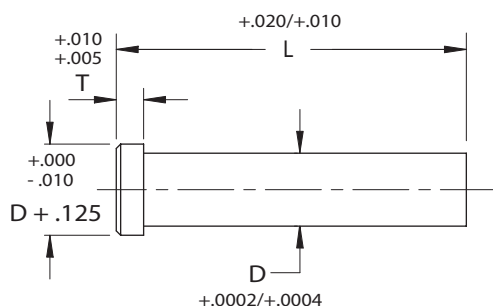
Note: When ordering, standard quantity breaks are: 1, 2-3, 4-11, 12-23, 24-49, 50-99

**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK DIA D	HEAD THICK T	POINT LENGTH "B"					
			NAPMA STD	ALTERNATES				
				B MIN L=1.75	C MIN L=2.00	D MIN L=2.25	E MIN L=2.50	
IS_018	.1875	.125	.44	.75	1.00			
IS_025	.2500	.125	.50	.75	1.00			
IS_031	.3125	.125	.56	.75	1.00	1.25	1.50	
IS_037	.3750	.188	.62	.75	1.00	1.25	1.50	
IS_043	.4375	.188	.75	.75	1.00	1.25	1.50	
IS_050	.5000	.188	.81	.75	1.00	1.25	1.50	
IS_062	.6250	.250	.94	.75	1.00	1.25	1.50	
IS_075	.7500	.250	1.06	.75	1.00	1.25	1.50	
IS_087	.8750	.250	1.12	.75	1.00	1.25	1.50	
IS_100	1.0000	.250	1.25	.75	1.00	1.25	1.50	

# SHOULDER PUNCH BLANKS

## BASIC/SOLID/EJECTOR



**Material**  
Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

**ORDER EXAMPLE:** (Reference page 60)  
SPECIFY: QTY: TYPE "D" "L" STEEL  
EXAMPLE: 4 ISB 050 500 PM4  
EXAMPLE: 6 ICB 087 450 PM4  
**MUST SPECIFY PM4**

**MUST SPECIFY PM4**

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

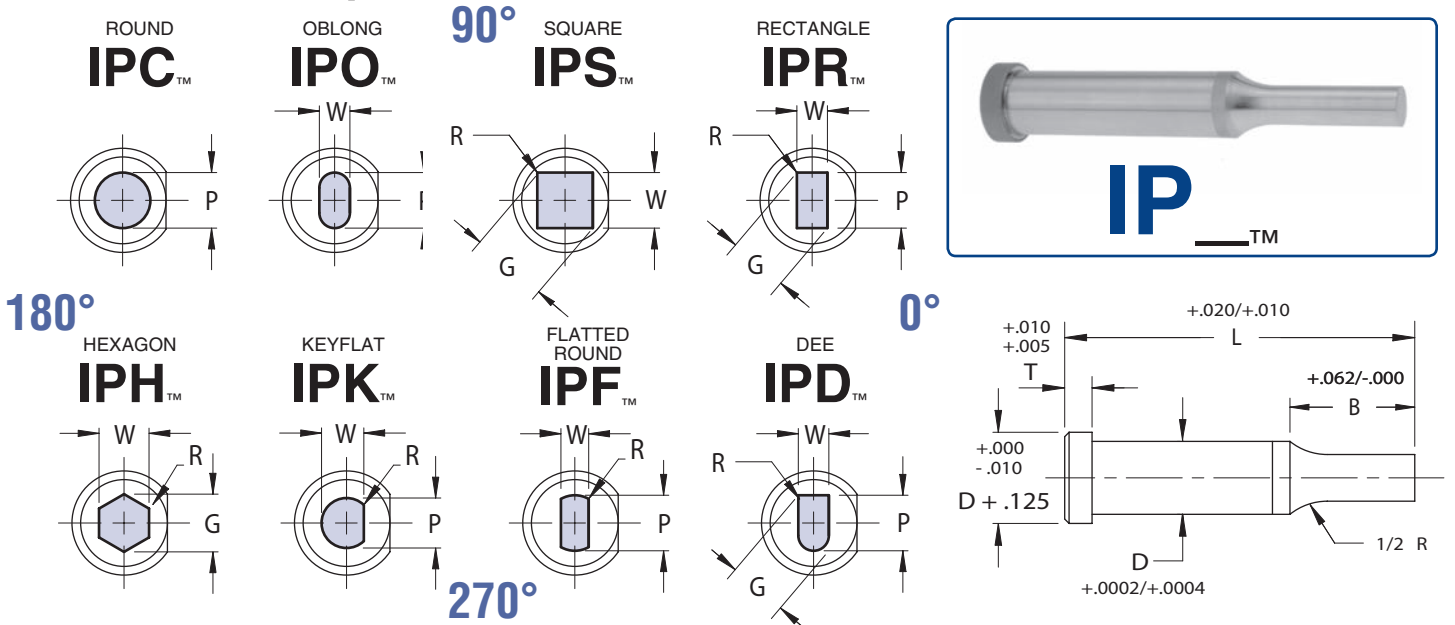
FOR STANDARD ALTERATIONS SEE PAGES 102-107.

INCH CATALOG TYPE SOLID	SHANK DIA D	HEAD DIM T	OVERALL LENGTH "L"															
			1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	
ISB 012	.1250	.125	X	X	X	X	X	X	X									
ISB 018	.1875	.125	X	X	X	X	X	X	X	X	X	X	X					
ISB 025	.2500	.125	X	X	X	X	X	X	X	X	X	X	X					
ISB 031	.3125	.125	X	X	X	X	X	X	X	X	X	X	X					
ISB 037	.3750	.188		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
ISB 043	.4375	.188		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
ISB 050	.5000	.188			X	X	X	X	X	X	X	X	X	X	X	X	X	
ISB 062	.6250	.250			X	X	X	X	X	X	X	X	X	X	X	X	X	
ISB 075	.7500	.250				X	X	X	X	X	X	X	X	X	X	X	X	
ISB 087	.8750	.250					X	X	X	X	X	X	X	X	X	X	X	
ISB 100	1.0000	.250					X	X	X	X	X	X	X	X	X	X	X	

INCH CATALOG TYPE EJECTOR	SHANK DIA D	HEAD DIM T	OVERALL LENGTH "L"														EJECTOR SIZE	
			1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75		5.00
ICB 018	.1875	.125	X	X	X	X	X	X	X	X	X	X						IAE 02
ICB 025	.2500	.125	X	X	X	X	X	X	X	X	X	X						IAE 03
ICB 031	.3125	.125	X	X	X	X	X	X	X	X	X	X						IAE 04
ICB 037	.3750	.188		X	X	X	X	X	X	X	X	X	X	X	X	X		IAE 06
ICB 043	.4375	.188		X	X	X	X	X	X	X	X	X	X	X	X	X		IAE 06
ICB 050	.5000	.188			X	X	X	X	X	X	X	X	X	X	X	X		IAE 06
ICB 062	.6250	.250			X	X	X	X	X	X	X	X	X	X	X	X		IAE 09
ICB 075	.7500	.250				X	X	X	X	X	X	X	X	X	X	X		IAE 09
ICB 087	.8750	.250					X	X	X	X	X	X	X	X	X	X		IAE 09
ICB 100	1.0000	.250					X	X	X	X	X	X	X	X	X	X		IAE 09

# SHOULDER PUNCHES

## SELECTIVE/SOLID



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 102-107.

INCH CATALOG TYPE	SHANK D	ROUND RANGE P	SHAPE		OVERALL LENGTH "L"														
			MIN W	MAX G/P	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
IP_012	.1250	.062-.1249	.062	.1250	X	X	X	X	X	X	X								
IP_018	.1875	.062-.1874	.062	.1875	X	X	X	X	X	X	X	X	X	X					
IP_025	.2500	.078-.2499	.078	.2500	X	X	X	X	X	X	X	X	X	X					
IP_031	.3125	.093-.3124	.093	.3125	X	X	X	X	X	X	X	X	X	X					
IP_037	.3750	.125-.3749	.125	.3750		X	X	X	X	X	X	X	X	X	X	X	X	X	X
IP_043	.4375	.187-.4374	.187	.4375		X	X	X	X	X	X	X	X	X	X	X	X	X	X
IP_050	.5000	.250-.4999	.187	.5000			X	X	X	X	X	X	X	X	X	X	X	X	X
IP_062	.6250	.375-.6249	.250	.6250			X	X	X	X	X	X	X	X	X	X	X	X	X
IP_075	.7500	.500-.7499	.312	.7500				X	X	X	X	X	X	X	X	X	X	X	X
IP_087	.8750	.562-.8749	.312	.8750					X	X	X	X	X	X	X	X	X	X	X
IP_100	1.0000	.687-.9999	.375	1.0000					X	X	X	X	X	X	X	X	X	X	X

### Material

Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

### Standard Point Tolerance

Round P  $\pm .0005$  to  $-.0000$  .0005 P to D  
Shape P, W  $\pm .0005$  .001 P to D

**MUST SPECIFY PM4**

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

Alternate Point Tolerance **T2**  
P, W TOLERANCE  $\pm .0002$  to  $-.0000$   
P to D  $\pm .0003$

### ORDER EXAMPLE:

(Reference page 60)  
SPECIFY: QTY: TYPE "D" "L" POINT LENGTH (P OR P&W) DIMENSIONS ALTERATION CODE STEEL  
EXAMPLE: 4 IPC 050 500 1.00 .435 T2 PM4  
EXAMPLE: 8 IPO 087 450 .75 .750 x .625 F1 @ 90 PM4

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

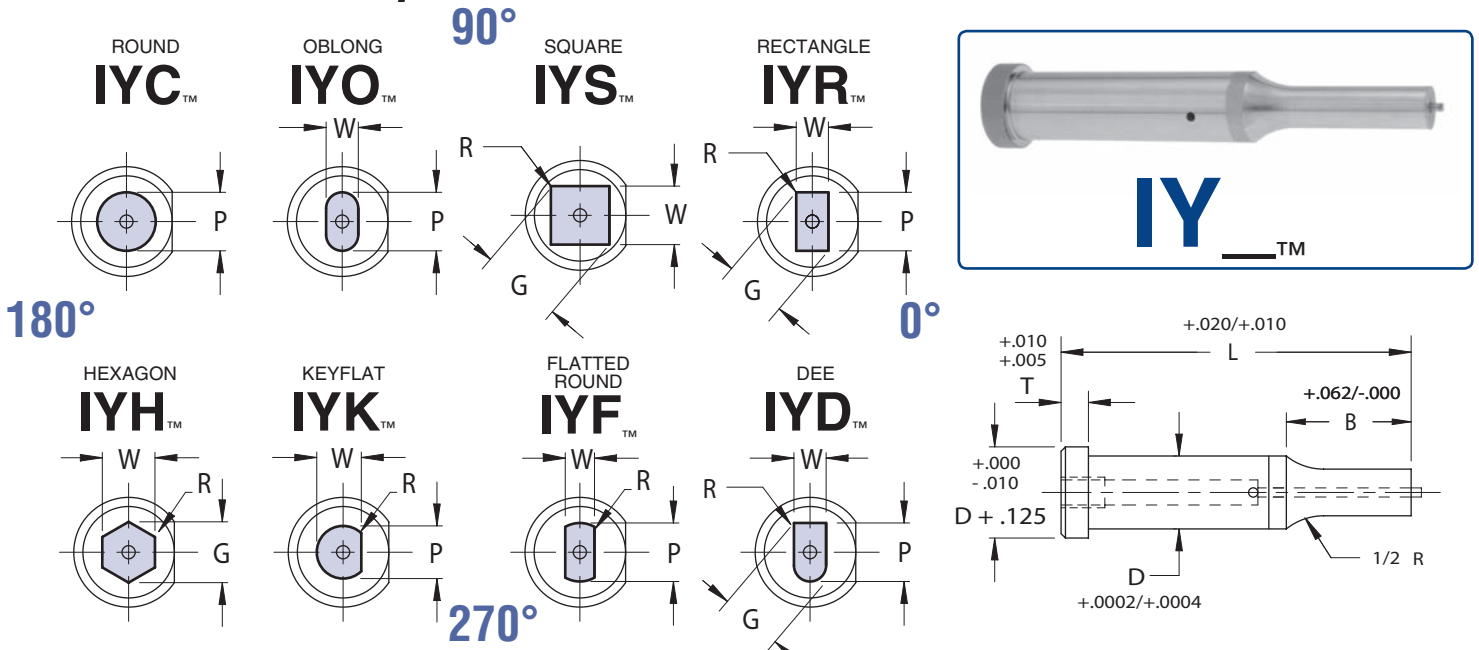
**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK DIA D	HEAD THICK T	POINT LENGTH "B"				
			NAPMA STD	B MIN L=1.75	C MIN L=2.00	D MIN L=2.25	E MIN L=2.50
IP_012	.1250	.125	.44	.75	1.00		
IP_018	.1875	.125	.44	.75	1.00		
IP_025	.2500	.188	.50	.75	1.00	1.25	
IP_031	.3125	.188	.56	.75	1.00	1.25	1.50
IP_037	.3750	.188	.62	.75	1.00	1.25	1.50
IP_043	.4375	.188	.75	.75	1.00	1.25	1.50
IP_050	.5000	.188	.81	.75	1.00	1.25	1.50
IP_062	.6250	.188	.94	.75	1.00	1.25	1.50
IP_075	.7500	.188	1.06	.75	1.00	1.25	1.50
IP_087	.8750	.188	1.12	.75	1.00	1.25	1.50
IP_100	1.0000	.188	1.25	.75	1.00	1.25	1.50



# SHOULDER PUNCHES

## SELECTIVE/EJECTOR



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 102-107.

INCH CATALOG TYPE	SHANK D	ROUND		SHAPE		OVERALL LENGTH "L"														
		RANGE P	MIN W	MAX G/P	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	
IY_018	.1875	.062-.1874	.062	.1875	X	X	X	X	X	X	X	X	X	X	X					
IY_025	.2500	.078-.2499	.078	.2500	X	X	X	X	X	X	X	X	X	X	X					
IY_031	.3125	.125-.3124	.125	.3125	X	X	X	X	X	X	X	X	X	X	X					
IY_037	.3750	.125-.3749	.125	.3750		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
IY_043	.4375	.187-.4374	.187	.4375		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
IY_050	.5000	.250-.4999	.187	.5000			X	X	X	X	X	X	X	X	X	X	X	X	X	
IY_062	.6250	.375-.6249	.250	.6250			X	X	X	X	X	X	X	X	X	X	X	X	X	
IY_075	.7500	.500-.7499	.312	.7500				X	X	X	X	X	X	X	X	X	X	X	X	
IY_087	.8750	.562-.8749	.312	.8750					X	X	X	X	X	X	X	X	X	X	X	
IY_100	1.0000	.687-.9999	.375	1.0000					X	X	X	X	X	X	X	X	X	X	X	

**Material**  
Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

**MUST SPECIFY PM4**

**Standard Point Tolerance**  
Round P +.0005  
                  -.0000  
Shape P, W ± .0005

⊙ .0005 P to D  
⊙ .001 P to D

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

Alternate Point Tolerance **T2**

P, W TOLERANCE +.0002  
                          -.0000

P to D .0003 ⊙

**ORDER EXAMPLE:**  
(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P(OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	2	IYC	062	300	.75	.552	T2	PM4
EXAMPLE:	6	IYO	087	450	1.25	.790 x .685	F6 F = .390	PM4

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

**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK D	HEAD DIM T	POINT LENGTH "B"					EJECTOR SIZE
			NAPMA STD	ALTERNATES				
				B MIN L=1.75	C MIN L=2.00	D MIN L=2.25	E MIN L=2.50	
IY_018	.1875	.125	.43	.75	1.00		IAE 02	
IY_025	.2500	.188	.50	.75	1.00		IAE 03	
IY_031	.3125	.188	.56	.75	1.00	1.25	1.50	IAE 04
IY_037	.3750	.188	.62	.75	1.00	1.25	1.50	IAE 06
IY_043	.4375	.188	.75	.75	1.00	1.25	1.50	IAE 06
IY_050	.5000	.188	.81	.75	1.00	1.25	1.50	IAE 06
IY_062	.6250	.188	.94	.75	1.00	1.25	1.50	IAE 09
IY_075	.7500	.188	1.06	.75	1.00	1.25	1.50	IAE 09
IY_087	.8750	.188	1.12	.75	1.00	1.25	1.50	IAE 09
IY_100	1.0000	.188	1.25	.75	1.00	1.25	1.50	IAE 09

# SHOULDER PILOTS

## SELECTIVE/PILOT

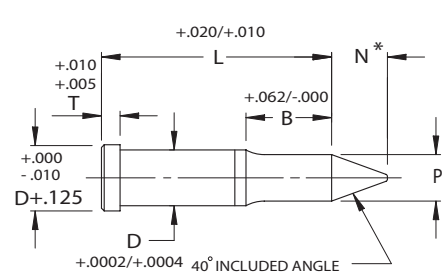
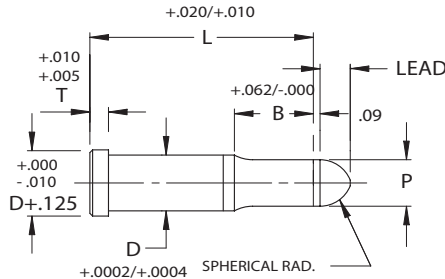
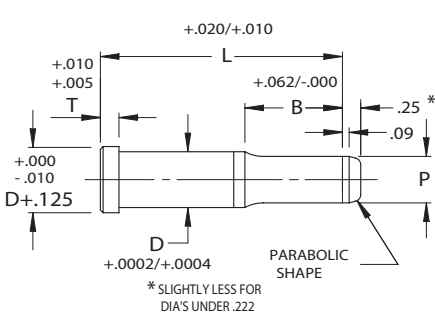
STANDARD STYLE



BULLET NOSE STYLE



LONG LEAD STYLE



P DIM	LEAD
.062-.374	5/32
.375-UP	13/32

FOR STANDARD ALTERATIONS SEE PAGES 102-107.

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

INCH CATALOG TYPE	SHANK DIA D	POINT RANGE P	LEAD N	P BELOW SEE NOTE*	LENGTH "L"												
					1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50
IP_012	.1250	.062-.1250	.12	.092	X	X	X	X	X	X							
IP_018	.1875	.062-.1875	.18	.124	X	X	X	X	X	X	X	X	X				
IP_025	.2500	.078-.2500	.25	.175	X	X	X	X	X	X	X	X	X				
IP_031	.3125	.093-.3125	.31	.219	X	X	X	X	X	X	X	X					
IP_037	.3750	.125-.3750	.37	.262		X	X	X	X	X	X	X	X	X	X	X	X
IP_043	.4375	.187-.4375	.43	.306		X	X	X	X	X	X	X	X	X	X	X	X
IP_050	.5000	.250-.5000	.50	.357			X	X	X	X	X	X	X	X	X	X	X
IP_062	.6250	.375-.6250	.62	.444			X	X	X	X	X	X	X	X	X	X	
IP_075	.7500	.500-.7500	.75	.539				X	X	X	X	X	X	X	X		
IP_087	.8750	.562-.8750	.87	.630				X	X	X	X	X	X	X			
IP_100	1.0000	.687-1.0000	1.00	.721					X	X	X	X	X	X			

### Material

Steel: PM4, HRC 60-63  
Heads HRC 45-55  
Alternate: M2, HRC 60-63

**MUST SPECIFY PM4**

### Standard Point Tolerance

Round P  $+ .0005$   
 $- .0000$  .0005 P to D

### Alternate Point Tolerance

**T2**

P, W TOLERANCE  $+ .0002$   
 $- .0000$

P to D  $.0003$

### ORDER EXAMPLE:

(Reference page 60)	QTY:	TYPE	"D"	"L"	POINT LENGTH	P (OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	3	IPP	062	400	1.00	.435	X1 = 3.85	PM4
EXAMPLE:	7	IPA	087	350	.75	.770	T2	PM4

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

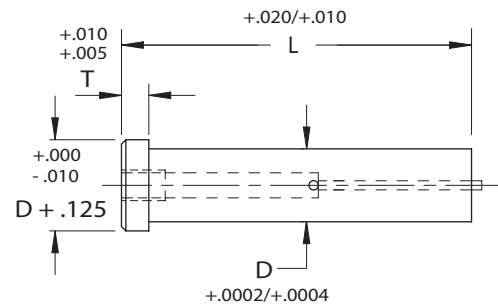
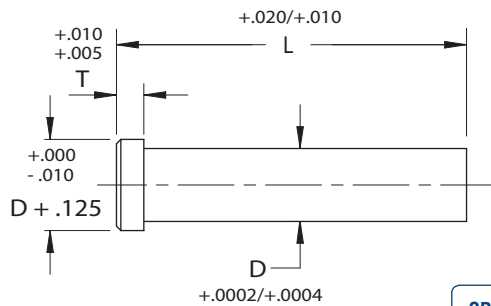
**MUST SPECIFY PM4**

INCH CATALOG TYPE	SHANK DIA D	HEAD THICK T	POINT LENGTH "B"				
			NAPMA STD	ALTERNATES			
				B MIN L=1.75	C MIN L=2.00	D MIN L=2.25	E MIN L=2.50
IP_012	.1250	.125	.44	.75	1.00		
IP_018	.1875	.125	.44	.75	1.00		
IP_025	.2500	.188	.50	.75	1.00	1.25	
IP_031	.3125	.188	.56	.75	1.00	1.25	1.50
IP_037	.3750	.188	.62	.75	1.00	1.25	1.50
IP_043	.4375	.188	.75	.75	1.00	1.25	1.50
IP_050	.5000	.188	.81	.75	1.00	1.25	1.50
IP_062	.6250	.188	.94	.75	1.00	1.25	1.50
IP_075	.7500	.188	1.06	.75	1.00	1.25	1.50
IP_087	.8750	.188	1.12	.75	1.00	1.25	1.50
IP_100	1.0000	.188	1.25	.75	1.00	1.25	1.50

# SHOULDER PUNCH BLANKS



## SELECTIVE/SOLID/EJECTOR



### Material

Steel: PM4, HRC 60-63  
 Heads HRC 45-55  
 Alternate: M2, HRC 60-63

### ORDER EXAMPLE:

(Reference page 60)  
 SPECIFY: QTY: TYPE "D" "L" STEEL  
 EXAMPLE: 4 IPB 062 500 PM4  
 EXAMPLE: 3 IYB 087 350 PM4  
**MUST SPECIFY PM4**

**MUST SPECIFY PM4**

FOR STANDARD ALTERATIONS SEE PAGES 102-107.

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

INCH CATALOG TYPE	SHANK DIA D	HEAD DIM T	OVERALL LENGTH "L"														
			1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
IPB 012	.1250	.125	X	X	X	X	X	X	X								
IPB 018	.1875	.125	X	X	X	X	X	X	X	X	X	X					
IPB 025	.2500	.188	X	X	X	X	X	X	X	X	X	X	X				
IPB 031	.3125	.188	X	X	X	X	X	X	X	X	X	X	X				
IPB 037	.3750	.188		X	X	X	X	X	X	X	X	X	X	X	X	X	X
IPB 043	.4375	.188		X	X	X	X	X	X	X	X	X	X	X	X	X	X
IPB 050	.5000	.188			X	X	X	X	X	X	X	X	X	X	X	X	X
IPB 062	.6250	.188			X	X	X	X	X	X	X	X	X	X	X	X	X
IPB 075	.7500	.188				X	X	X	X	X	X	X	X	X	X	X	X
IPB 087	.8750	.188					X	X	X	X	X	X	X	X	X	X	X
IPB 100	1.0000	.188					X	X	X	X	X	X	X	X	X	X	X

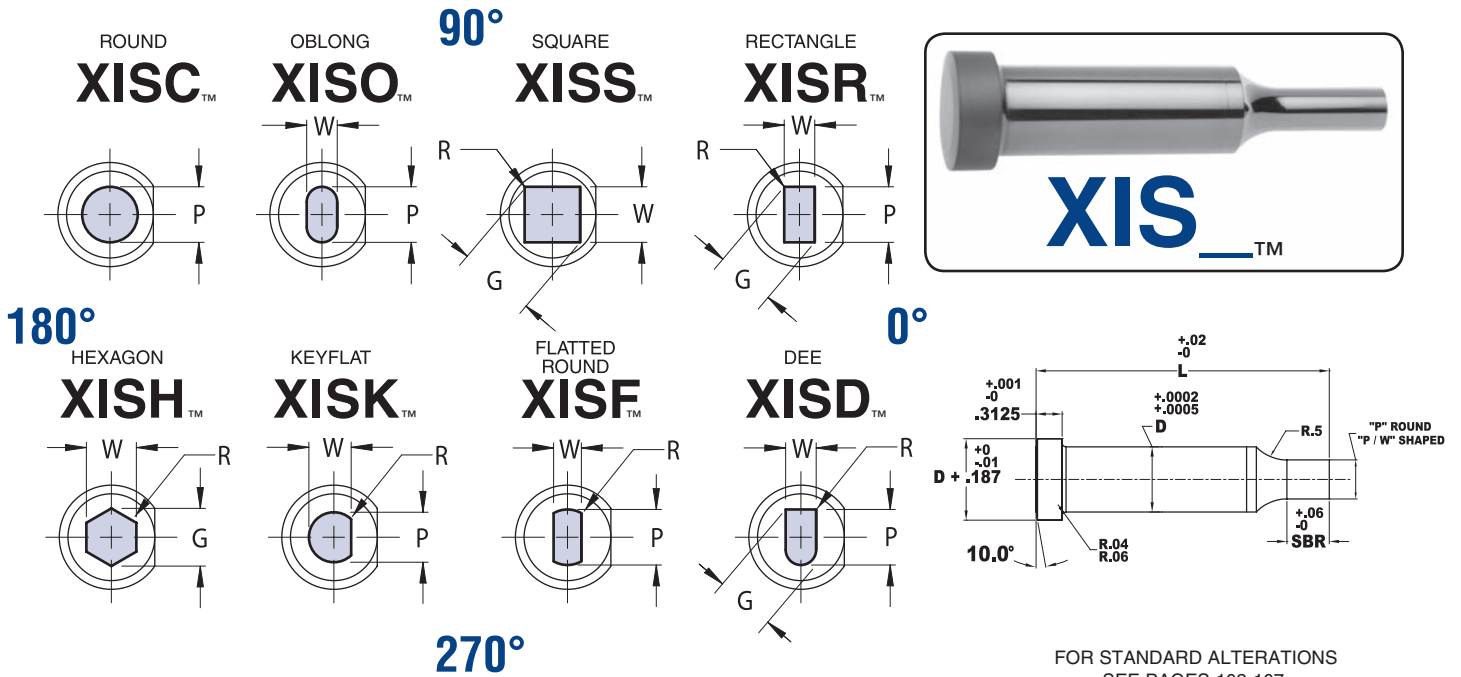
INCH CATALOG TYPE	SHANK DIA D	HEAD DIM T	OVERALL LENGTH "L"													EJECTOR SIZE	
			1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50		4.75
IYB 018	.1875	.125	X	X	X	X	X	X	X	X	X	X					IAE 02
IYB 025	.2500	.188	X	X	X	X	X	X	X	X	X	X					IAE 03
IYB 031	.3125	.188	X	X	X	X	X	X	X	X	X	X					IAE 04
IYB 037	.3750	.188		X	X	X	X	X	X	X	X	X	X	X	X	X	IAE 06
IYB 043	.4375	.188		X	X	X	X	X	X	X	X	X	X	X	X	X	IAE 06
IYB 050	.5000	.188			X	X	X	X	X	X	X	X	X	X	X	X	IAE 06
IYB 062	.6250	.188			X	X	X	X	X	X	X	X	X	X	X	X	IAE 09
IYB 075	.7500	.188				X	X	X	X	X	X	X	X	X	X	X	IAE 09
IYB 087	.8750	.188					X	X	X	X	X	X	X	X	X	X	IAE 09
IYB 100	1.0000	.188					X	X	X	X	X	X	X	X	X	X	IAE 09



# DURA PUNCHES



## SOLID



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

FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

INCH CATALOG TYPE	SHANK D	ROUND	SHAPE		OVERALL LENGTH "L"							
		RANGE P	MIN W	MAX G/P	2.50	3.00	3.25	3.50	3.75	4.00	4.50	5.00
XIS_037	.3750	.158-.3749	.158	.3750	X	X	X	X	X	X	X	X
XIS_043	.4375	.187-.4374	.187	.4375	X	X	X	X	X	X	X	X
XIS_050	.5000	.250-.4999	.187	.5000	X	X	X	X	X	X	X	X
XIS_062	.6250	.375-.6249	.250	.6250	X	X	X	X	X	X	X	X
XIS_075	.7500	.500-.7499	.312	.7500	X	X	X	X	X	X	X	X
XIS_087	.8750	.562-.8749	.312	.8750	X	X	X	X	X	X	X	X
XIS_100	1.0000	.687-.9999	.375	1.0000	X	X	X	X	X	X	X	X

**Material**  
Steel: PM4, HRC 60-62  
Heads HRC 40-55

**Standard Point Tolerance**

Round P  $\begin{matrix} +.0005 \\ -.0000 \end{matrix}$  .0005 P to D

Shape P, W  $\pm .0005$  .001 P to D

**ORDER EXAMPLE:**  
(Reference page 61)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT DIMENSIONS	P(OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	6	XISC	050	500	1.00	.435	F1	PM4
EXAMPLE:	6	XISO	087	350	.75	.750 x .625	F1 @ 90	PM4

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

INCH CATALOG TYPE	SHANK D	SBR		
		STD	ALTERNATES	
			B	C
XIS_037	.3750	.50	.75	1.00
XIS_043	.4375	.50	.75	1.00
XIS_050	.5000	.50	.75	1.00
XIS_062	.6250	.50	.75	1.00
XIS_075	.7500	.50	.75	1.00
XIS_087	.8750	.50	.75	1.00
XIS_100	1.000	.50	.75	1.00

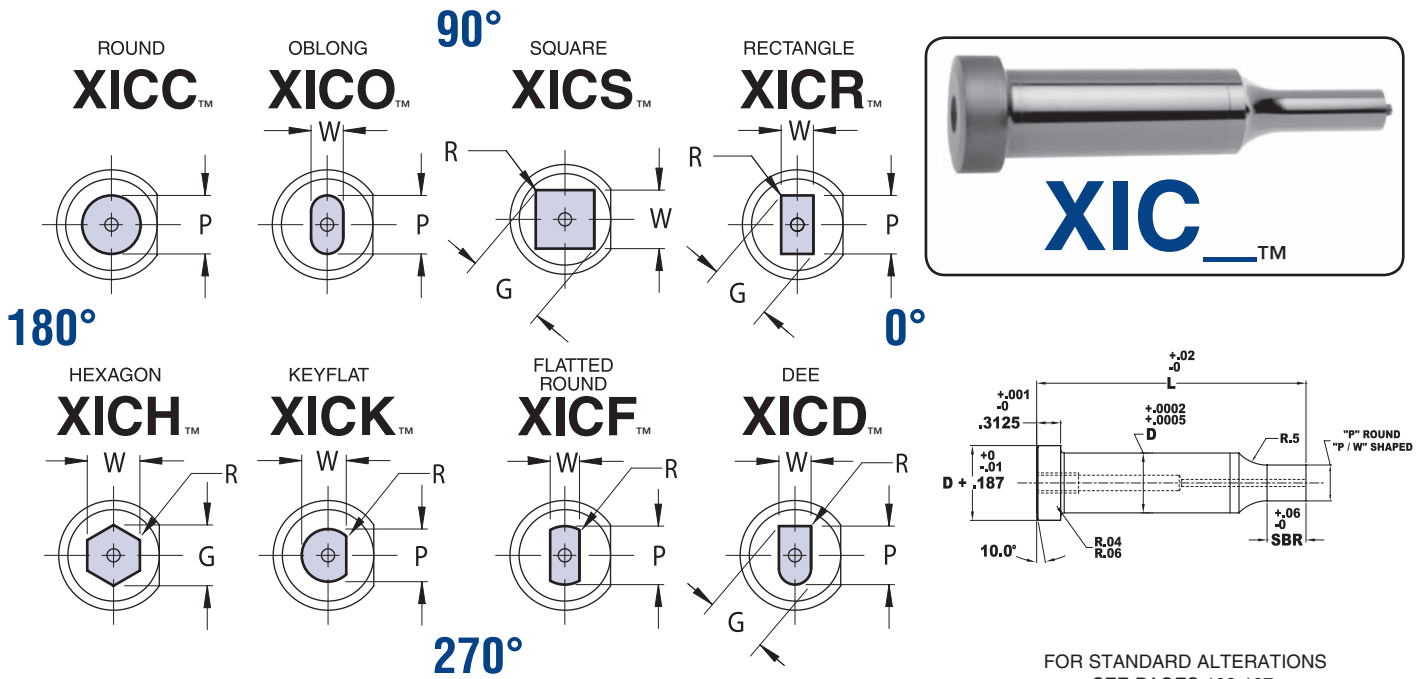
STANDARD FLAT LOCATION IS AT 0° AS SHOWN.  
AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.



# DURA PUNCHES



## EJECTOR



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

FOR STANDARD ALTERATIONS SEE PAGES 102-107.

INCH CATALOG TYPE	SHANK D	ROUND	SHAPE		OVERALL LENGTH "L"								
		RANGE P	MIN W	MAX G/P	2.50	3.00	3.25	3.50	3.75	4.00	4.50	5.00	
XIC_037	.3750	.187-.3749	.187	.3750	X	X	X	X	X	X	X	X	X
XIC_043	.4375	.187-.4374	.187	.4375	X	X	X	X	X	X	X	X	X
XIC_050	.5000	.250-.4999	.187	.5000	X	X	X	X	X	X	X	X	X
XIC_062	.6250	.375-.6249	.250	.6250	X	X	X	X	X	X	X	X	X
XIC_075	.7500	.500-.7499	.312	.7500	X	X	X	X	X	X	X	X	X
XIC_087	.8750	.562-.8749	.312	.8750	X	X	X	X	X	X	X	X	X
XIC_100	1.0000	.687-.9999	.375	1.0000	X	X	X	X	X	X	X	X	X

**Material**  
 Steel: PM4, HRC 60-62  
 Heads HRC 40-55

**Standard Point Tolerance**

Round P  $\pm .0005$   
 $\begin{matrix} +.0005 \\ -.0000 \end{matrix}$  .0005 P to D

Shape P, W  $\pm .0005$  .001 P to D

**ORDER EXAMPLE:**  
 (Reference page 61)

SPECIFY:	QTY:	TYPE	"D"	"L"	POINT LENGTH	P(OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	6	XICC	050	500	1.00	.435	F1	PM4
EXAMPLE:	6	XICO	087	350	.75	.750 x .625	F1 @ 90	PM4

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

INCH CATALOG TYPE	SHANK D	SBR			EJECTOR SIZE
		STD	ALTERNATES		
			B	C	
XIC_037	.3750	.50	.75	1.00	IAE 06
XIC_043	.4375	.50	.75	1.00	IAE 06
XIC_050	.5000	.50	.75	1.00	IAE 06
XIC_062	.6250	.50	.75	1.00	IAE 09
XIC_075	.7500	.50	.75	1.00	IAE 09
XIC_087	.8750	.50	.75	1.00	IAE 09
XIC_100	1.000	.50	.75	1.00	IAE 09

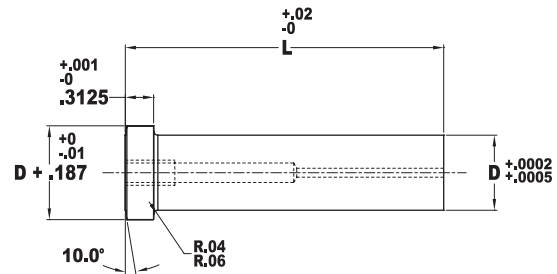
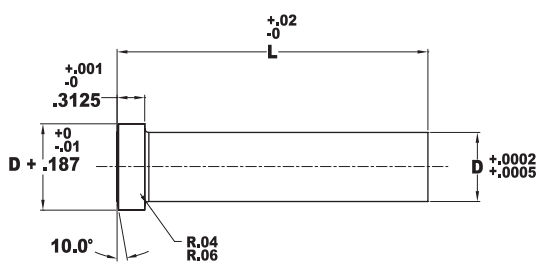
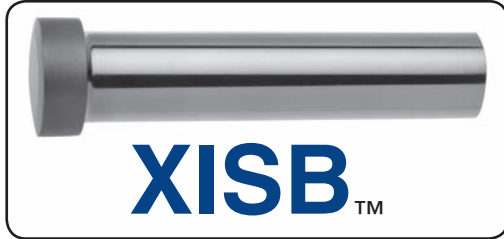
STANDARD FLAT LOCATION IS AT 0° AS SHOWN. AVAILABLE AT 90°, 180°, 270°, FOR SAME ALTERATION PRICE.



# DURA PUNCH BLANKS



## BASIC/SOLID/EJECTOR



### Material

Steel: PM4, HRC 60-62  
Heads HRC 40-55

FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

INCH CATALOG TYPE SOLID	SHANK DIA D	OVERALL LENGTH "L"							
		2.50	3.00	3.25	3.50	3.75	4.00	4.50	5.00
XISB 037	.3750	X	X	X	X	X	X	X	X
XISB 043	.4375	X	X	X	X	X	X	X	X
XISB 050	.5000	X	X	X	X	X	X	X	X
XISB 062	.6250	X	X	X	X	X	X	X	X
XISB 075	.7500	X	X	X	X	X	X	X	X
XISB 087	.8750	X	X	X	X	X	X	X	X
XISB 100	1.0000	X	X	X	X	X	X	X	X

### ORDER EXAMPLE:

(Reference page 61)

SPECIFY: QTY: TYPE "D" "L" STEEL

EXAMPLE: 6 XISB 043 400 PM4

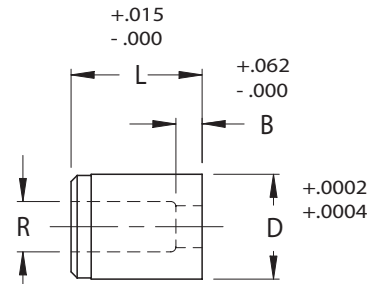
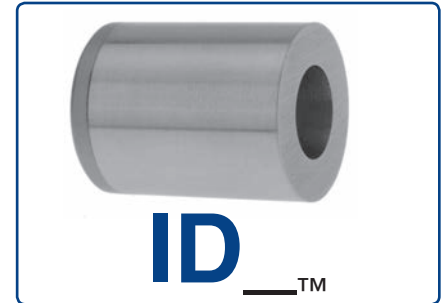
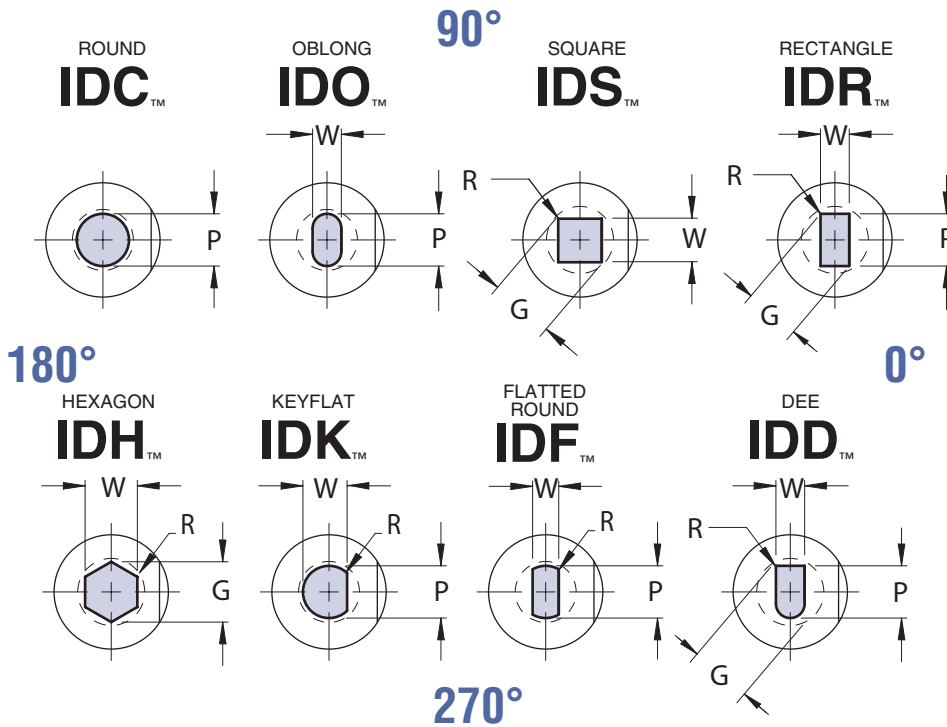
EXAMPLE: 6 XICB 062 350 PM4

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

INCH CATALOG TYPE EJECTOR	SHANK DIA D	OVERALL LENGTH "L"								EJECTOR SIZE
		2.50	3.00	3.25	3.50	3.75	4.00	4.50	5.00	
XICB 037	.3750	X	X	X	X	X	X	X	X	IAE 06
XICB 043	.4375	X	X	X	X	X	X	X	X	IAE 06
XICB 050	.5000	X	X	X	X	X	X	X	X	IAE 06
XICB 062	.6250	X	X	X	X	X	X	X	X	IAE 09
XICB 075	.7500	X	X	X	X	X	X	X	X	IAE 09
XICB 087	.8750	X	X	X	X	X	X	X	X	IAE 09
XICB 100	1.0000	X	X	X	X	X	X	X	X	IAE 09

# PRESS FIT BUTTONS

## COUNTER BORE RELIEF



R = P or G plus .030 min/.125 max

FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

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

INCH CATALOG TYPE	BODY DIA D	DIE LAND B	MAX DIA R	ROUND	SHAPE		OVERALL LENGTH "L"						
				RANGE P	MIN W	MAX G/P	.750	.875	.937	1.000	1.125	1.250	1.500
ID_025	.2500	.156	.156	.064-.125	.064	.125	X	X	X	X	X	X	
ID_031	.3125	.156	.188	.064-.156	.064	.156	X	X	X	X	X	X	X
ID_037	.3750	.156	.234	.064-.195	.064	.195	X	X	X	X	X	X	X
ID_043	.4375	.156	.281	.064-.250	.064	.250	X	X	X	X	X	X	X
ID_050	.5000	.156	.328	.064-.285	.093	.285	X	X	X	X	X	X	X
ID_062	.6250	.188	.375	.137-.345	.093	.345	X	X	X	X	X	X	X
ID_075	.7500	.188	.468	.137-.435	.115	.435	X	X	X	X	X	X	X
ID_087	.8750	.188	.578	.275-.545	.125	.545	X	X	X	X	X	X	X
ID_100	1.0000	.250	.687	.359-.655	.156	.655	X	X	X	X	X	X	X
ID_125	1.2500	.312	.843	.506-.803	.187	.803	X	X	X	X	X	X	X
ID_150	1.5000	.312	1.093	.617-1.052	.250	1.052	X	X	X	X	X	X	X

### Material

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

### Standard Point Tolerance

Round P	+.0005 -.0000		.0005	P to D
Shape P,W	+.001 -.000		.001	P to D

**MUST SPECIFY M2**

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	DIMENSIONS	P (OR P&W)	ALTERATION	CODE	STEEL
EXAMPLE:	4	IDC	050	087	.235	X2 = .85			M2
EXAMPLE:	8	IDO	087	100	.480 X .325	F2			M2

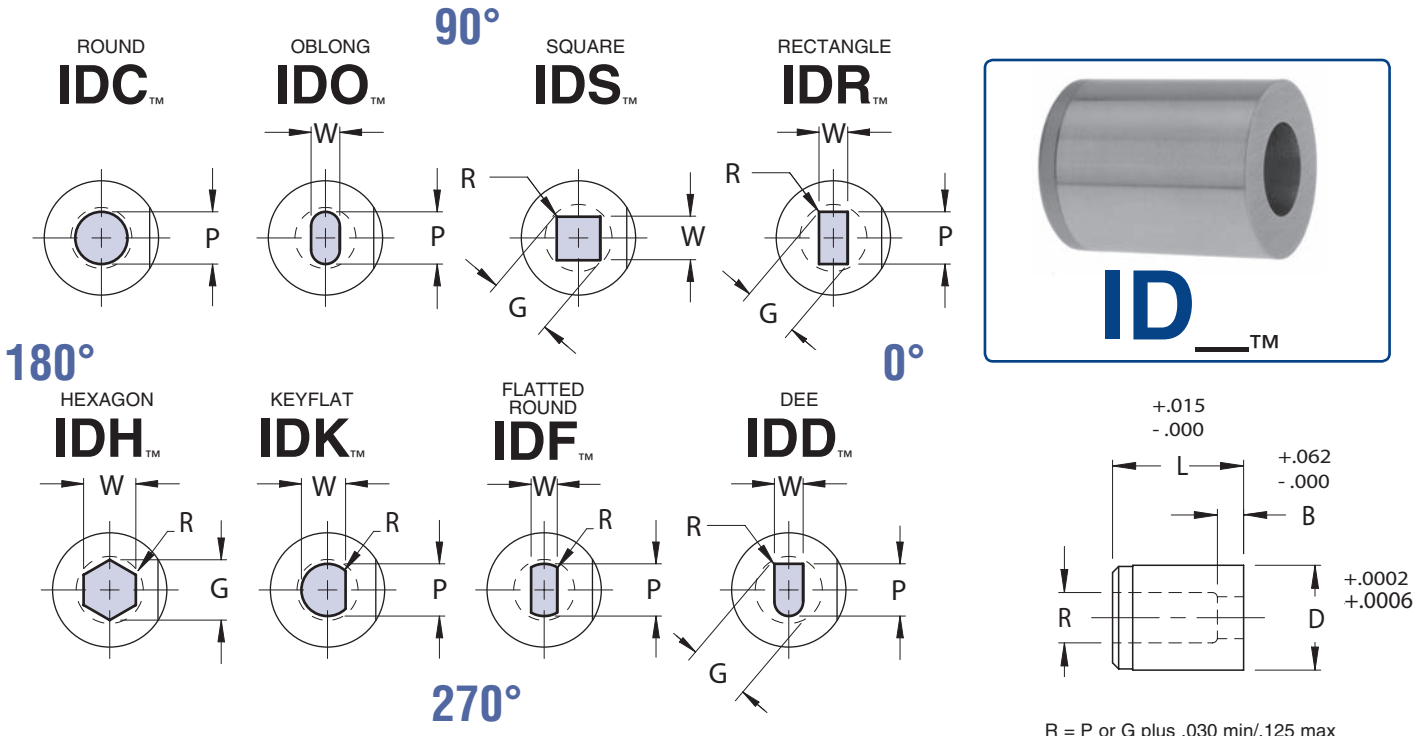
Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

**MUST SPECIFY M2**

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

# PRESS FIT BUTTONS

## COUNTER BORE RELIEF/EXTENDED RANGE



R = P or G plus .030 min/.125 max

VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

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

FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

INCH CATALOG TYPE	BODY DIA D	DIE LAND B	MAX DIA R	ROUND	SHAPE		OVERALL LENGTH "L"						
				RANGE P	MIN W	MAX G/P	.750	.875	.937	1.000	1.125	1.250	1.500
ID_175	1.750	.312	1.43	.730-1.400	.250	1.400	X	X	X	X	X	X	X
ID_200	2.000	.312	1.64	.870-1.610	.250	1.610	X	X	X	X	X	X	X
ID_225	2.250	.312	1.85	.990-1.820	.250	1.820	X	X	X	X	X	X	X
ID_250	2.500	.312	2.05	1.120-2.020	.250	2.020	X	X	X	X	X	X	X
ID_275	2.750	.312	2.25	1.230-2.220	.250	2.220	X	X	X	X	X	X	X
ID_300	3.000	.312	2.48	1.400-2.450	.250	2.450	X	X	X	X	X	X	X

### Material

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

### Standard Point Tolerance

Round P	+ .0005 - .0000		.0005	P to D
Shape P,W	+ .001 - .000		.001	P to D

**MUST SPECIFY M2**

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	P (OR P & W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	1	IDC	225	090	1.566	X2 = .900	M2
EXAMPLE:	4	IDO	250	100	1.620 X .840	F2 @ 90	M2

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

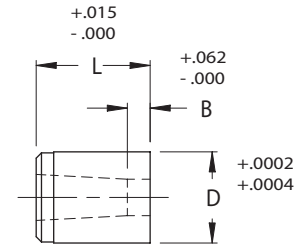
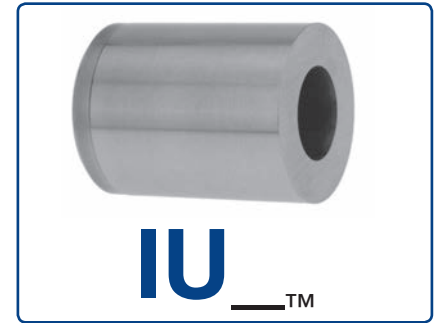
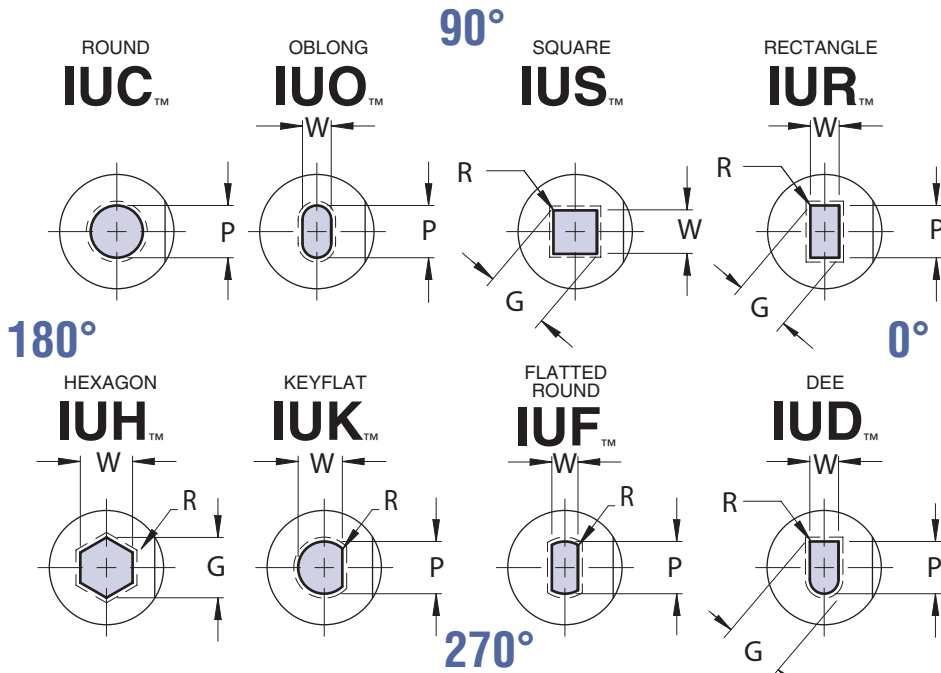
**MUST SPECIFY M2**

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



# PRESS FIT BUTTONS

## ULTRA LIFE/TAPER RELIEF



FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

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

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

INCH CATALOG TYPE	BODY DIA D	LAND LENGTH "B"					ROUND RANGE P	SHAPE		OVERALL LENGTH "L"						
		NAPMA STD	ALTERNATES					MIN W	MAX G/P	.750	.875	.937	1.000	1.125	1.250	1.500
			A	B	C	D										
IU_025	.2500	.156	.062	.125	.250	.375	.064-.125	.064	.125	X	X	X	X	X	X	X
IU_031	.3125	.156	.062	.125	.250	.375	.064-.156	.064	.156	X	X	X	X	X	X	X
IU_037	.3750	.156	.062	.125	.250	.375	.064-.195	.064	.195	X	X	X	X	X	X	X
IU_043	.4375	.156	.062	.125	.250	.375	.137-.250	.093	.250	X	X	X	X	X	X	X
IU_050	.5000	.156	.062	.125	.250	.375	.137-.285	.093	.285	X	X	X	X	X	X	X
IU_062	.6250	.188	.062	.125	.312	.437	.137-.345	.093	.345	X	X	X	X	X	X	X
IU_075	.7500	.188	.062	.125	.312	.437	.137-.435	.115	.435	X	X	X	X	X	X	X
IU_087	.8750	.188	.062	.125	.375	.500	.275-.545	.125	.545	X	X	X	X	X	X	X
IU_100	1.0000	.250	.062	.125	.375	.500	.359-.655	.156	.655	X	X	X	X	X	X	X
IU_125	1.2500	.312	.062	.125	.500	.625	.506-.803	.187	.803	X	X	X	X	X	X	X
IU_150	1.5000	.312	.062	.125	.500	.625	.617-1.052	.250	1.052	X	X	X	X	X	X	X

### Material

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

### Standard Point Tolerance

Round P	+ .0005 - .0000		.0005	P to D
Shape P,W	+ .001 - .000		.001	P to D

**MUST SPECIFY M2**

Alternate Hole Tolerance	<b>T2</b>
P, W TOLERANCE	+ .0002 - .0000
P to D	.0003

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	P (OR P & W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	9	IUC	062	087	.305	X2 = .83	M2
EXAMPLE:	4	IUO	087	125	.437 X .312	F2	M2

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

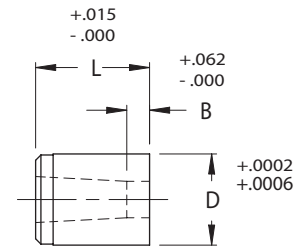
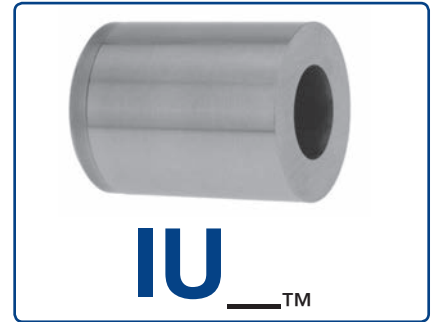
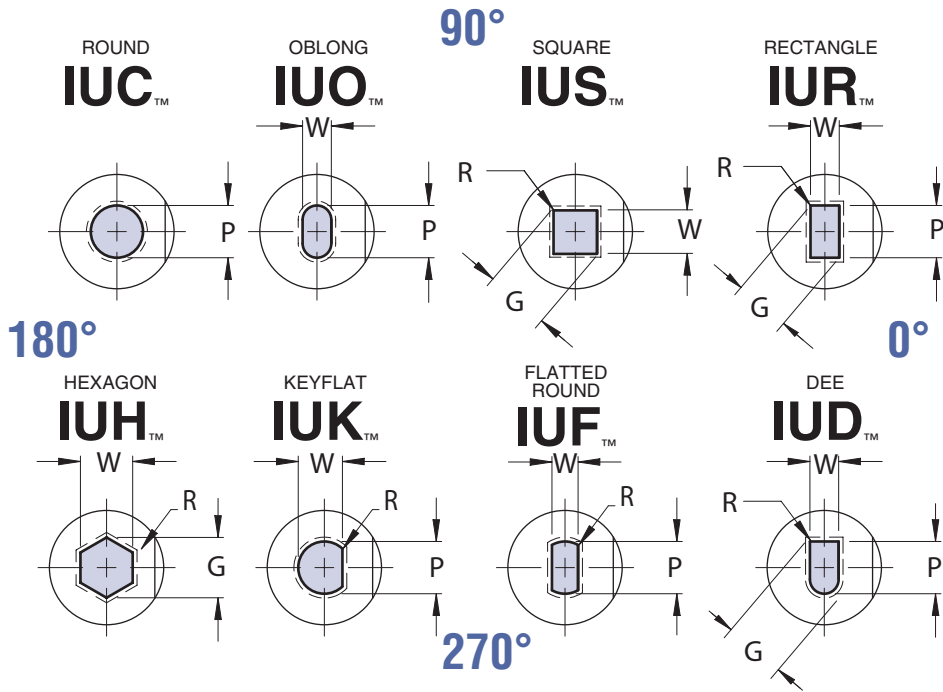
**MUST SPECIFY M2**

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

# PRESS FIT BUTTONS



## ULTRA LIFE/TAPER RELIEF/EXTENDED RANGE



FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

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

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

INCH CATALOG TYPE	BODY DIA D	LAND LENGTH "B"					ROUND RANGE P	SHAPE		OVERALL LENGTH "L"			
		NAPMA STD	ALTERNATES					MIN W	MAX G/P	1.000	1.125	1.250	1.500
			A	B	C	D							
IU_175	1.7500	.312	.062	.125	.500	.625	.750-1.400	.250	1.400	X	X	X	X
IU_200	2.0000	.312	.062	.125	.500	.625	.875-1.650	.281	1.650	X	X	X	X
IU_225	2.2500	.312	.062	.125	.500	.625	1.000-1.800	.312	1.800	X	X	X	X
IU_250	2.5000	.312	.062	.125	.500	.625	1.125-2.050	.375	2.050	X	X	X	X
IU_275	2.7500	.312	.062	.125	.500	.625	1.250-2.250	.438	2.250	X	X	X	X
IU_300	3.0000	.312	.062	.125	.500	.625	1.375-2.500	.500	2.500	X	X	X	X

### Material

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

### Standard Point Tolerance

Round P	+0.005 -.0000		.0005	P to D
Shape P,W	+0.001 -.000		.001	P to D

**MUST SPECIFY M2**

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	P (OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	4	IUC	200	125	1.315	X2 = 1.20	M2
EXAMPLE:	3	IUD	175	100	1.112 X .721	F1	M2

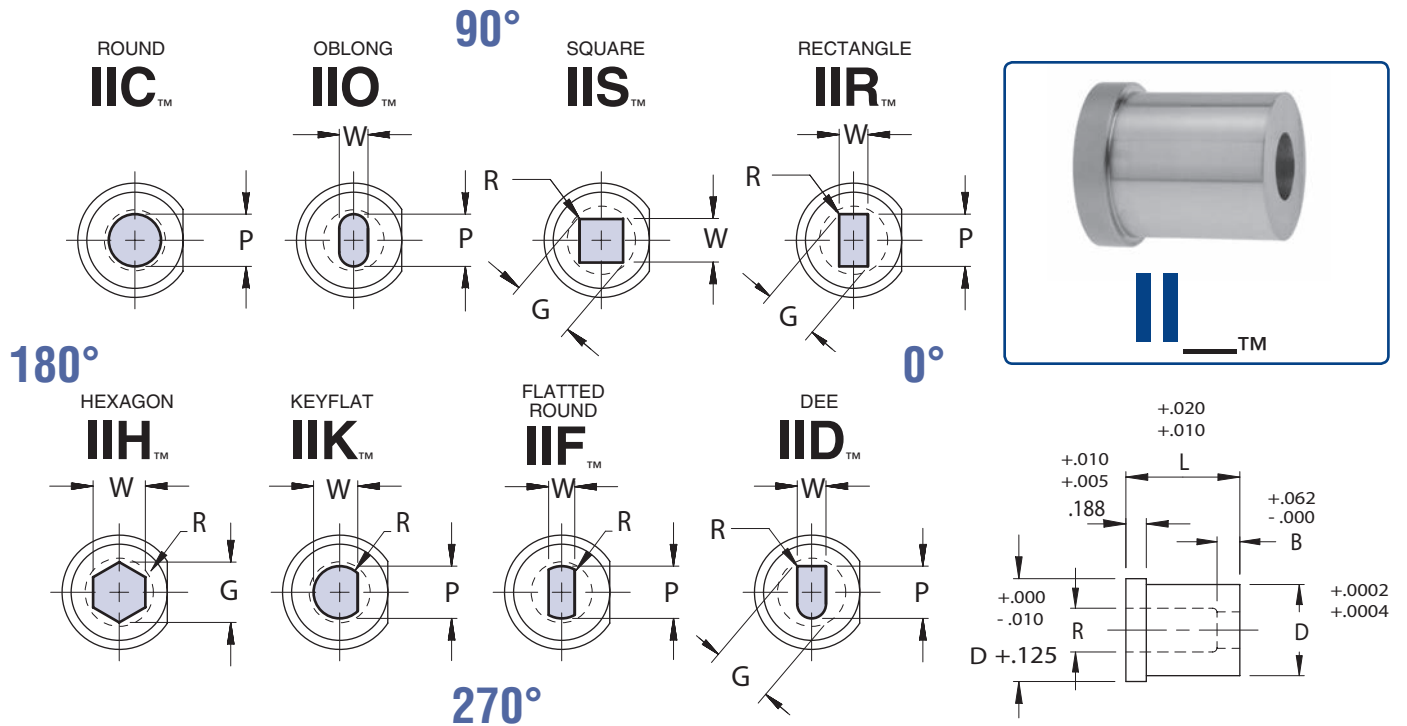
Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

**MUST SPECIFY M2**

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

# 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)

R = P or G plus .030 min/.125 max

FOR STANDARD ALTERATIONS  
SEE PAGES 102-107.

INCH CATALOG TYPE	BODY DIA D	DIE LAND B	MAX DIA R	ROUND	SHAPE		OVERALL LENGTH "L"					
				RANGE P	MIN W	MAX G/P	.750	.875	1.000	1.125	1.250	1.500
II_025	.250	.156	.156	.064-.125	.064	.125	X	X	X	X	X	X
II_037	.375	.156	.234	.064-.195	.064	.195	X	X	X	X	X	X
II_050	.500	.156	.328	.064-.285	.093	.285	X	X	X	X	X	X
II_062	.625	.188	.375	.137-.345	.093	.345	X	X	X	X	X	X
II_075	.750	.188	.468	.137-.435	.115	.435	X	X	X	X	X	X
II_087	.875	.188	.578	.275-.545	.125	.545	X	X	X	X	X	X
II_100	1.000	.250	.687	.359-.655	.156	.655	X	X	X	X	X	X
II_125	1.250	.312	.843	.506-.803	.187	.803	X	X	X	X	X	X

### Material

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

### Standard Point Tolerance

Round P	+ .0005 - .0000		.0005	P to D
Shape P,W	+ .001 - .000		.001	P to D

**MUST SPECIFY M2**

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	P (OR P&W) DIMENSIONS	ALTERATION CODE	STEEL
EXAMPLE:	2	IIF	.087	.125	.492 X .310	F1	M2
EXAMPLE:	5	IIC	.050	100	.223	X2 = .97	M2

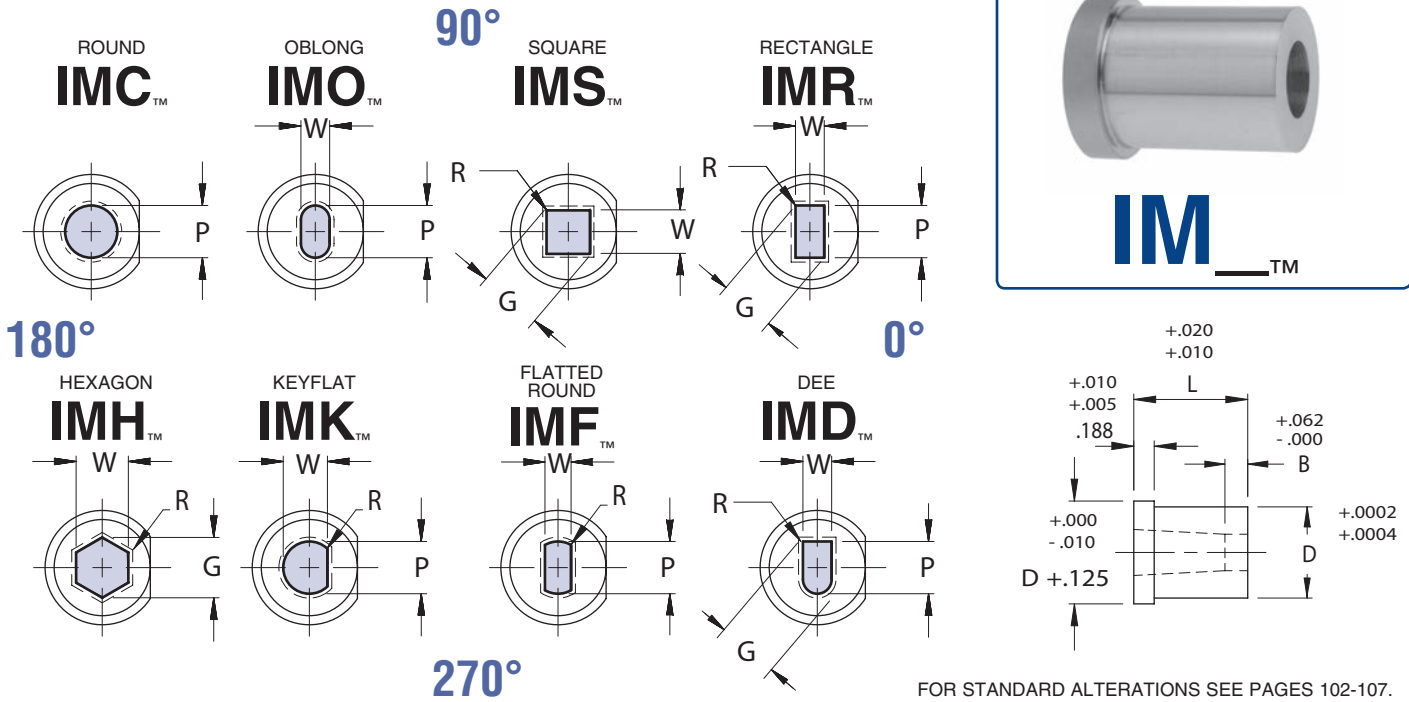
Note: When ordering, standard quantity breaks are:  
1, 2-3, 4-11, 12-23, 24-49, 50-99

**MUST SPECIFY M2**

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

# SHOULDER BUTTONS

## ULTRA LIFE/TAPER RELIEF



FOR STANDARD ALTERATIONS SEE PAGES 102-107.  
STANDARD TAPER: ROUND 1° PER SIDE/SHAPED 1-1/2° PER SIDE

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

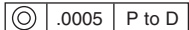
INCH CATALOG TYPE	BODY DIA D	LAND LENGTH "B"					ROUND RANGE P	SHAPE		OVERALL LENGTH "L"				
		NAPMA STD	ALTERNATES					MIN W	MAX G/P	.875	1.000	1.125	1.250	1.500
			A	B	C	D								
IM_025	.2500	.156	.062	.125	.250	.375	.064 - .115	.064	.115	X	X	X	X	X
IM_031	.3125	.156	.062	.125	.250	.375	.064 - .180	.064	.180	X	X	X	X	X
IM_037	.3750	.156	.062	.125	.250	.375	.064 - .195	.064	.195	X	X	X	X	X
IM_043	.4375	.156	.062	.125	.250	.375	.137 - .250	.093	.250	X	X	X	X	X
IM_050	.5000	.156	.062	.125	.250	.375	.137 - .285	.093	.285	X	X	X	X	X
IM_062	.6250	.187	.062	.125	.312	.437	.137 - .345	.093	.345	X	X	X	X	X
IM_075	.7500	.187	.062	.125	.312	.437	.137 - .435	.115	.435	X	X	X	X	X
IM_087	.8750	.187	.062	.125	.375	.500	.275 - .545	.125	.545	X	X	X	X	X
IM_100	1.0000	.250	.062	.125	.375	.500	.359 - .655	.156	.655	X	X	X	X	X
IM_125	1.2500	.312	.062	.125	.500	.625	.506 - .803	.187	.803	X	X	X	X	X
IM_150	1.5000	.312	.062	.125	.500	.625	.617 - 1.052	.250	1.052	X	X	X	X	X

### Material

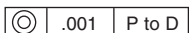
Steel: M2, HRC 60-63

### Standard Point Tolerance

Round P +.0005  
-.0000



Shape P,W +.001  
-.000



Alternate Hole Tolerance

**T2**

P, W TOLERANCE +.0002  
-.0000

P to D .0003

### ORDER EXAMPLE:

(Reference page 60)

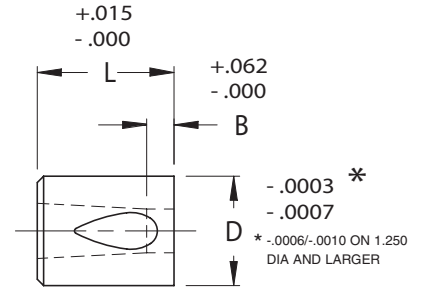
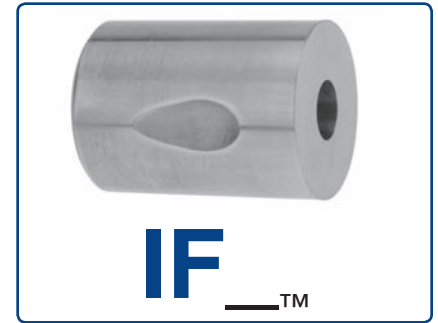
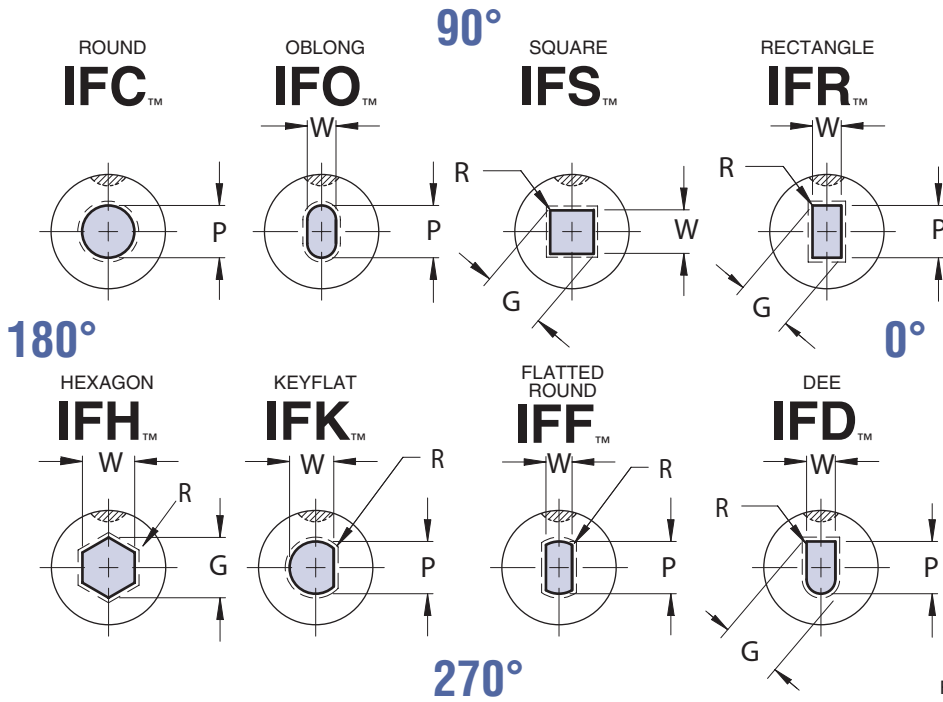
SPECIFY: QTY: TYPE "D" "L" DIMENSIONS CODE STEEL  
EXAMPLE: 6 IMC 043 100 .221  
EXAMPLE: 8 IMH 075 150 .335 F1 M2

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.

# BALL LOCK BUTTONS

## ULTRA LIFE/TAPER RELIEF



FOR STANDARD ALTERATIONS SEE PAGES 102-107.  
STANDARD TAPER: ROUND 1° PER SIDE/SHAPED 1-1/2° PER SIDE

VIEWS ARE SHOWN LOOKING AT TOP FACE OF BUTTON.

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

INCH CATALOG TYPE	BODY DIA D	LAND LENGTH "B"					ROUND RANGE P	SHAPE		OVERALL LENGTH "L" 1.188
		NAPMA STD	ALTERNATES					MIN W	MAX G/P	
			A	B	C	D				
IF_050	.500	.188	.062	.125	.250	.375	.137-.220	.093	.220	X
IF_062	.625	.188	.062	.125	.312	.437	.137-.282	.093	.282	X
IF_075	.750	.250	.062	.125	.312	.437	.137-.391	.115	.391	X
IF_087	.875	.312	.062	.125	.375	.500	.275-.516	.125	.516	X
IF_100	1.000	.312	.062	.125	.375	.500	.359-.657	.156	.657	X
IF_125	1.250*	.312	.062	.125	.500	.625	.506-.813	.187	.813	X
IF_150	1.500*	.375	.062	.125	.500	.625	.617-.970	.250	.970	X
IF_175	1.750*	.375	.062	.125	.500	.625	.750-1.062	.250	1.062	X

\* D Tolerance -.0006 / -.0010

### Material

Steel: M2, HRC 60-63

### Standard Point Tolerance

Round P +.0005 / -.0000 .0005 P to D

Shape P,W +.001 / -.000 .001 P to D

### ORDER EXAMPLE:

(Reference page 60)

P (OR P&W) ALTERATION  
SPECIFY: QTY: TYPE "D" DIMENSIONS CODE STEEL

EXAMPLE: 4 IFO 100 .645 X .513 X3 = 1.187 M2

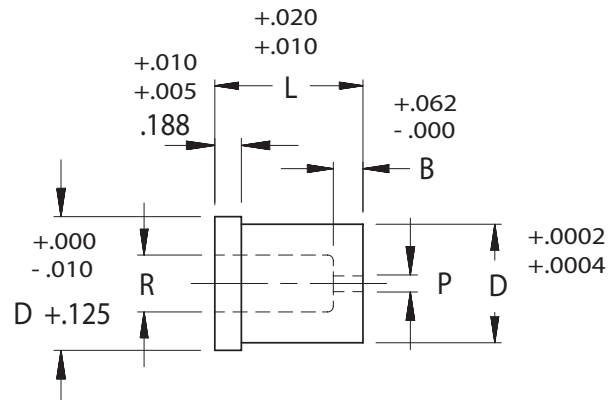
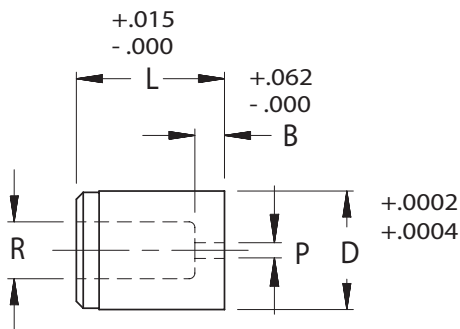
EXAMPLE: 3 IFC 075 .382 M2

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

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

# BUTTON BLANKS

## WITH COUNTER BORE RELIEF



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

**MUST SPECIFY M2**

FOR STANDARD ALTERATIONS SEE PAGES 102-107.

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

INCH CATALOG TYPE	BODY DIA D	DIE LAND B	RLF DIA R	DRILL SIZE P	OVERALL LENGTH "L"						
					.750	.875	.937**	1.000	1.125	1.250	1.500
I_B 025	.2500	.156	.156	.046	X	X	X	X	X	X	X
IDB 031	.3125*	.156	.188	.046	X	X	X	X	X	X	X
I_B 037	.3750	.156	.234	.046	X	X	X	X	X	X	X
IDB 043	.4375*	.156	.281	.046	X	X	X	X	X	X	X
I_B 050	.5000	.156	.328	.046	X	X	X	X	X	X	X
I_B 062	.6250	.188	.375	.078	X	X	X	X	X	X	X
I_B 075	.7500	.188	.468	.093	X	X	X	X	X	X	X
I_B 087	.8750	.188	.578	.093	X	X	X	X	X	X	X
I_B100	1.0000	.250	.687	.125	X	X	X	X	X	X	X
I_B125	1.2500	.312	.843	.125	X	X	X	X	X	X	X
IDB150	1.5000*	.312	1.093	.125	X	X	X	X	X	X	X

\* Available IDB Only

\*\*Not Available in IIB

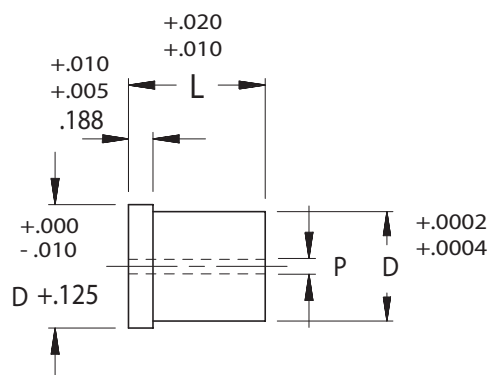
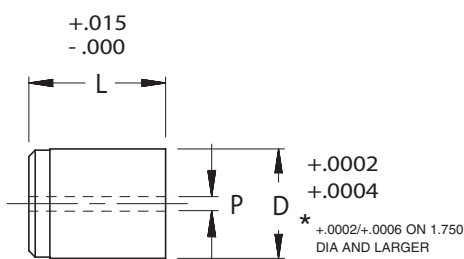
**ORDER EXAMPLE:**  
(Reference page 60)

SPECIFY:	QTY:	TYPE:	"D":	"L":	CODE	STEEL
EXAMPLE:	2	IDB	087	075	X2 = .745	M2
EXAMPLE:	8	IIB	075	100		M2

**MUST SPECIFY M2**

# BUTTON BLANKS

## WITH STRAIGHT THRU HOLE



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

**MUST SPECIFY M2**

FOR STANDARD ALTERATIONS SEE PAGES 102-107.

**ORDER EXAMPLE:**

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	"L"	ALTERATION	STEEL
EXAMPLE:	3	IUB	.050	.093		M2
EXAMPLE:	1	IMB	.087	.087	X2 = .810	M2

**MUST SPECIFY M2**

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

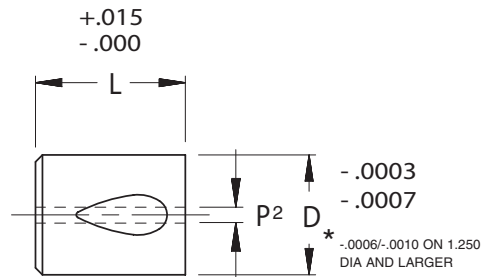
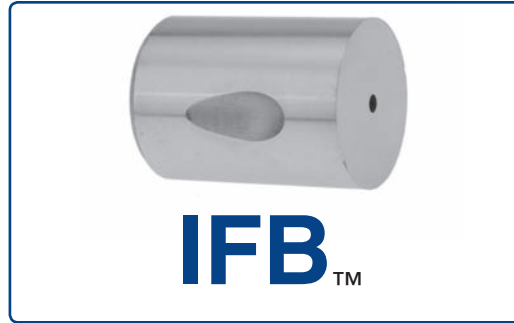
INCH CATALOG TYPE	BODY DIA D	DRILL SIZE P	OVERALL LENGTH "L"						
			.750**	.875	.937**	1.000	1.125	1.250	1.500
I_B 025	.2500	.046	X	X	X	X	X	X	X
I_B 031	.3125	.046	X	X	X	X	X	X	X
I_B 037	.3750	.046	X	X	X	X	X	X	X
I_B 043	.4375	.046	X	X	X	X	X	X	X
I_B 050	.5000	.046	X	X	X	X	X	X	X
I_B 062	.6250	.062	X	X	X	X	X	X	X
I_B 075	.7500	.093	X	X	X	X	X	X	X
I_B 087	.8750	.093	X	X	X	X	X	X	X
I_B100	1.0000	.093	X	X	X	X	X	X	X
I_B125	1.2500	.093	X	X	X	X	X	X	X
I_B150	1.5000	.093	X	X	X	X	X	X	X
IUB175	1.7500*	.093				X	X	X	X
IUB200	2.0000*	.093				X	X	X	X
IUB225	2.2500*	.093				X	X	X	X
IUB250	2.5000*	.093				X	X	X	X
IUB275	2.7500*	.093				X	X	X	X
IUB300	3.0000*	.093				X	X	X	X

\*Available in IUB Only

\*\*Not Available in IMB

# BUTTON BLANKS

## BALL LOCK WITH STRAIGHT THRU HOLE



FOR STANDARD ALTERATIONS SEE PAGES 102-107.

### Material

Steel: M2, HRC 60-63

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

INCH CATALOG TYPE	BODY DIA D	DRILL SIZE P2	OVERALL LENGTH "L"
			1.188
IFB 050	.500	.062	X
IFB 062	.625	.062	X
IFB 075	.750	.093	X
IFB 087	.875	.093	X
IFB 100	1.000	.093	X
IFB 125	1.250*	.093	X
IFB 150	1.500*	.093	X
IFB 175	1.750*	.093	X

\* D Tolerance -.0006 / -.0010

### ORDER EXAMPLE:

(Reference page 60)

SPECIFY:	QTY:	TYPE	"D"	CODE	STEEL
EXAMPLE:	6	IBB	062		M2
EXAMPLE:	3	IFB	050	X3 = 1.187	M2



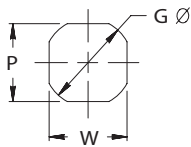
# INCH COMPONENTS UNIVERSAL SHAPES

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 .008 radius to facilitate wire EDM. To order the first character is I, 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.

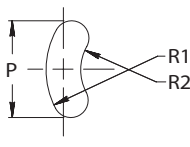
ORDER EXAMPLE: IHU125-400 P=.975 W=.655 R=.060, U-17

## MISCELLANEOUS

U-05

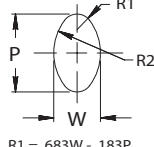


U-06



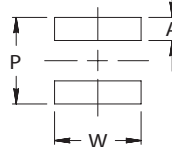
## 90°

U-07

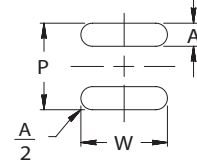


R1 = .683W - .183P  
R2 = 1.183P - .683W

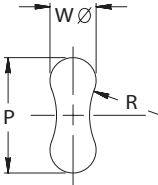
U-08



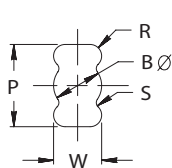
U-09



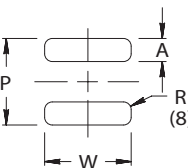
U-10



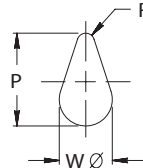
U-11



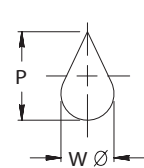
U-12



U-13

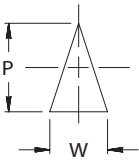


U-14

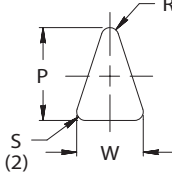


## TRIANGLES/TRAPEZOIDS

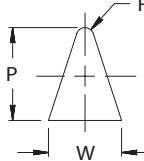
U-15



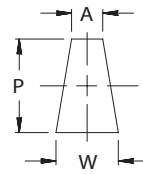
U-16



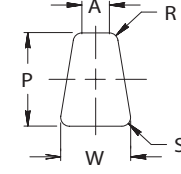
U-17



U-18



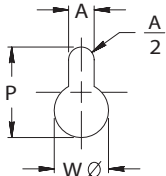
U-19



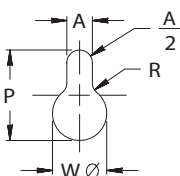
## MONO LOBES

## 180°

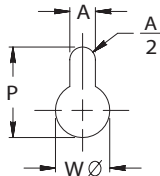
U-20



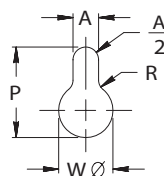
U-21



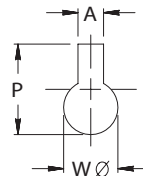
U-22



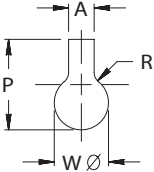
U-23



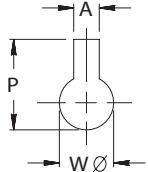
U-24



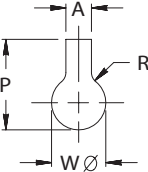
U-25



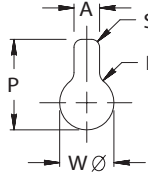
U-26



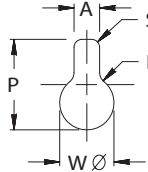
U-27



U-28



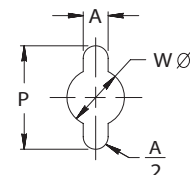
U-29



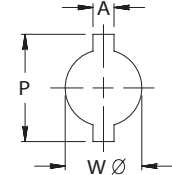
## 0°

## MULTI LOBES

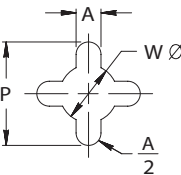
U-30



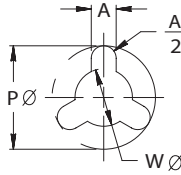
U-31



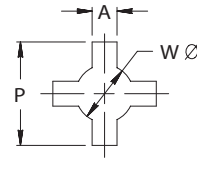
U-32



U-33



U-34



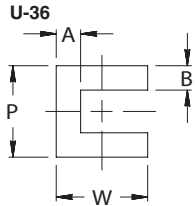
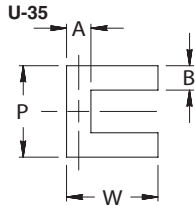
## 270°

# INCH COMPONENTS UNIVERSAL SHAPES

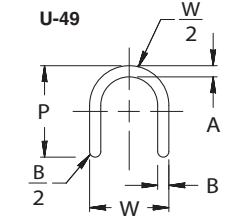
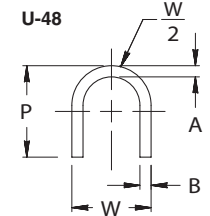
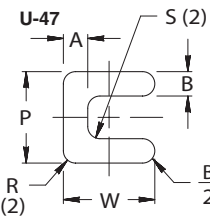
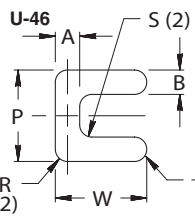
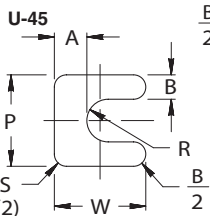
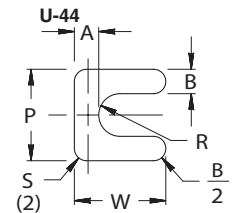
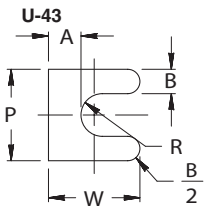
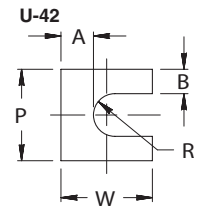
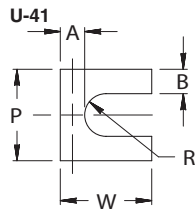
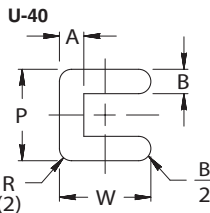
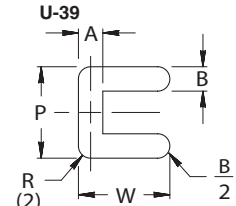
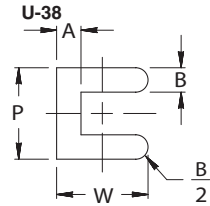
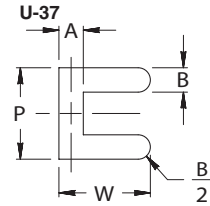
Views are shown looking through the shank of punch and top of button, as in true die position. Standard ballseat location is at 90°, standard flat location is at 0°. Points are centered on shanks unless noted by drawing. Female corners on buttons will be furnished with a .008 radius to facilitate wire EDM. To order, the first character is I, 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: IHU125-400 P=.975 W=.655 B=.190 A=.190, U-38

## U's

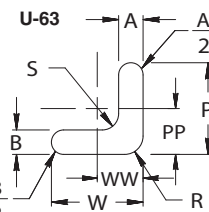
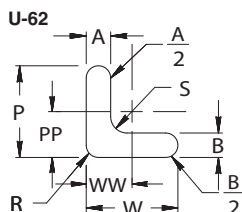
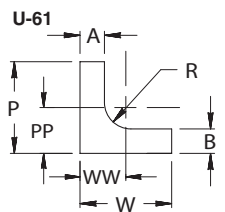
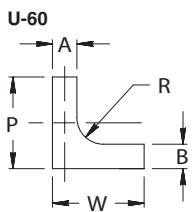
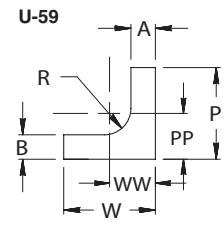
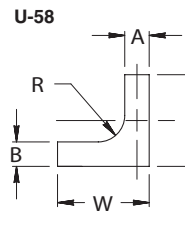
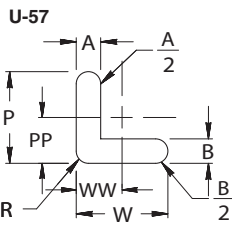
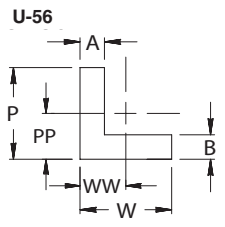
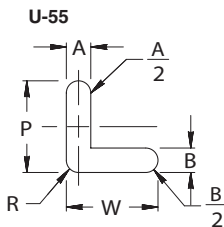
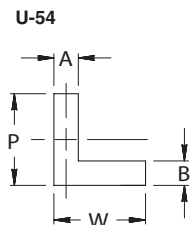
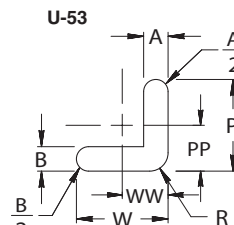
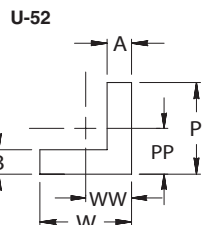
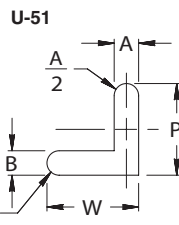
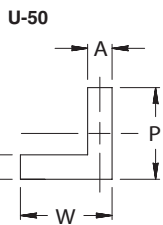


## 90°



## L's

## 180°



## 0°

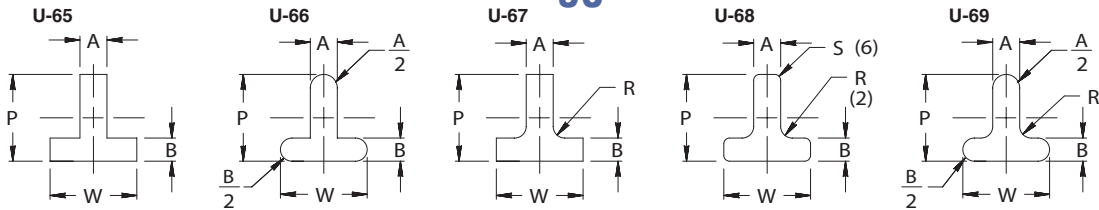
## 270°

# INCH COMPONENTS 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 .008 radius to facilitate wire EDM. To order, the first character is I, 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.

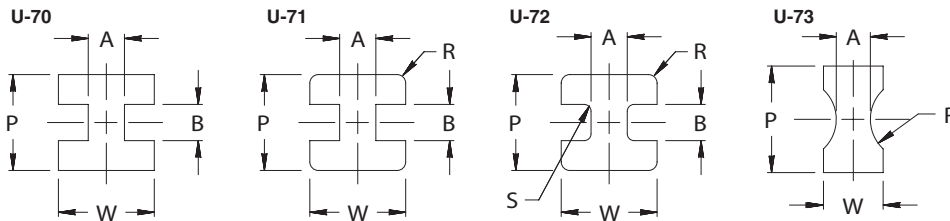
ORDER EXAMPLE: IHU100-400 P=.975 W=.655 R=.060, U-81

## T's

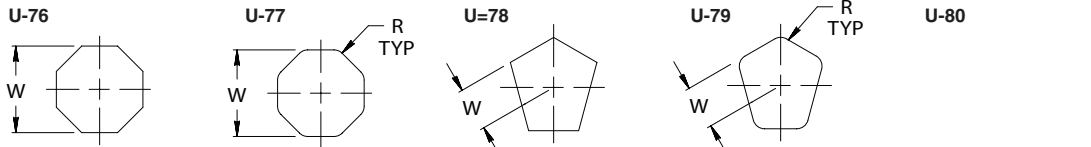


90°

## DUO TEES



## POLYGONS



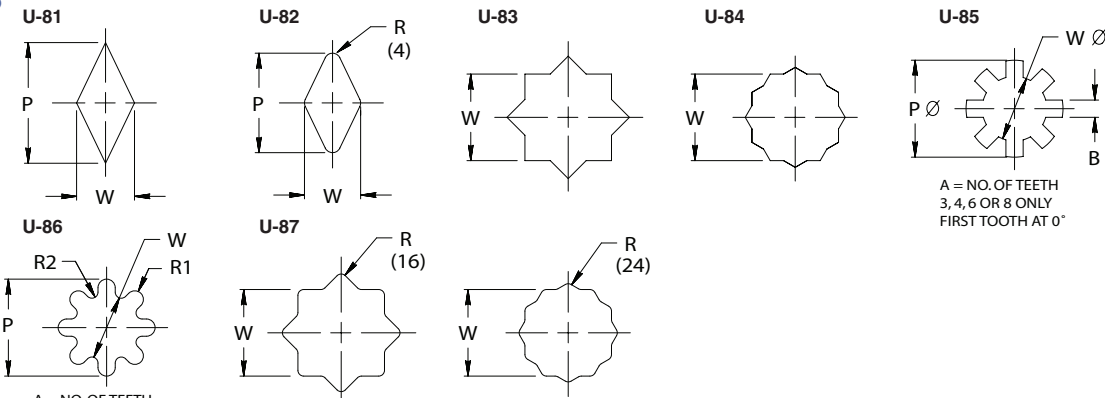
A = EVEN NO. OF SIDES

A = EVEN NO. OF SIDES

A = ODD NO. OF SIDES

A = ODD NO. OF SIDES

180°

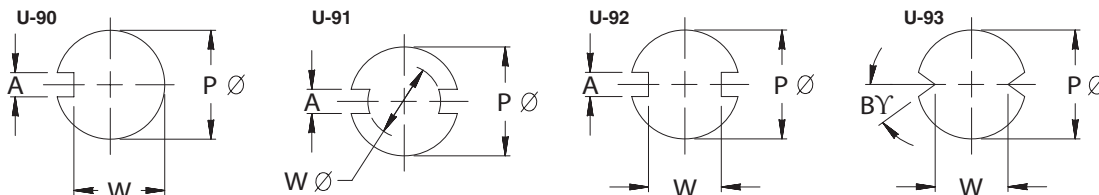


A = NO. OF TEETH  
3, 4, 6 OR 8 ONLY  
FIRST TOOTH AT 0°

A = NO. OF TEETH  
3, 4, 6 OR 8 ONLY  
FIRST TOOTH AT 0°

0°

## KEYS

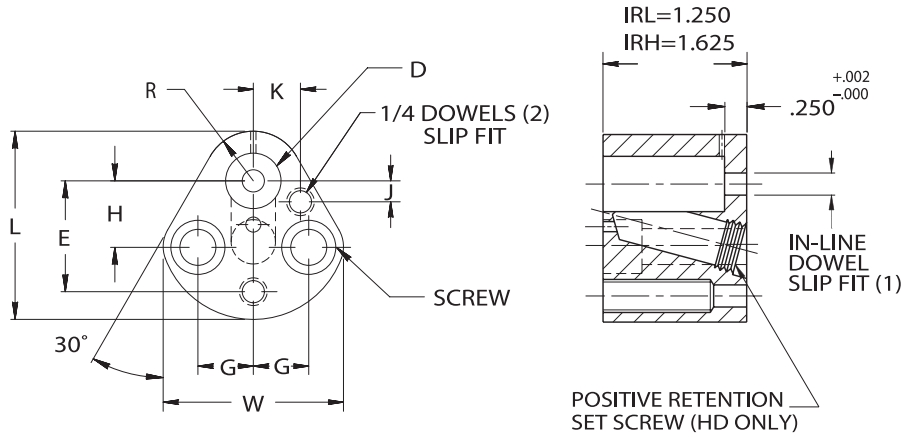


270°



# BALL LOCK RETAINERS

## TRUE SET



Manufactured under Patent No.'s 0351395, 5357835  
International Patents Pending.

FOR ACCESSORIES AND SHIM PLATES SEE PAGE 100.

## Heavy Duty

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

INCH CATALOG TYPE	D DIA.	L	W	R	H	±.0004 J	±.0004 K	G	±.0004 E	IN-LINE DOWEL	SCREW SIZE
IRH 037	.375	1.75	1.57	.38	.750	.2953	.3543	.438	1.060	.1875	5/16-18
IRH 050	.500	2.00	1.90	.50	.750	.2559	.4724	.562	1.180	.2500	3/8-16
IRH 062	.625	2.12	2.03	.56	.750	.2362	.5315	.625	1.250	.2500	3/8-16
IRH 075	.750	2.37	2.29	.69	.750	.1969	.6496	.688	1.320	.2500	3/8-16
IRH 087	.875	2.50	2.42	.75	.750	.1969	.7283	.688	1.400	.2500	3/8-16
IRH 100	1.000	2.75	2.62	.88	.938	.2756	.8661	.781	1.600	.2500	1/2-13
IRH 125	1.250	2.75	2.62	.88	.938	.2756	.8661	.781	1.600	.2500	1/2-13

## Light Duty

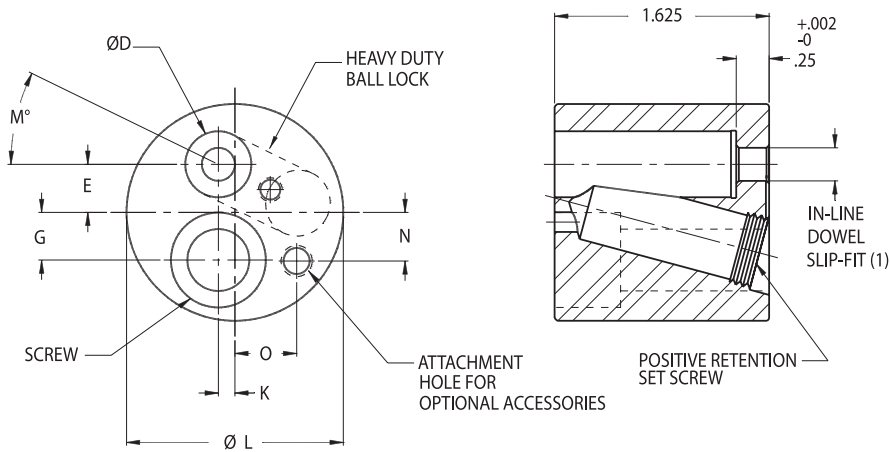
Complete design & CAD files visit [WWW.MOELLERMCAD.COM](http://WWW.MOELLERMCAD.COM)

INCH CATALOG TYPE	D	L	W	R	H	±.0004 J	±.0004 K	G	±.0004 E	IN-LINE DOWEL	SCREW SIZE
IRL 025	.250	1.75	1.57	.38	.750	.2953	.3543	.438	1.060	.1250	5/16-18
IRL 037	.375	1.75	1.57	.38	.750	.2953	.3543	.438	1.060	.1875	5/16-18
IRL 050	.500	2.00	1.90	.50	.750	.2559	.4724	.562	1.180	.2500	3/8-16
IRL 062	.625	2.12	2.03	.56	.750	.2362	.5315	.625	1.250	.2500	3/8-16
IRL 075	.750	2.37	2.29	.69	.750	.1969	.6496	.688	1.320	.2500	3/8-16
IRL 087	.875	2.50	2.42	.75	.750	.1969	.7283	.688	1.400	.2500	3/8-16
IRL 100	1.000	2.75	2.62	.88	.938	.2756	.8661	.781	1.600	.2500	1/2-13
IRL 125	1.250	2.75	2.62	.88	.938	.2756	.8661	.781	1.600	.2500	1/2-13



# BALL LOCK RETAINERS

## ECONOMY ROUND TRUE SET HEAVY DUTY



FOR ACCESSORIES SEE PAGE 100.

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

INCH CATALOG TYPE	D	ØL	E	G	$\pm .25^\circ$ M	K	SCREW SIZE	IN-LINE DOWEL
IRR 037	.375	1.50	.389	.280	20.5°	.104	7/16-14	.1875
IRR 050	.500	1.63	.364	.361	26°	.125	7/16-14	.2500
IRR 062	.625	1.75	.358	.436	33.5°	.076	7/16-14	.2500
IRR 075	.750	2.25	.480	.563	30°	0	5/8-11	.2500
IRR 087	.875	2.38	.484	.626	30°	0	5/8-11	.2500
IRR 100	1.000	2.50	.492	.689	30°	0	5/8-11	.2500
IRR 125	1.250	3.00	.617	.820	30°	0	3/4-10	.2500

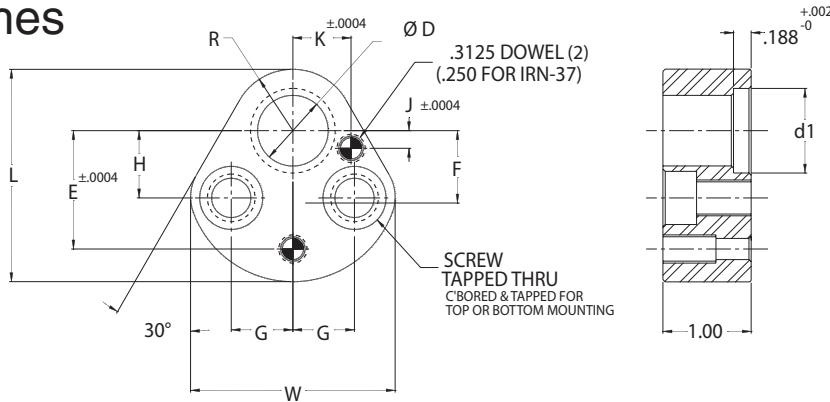


# SHOULDER PUNCH RETAINERS

## TRUE SET

### IRN STYLE

For Round Punches



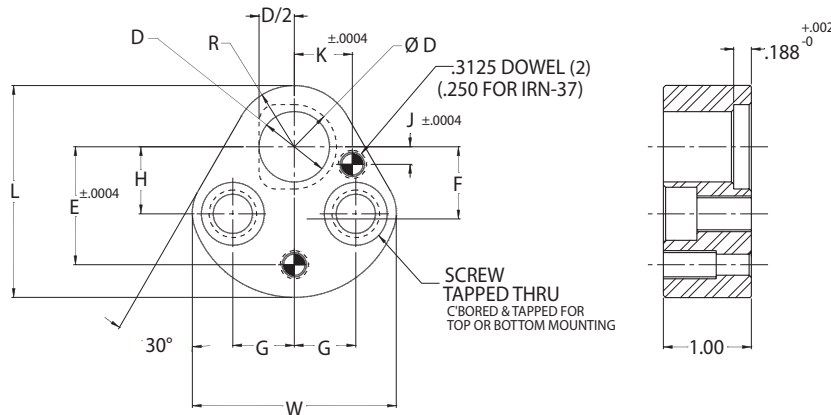
FOR ACCESSORIES AND BACKING PLATES  
SEE PAGE 100.

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

INCH CATALOG TYPE	D	d1	L	W	R	H	±.0004 J	±.0004 K	G	±.0004 E	F	SCREW SIZE	TAP
IRN 037	.375	.53	1.75	1.57	.38	.75	.2953	.3543	.438	1.060	.63	5/16-18	3/8-16
IRN 050	.500	.66	2.00	1.90	.50	.75	.2559	.4724	.562	1.180	.63	5/16-18	3/8-16
IRN 062	.625	.78	2.12	2.03	.56	.75	.2362	.5315	.625	1.250	.63	5/16-18	3/8-16
IRN 075	.750	.91	2.37	2.29	.69	.75	.1968	.6496	.688	1.320	.91	5/16-18	3/8-16
IRN 100	1.000	1.18	2.75	2.62	.88	.94	.2756	.8661	.781	1.600	1.18	1/2-13	5/8-11
IRN 125	1.250	1.41	2.75	2.62	.88	.94	.2756	.8661	.781	1.600	1.18	1/2-13	5/8-11

### IRO STYLE

For Shaped Punches



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

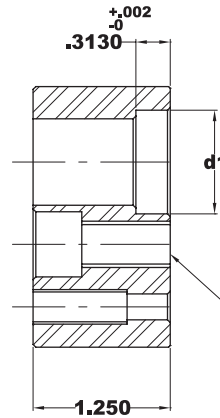
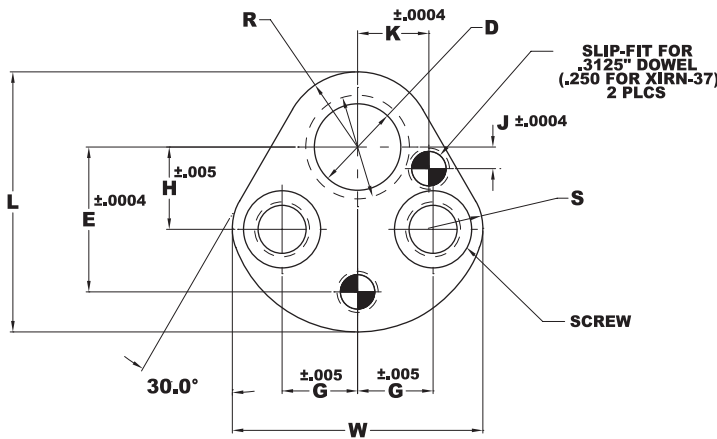
INCH CATALOG TYPE	D	r1	L	W	R	H	±.0004 J	±.0004 K	G	±.0004 E	F	SCREW SIZE	TAP
IRO 037	.375	.53	1.75	1.57	.38	.75	.2953	.3543	.438	1.060	.63	5/16-18	3/8-16
IRO 050	.500	.66	2.00	1.90	.50	.75	.2559	.4724	.562	1.180	.63	5/16-18	3/8-16
IRO 062	.625	.78	2.12	2.03	.56	.75	.2362	.5315	.625	1.250	.63	5/16-18	3/8-16
IRO 075	.750	.91	2.37	2.29	.69	.75	.1968	.6496	.688	1.320	.91	5/16-18	3/8-16
IRO 100	1.000	1.18	2.75	2.62	.88	.94	.2756	.8661	.781	1.600	1.18	1/2-13	5/8-11
IRO 125	1.250	1.41	2.75	2.62	.88	.94	.2756	.8661	.781	1.600	1.18	1/2-13	5/8-11



# DURA PUNCH RETAINERS



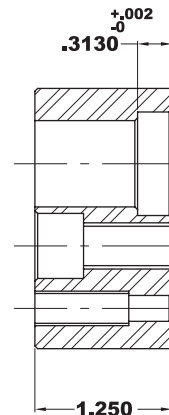
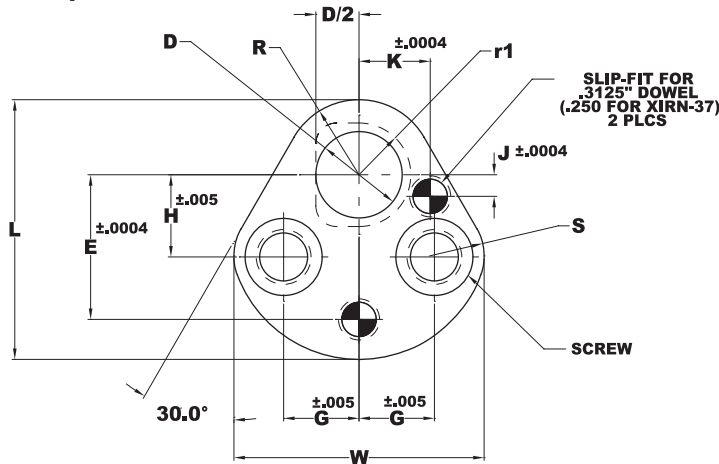
## XIRN STYLE For Round Punches



C'BORED & TAPPED FOR TOP OR BOTTOM MOUNTING

INCH CATALOG TYPE	D	d1	L	W	R	H	J	K	S	G	E	SCREW SIZE	TAPPED HOLE
XIRN 037	.375	.59	1.75	1.72	.38	.75	.2953	.3543	.47	.438	1.060	5/16-18	3/8-16
XIRN 050	.500	.72	2.00	1.97	.50	.75	.2559	.4724	.60	.563	1.180	5/16-18	3/8-16
XIRN 062	.625	.84	2.12	2.09	.56	.75	.2362	.5315	.66	.625	1.25	5/16-18	3/8-16
XIRN 075	.750	.97	2.37	2.34	.69	.75	.1968	.6496	.79	.688	1.320	5/16-18	3/8-16
XIRN 087	.875	1.09	2.50	2.47	.75	.75	.1970	.7284	.85	.688	1.400	5/16-18	3/8-16
XIRN 100	1.00	1.22	2.75	2.72	.88	.938	.2756	.8661	.97	.781	1.600	1/2-13	5/8-11

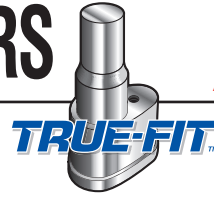
## XIRO STYLE For Shaped Punches



C'BORED & TAPPED FOR TOP OR BOTTOM MOUNTING

INCH CATALOG TYPE	D	r1	L	W	R	H	J	K	S	G	E	SCREW SIZE	TAPPED HOLE
XIRO 037	.375	.296	1.75	1.72	.38	.75	.2953	.3543	.47	.438	1.060	5/16-18	3/8-16
XIRO 050	.500	.359	2.00	1.97	.50	.75	.2559	.4724	.60	.563	1.180	5/16-18	3/8-16
XIRO 062	.625	.422	2.12	2.09	.56	.75	.2362	.5315	.66	.625	1.25	5/16-18	3/8-16
XIRO 075	.750	.484	2.37	2.34	.69	.75	.1968	.6496	.79	.688	1.320	5/16-18	3/8-16
XIRO 087	.875	.546	2.50	2.47	.75	.75	.1970	.7284	.85	.688	1.400	5/16-18	3/8-16
XIRO 100	1.00	.609	2.75	2.72	.88	.938	.2756	.8661	.97	.781	1.600	1/2-13	5/8-11

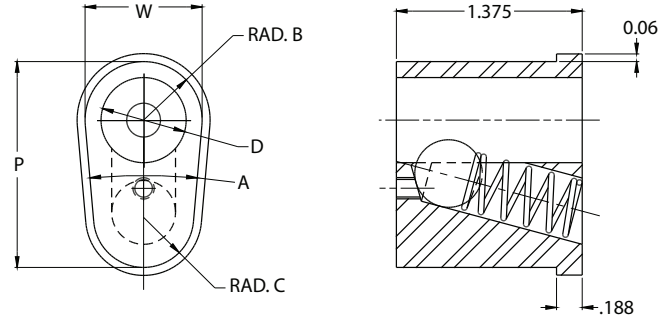
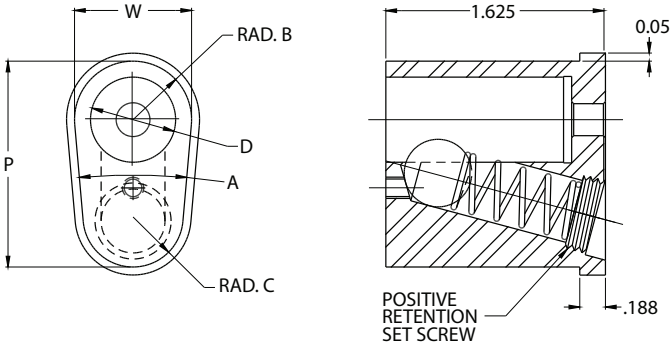
# INSERTABLE PUNCH RETAINERS



## TRUE-FIT

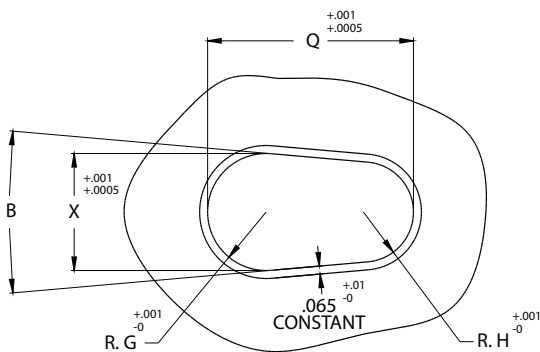
### IRI TRUE-SET STYLE

### IRJ BACKING PLATE STYLE



INCH CATALOG TYPE	D	P	W	A	RAD. B	RAD. C
IR_037	.375	1.1608	.625	5°	.3125	.2881
IR_050	.500	1.4188	.750	5°	.375	.3445
IR_062	.625	1.5438	.875	10°	.4375	.3737
IR_075	.750	1.6688	1.000	10°	.500	.4362
IR_087	.875	1.7938	1.125	10°	.5625	.4987
IR_100	1.000	1.9188	1.250	30°	.625	.3915
IR_125	1.250	2.1688	1.500	30°	.750	.5165

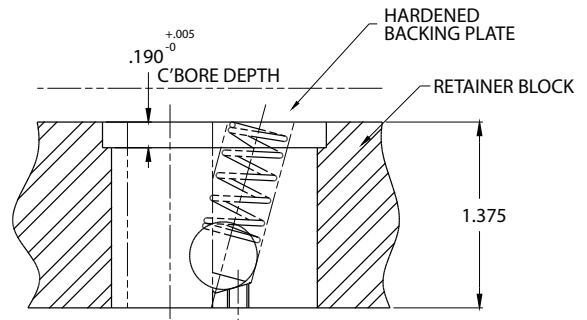
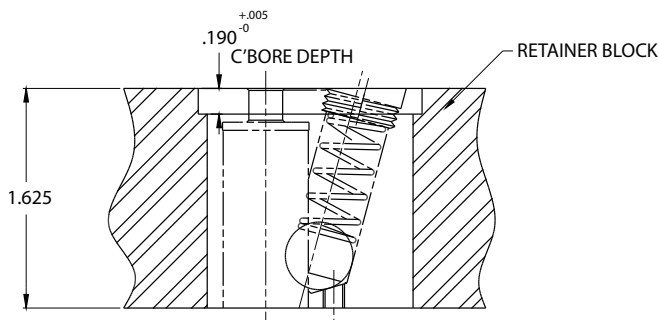
## HOLE DIMENSIONS FOR TRUE-FIT INSERTS



PUNCH SHANK Ø	Q	X	B	RAD. G	RAD. H
.375	1.1612	.6254	5°	.3127	.2883
.500	1.4192	.7504	5°	.3752	.3447
.625	1.5442	.8754	10°	.4377	.3739
.750	1.6692	1.0004	10°	.5002	.4364
.875	1.7942	1.1254	10°	.5627	.4989
1.000	1.9192	1.2504	30°	.6252	.3917
1.250	2.1692	1.5004	30°	.7502	.5167

### IRI TRUE-SET STYLE

### IRJ BACKING PLATE STYLE



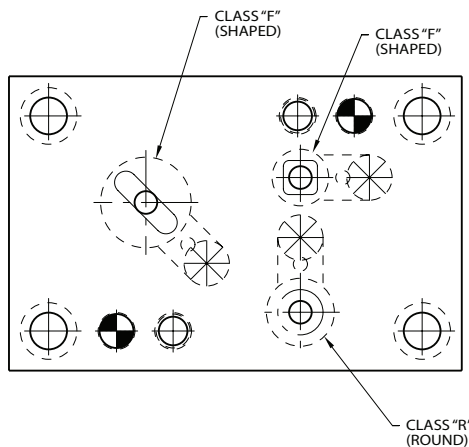


# SPECIAL MULTI HOLE

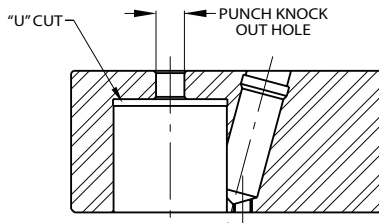
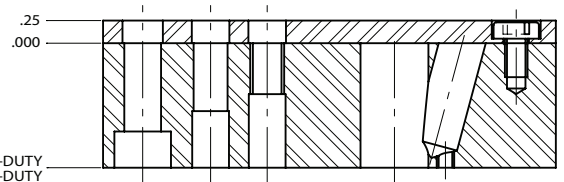
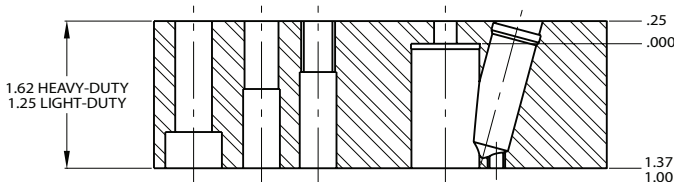
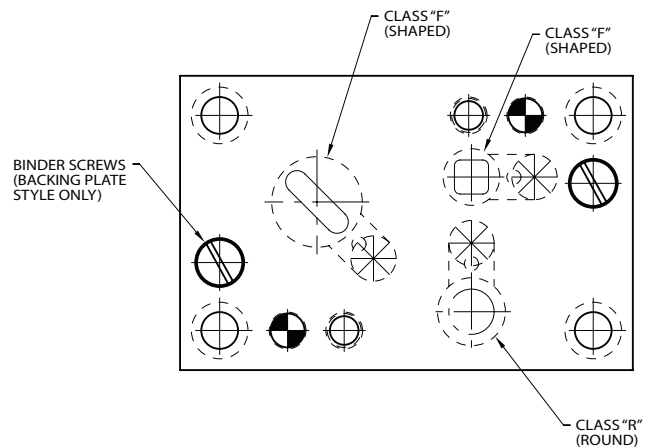
## BALL LOCK RETAINERS

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-

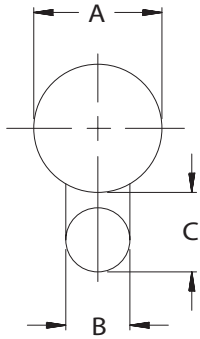
### TOLERANCES ALL TYPES

OUTSIDE EDGES	± .020
DOWEL HOLE LOCATIONS	± .0005
SCREW HOLE LOCATIONS	± .005
COMPONENT HOLE LOCATIONS	± .0005

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

## BALL LOCK SPACE REQUIREMENTS

### True-Set Style Ball Lock Space Requirements



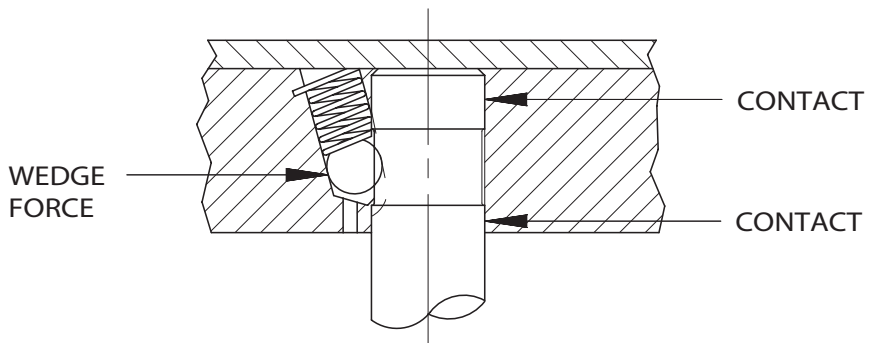
LIGHT-DUTY DIE BUTTON			HEAVY-DUTY PUNCH FOR PIERCING STOCK UP TO 3/8"		
DIE BUTTON O.D. A	BALL DIA. B	CLEARANCE C	DIA. PUNCH SHANK A	BALL DIA. B	CLEARANCE C
.500	.312	.500	.375	.375	.625
.625	.312	.57	.500	.500	.750
.750	.375	.570	.625	.500	.750
.875	.375	.570	.750	.500	.750
1.000	.375	.570	.875	.500	.750
1.250	.375	.570	1.000	.500	.750
1.500	.375	.570	1.250	.500	.750
1.750	.375	.570			

### Backing Plate Style Ball Lock Space Requirements

LIGHT-DUTY DIE BUTTON			HEAVY-DUTY PUNCH FOR PIERCING STOCK UP TO 3/8"		
DIE BUTTON O.D. A	BALL DIA. B	CLEARANCE C	DIA. PUNCH SHANK A	BALL DIA. B	CLEARANCE C
.500	.312	.437	.375	.375	.500
.625	.312	.437	.500	.500	.625
.750	.375	.500	.625	.500	.625
.875	.375	.500	.750	.500	.625
1.000	.375	.500	.875	.500	.625
1.250	.375	.500	1.000	.500	.625
1.500	.375	.500	1.250	.500	.625
1.750	.375	.500			

### Body Band Ball Relief

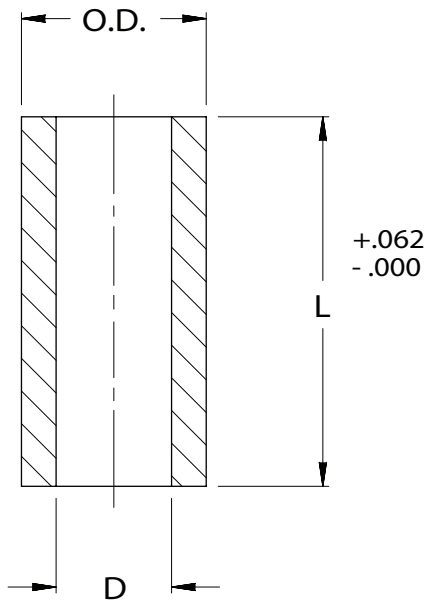
Moeller incorporates a body band ball relief on all ball lock punches. This type of relief facilitates a rounder shank diameter, thusly improving the "fit" between the tool and its mating retainer. When centerless grinding, the interruption of contact caused by the ball-seat, generates a slight "hump" 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).



# URETHANE STRIPPERS

## OPEN END

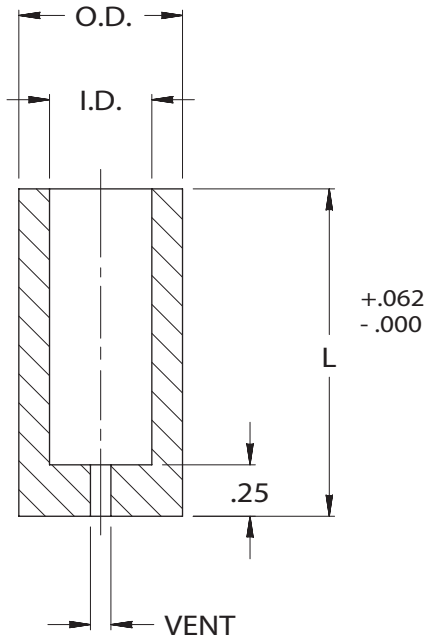
- “D” INSIDE DIAMETER PROVIDES RING FIT WITH PUNCH SHANK OR DOWEL DIAMETER
- DUROMETER 90 SHORE A



CATALOG TYPE	FITS PUNCH SHANK D	OUTSIDE DIA. O.D.	OVER-ALL LGTH. L.	LOAD-POUNDS TO DEFLECT SPRINGS			
				.125	.250	.375	.500
ITO 018-125	.1875	.687	1.25	125	230	400	—
ITO 018-150			1.50	120	225	390	—
ITO 018-1200			12.00	—	—	—	—
ITO 025-125	.250	.750	1.25	135	250	420	—
ITO 025-150			1.50	130	240	380	—
ITO 025-175			1.75	125	230	345	—
ITO 025-200			2.00	115	215	300	—
ITO 025-1200			12.00	—	—	—	—
ITO 031-125	.3125	.812	1.25	160	300	500	—
ITO 031-150			1.50	150	280	445	—
ITO 031-175			1.75	140	260	390	—
ITO 031-200			2.00	135	240	350	—
ITO 031-1200			12.00	—	—	—	—
ITO 037-125	.375	.875	1.25	170	320	510	—
ITO 037-150			1.50	160	310	475	—
ITO 037-175			1.75	150	200	480	—
ITO 037-200			2.00	140	260	390	—
ITO 037-1200			12.00	—	—	—	—
ITO 050-125	.500	1.000	1.25	205	370	550	—
ITO 050-150			1.50	195	355	520	—
ITO 050-175			1.75	180	335	480	—
ITO 050-200			2.00	165	305	440	—
ITO 050-225			2.25	150	270	395	520
ITO 050-1200	12.00	—	—	—	—		
ITO 062-125	.625	1.125	1.25	240	420	610	—
ITO 062-150			1.50	235	410	600	—
ITO 062-175			1.75	230	400	590	—
ITO 062-200			2.00	225	390	575	—
ITO 062-225			2.25	220	375	550	790
ITO 062-1200	12.00	—	—	—	—		
ITO 075-150	.750	1.375	1.50	380	675	950	—
ITO 075-175			1.75	360	645	920	—
ITO 075-200			2.00	340	610	885	—
ITO 075-225			2.25	320	575	810	1150
ITO 075-250			2.50	275	525	735	1070
ITO 075-275			2.75	240	475	670	980
ITO 075-300			3.00	210	410	600	875
ITO 075-1200			12.00	—	—	—	—
ITO 087-150	.875	1.625	1.50	480	870	1260	—
ITO 087-175			1.75	470	850	1240	—
ITO 087-200			2.00	450	850	1210	—
ITO 087-225			2.25	440	800	1175	1660
ITO 087-250			2.50	425	770	1120	1600
ITO 087-275			2.75	410	740	1075	1525
ITO 087-300			3.00	395	705	1025	1430
ITO 087-1200			12.00	—	—	—	—
ITO 100-150	1.000	1.750	1.50	570	980	1400	—
ITO 100-175			1.75	550	970	1385	—
ITO 100-200			2.00	530	955	1370	—
ITO 100-225			2.25	510	930	1345	1850
ITO 100-250			2.50	485	900	1315	1800
ITO 100-275			2.75	465	865	1275	1745
ITO 100-300			3.00	440	820	1235	1675
ITO 100-1200			12.00	—	—	—	—

# URETHANE STRIPPERS

## CLOSED END



VENT	I.D.'s
.062	.187-.250
.093	.312
.125	.375-1.00

CATALOG TYPE	I.D.	O.D.	LENGTH L	APPROXIMATE PRESSURE AVAILABLE AT DEFLECTION OF		
				.125	.250	.375
ITC 018-125	.187	.687	1.25	275	440	—
ITC 018-150			1.50	250	400	—
ITC 018-175			1.75	225	375	—
ITC 025-125	.250	.750	1.25	310	500	—
ITC 025-150			1.50	300	490	—
ITC 025-175			1.75	250	400	520
ITC 025-200			2.00	240	380	510
ITC 031-125	.312	.812	1.25	350	540	—
ITC 031-150			1.50	325	475	—
ITC 031-175			1.75	320	450	720
ITC 031-200			2.00	260	390	600
ITC 031-225			2.25	230	370	590
ITC 037-125	.375	.875	1.25	470	725	—
ITC 037-150			1.50	420	700	—
ITC 037-175			1.75	390	640	775
ITC 037-200			2.00	360	580	700
ITC 037-225			2.25	330	520	680
ITC 050-125	.500	1.000	1.25	575	830	—
ITC 050-150			1.50	510	780	—
ITC 050-175			1.75	480	720	940
ITC 050-200			2.00	370	560	685
ITC 050-225			2.25	320	520	640
ITC 050-250			2.50	300	480	600
ITC 062-125	.625	1.125	1.25	670	970	—
ITC 062-150			1.50	565	885	—
ITC 062-175			1.75	530	830	1040
ITC 062-200			2.00	480	780	980
ITC 062-225			2.25	440	720	900
ITC 075-175	.750	1.500	1.75	560	860	1260
ITC 075-200			2.00	450	750	1100
ITC 075-225			2.25	390	690	1050
ITC 075-250			2.50	350	650	1000
ITC 075-275			2.75	340	640	950
ITC 075-300			3.00	320	510	820
ITC 087-175	.875	1.750	1.75	1600	2300	3500
ITC 087-200			2.00	1350	2050	3000
ITC 087-225			2.25	1325	2025	2700
ITC 087-250			2.50	1000	1700	2100
ITC 087-275			2.75	950	1650	1950
ITC 087-300			3.00	850	1450	1850
ITC 100-175	1.000	2.000	1.75	2100	3100	3600
ITC 100-200			2.00	1750	2700	3500
ITC 100-225			2.25	1550	2400	3300
ITC 100-250			2.50	1350	2100	3100
ITC 100-275			2.75	1100	1900	2900
ITC 100-300			3.00	950	1500	2400

**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 6800 P.S.I., 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.**

# 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	IRH 037	IAC 031-175 5/16-18 x 1-3/4	IAD 018-75 3/16 x 3/4	IAB 037 3/8 DIA.	IAS 037T 3/8 DIA. H.D.	IAC 010-100 10-24 x 1	IAN 037
	IRH 050	IAC 037-200 3/8-16 x 2	IAD 025-075 1/4 x 3/4	IAB 050 1/2 DIA.	IAS 050T 1/2 DIA.		IAN 050
	IRH 062						
	IRH 075						
	IRH 087						
	IRH 100						
	IRH-125	IAC 050-200 1/2 - 13 x 2					
LIGHT DUTY	IRL 025	IAC 031-150 5/16-18 x 1-1/2	IAD 012-075 1/8 x 3/4	IAB 025 1/4 DIA.	IAS 025 1/4 DIA.	IAC 08-100 8-32 x 1	
	IRL 037		IAD 018-075 3/16 x 3/4				
	IRL 050	IAC 037-150 3/8-16 x 1-1/2	IAD 025-075 1/4 x 3/4	IAB 031 5/16 DIA.	IAS 031 5/16 DIA.		
	IRL 062						
	IRL 075			IAB 037 3/8 DIA.	IAS 037 3/8 DIA. L.D.		
	IRL 087						
	IRL 100			IAC 050-175 1/2-13 x 1-3/4			
	IRL 125						

### SPECIAL BACKING PLATE RETAINER COMPONENTS

	SPRINGS	BALLS
1/4 DIA.	IAS 025S	IAB 025
5/16 DIA.	IAS 031S	IAB 031
3/8 DIA.	IAS 037S	IAB 037
1/2 DIA.	IAS 050S	IAB 050

### BOOSTER SPRINGS

	PUNCH SIZE .375 HDBL  CATALOG # IAS037B
	PUNCH SIZE .500 THRU 1.250 HDBL  CATALOG # IAS050B

## ECONOMY ROUND TRUE SET RETAINER COMPONENTS

TRUE SET ROUND RETAINER	SOC. HD. CAP SCREW	DOWELS	BALL	SPRING	BALL RELEASE SCREW	ANGLE HOLE SET SCREW
IRR 037	IAC043-175 TL 7/16"-14 x 1.75	IAD 018-075 3/16 X 3/4	IAB 037 3/8 DIA.	IAS 037T 3/8 DIA. H.D.	IAC 010-100	IAN 037
IRR 050						
IRR 062						
IRR 075	IAC062-200 TL 5/8"-11 x 2.0 LONG	IAD 025-075 1/4 x 3/4	IAB 050 1/2 DIA.	IAS 050T 1/2 DIA. H.D.	10-24 x 1	IAN 050
IRR 087						
IRR 100						
IRR 125	IAC075-200 TL 3/4"-10 x 2.0 LONG					

## SHOULDER TRUE SET RETAINER COMPONENTS

TRUE SET DURA PUNCH RETAINER	TRUE SET SHOULDER RETAINER	SOC. HD. CAP SCREW	DOWELS	TRUE SET DURA PUNCH RETAINER	TRUE SET SHOULDER RETAINER	SOC. HD. CAP SCREW	DOWELS
XIRN 037	IRN 037	IAC 031-150 5/16-18 X 1.50	IAD 025-075 / .250 X .75	XIRO 037	IRO 037	IAC 031-150 5/16-18 X 1.50	IAD 025-075 / .250 X .75
XIRN 050	IRN 050		IAD 31-150 .3125 X 1.50	XIRO 050	IRO 050		
XIRN 062	IRN 062			XIRO 062	IRO 062		
XIRN 075	IRN 075			XIRO 075	IRO 075		
XIRN 100	IRN 100	IAC 050-175 1/2-13 X 1.75		XIRO 100	IRO 100		
XIRN 125	IRN 125		XIRO 125	IRO 125			

# RETAINER ACCESSORIES

## TRUE SET SHIM PLATES

Available Thickness	Ordering Number
.071	071
.118	118
.125	125
.187	187
.236	236
.250	250
.394	394
.512	512

CATALOG TYPE
IAX 025-
IAX 037-
IAX 050-
IAX 062-
IAX 075-
IAX 087-
IAX 100-
IAX 125-

INSERT SHIM THICKNESS  
ORDERING EXAMPLE  
IAX 050-236

Available Thickness	Ordering Number
.071	071
.118	118
.125	125
.187	187
.236	236
.250	250
.394	394
.512	512

CATALOG NUMBER
IAY 037-
IAY 050-
IAY 062-
IAY 075-
IAY 087-
IAY 100-
IAY 125-

INSERT SHIM THICKNESS  
ORDERING EXAMPLE  
IAY 050-236

## TRUE SET SHOULDER RETAINER BACKING PLATES

CATALOG TYPE
IAW 037-
IAW 050-
IAW 062-
IAW 075-
IAW 100-
IAW 125-

Available Thickness	Ordering Number
.188	188
.250	250

HARDENED TO R/C 50-52  
ORDERING EXAMPLE  
IAW 050-188

INSERT BACKING PLATE THICKNESS

## BALL RELEASE TOOLS

**ANGLE TIP**  
(for all Retainers) Cat.. No. IAT 01



**STRAIGHT TIP**  
(for all Retainers) Cat. No. IAT 02



**THREADED TIP HEAVY DUTY**  
(for True Set Retainers) Cat. No. IAT 03



**THREADED TIP LIGHT DUTY**  
(for True Set Retainers) Cat. No. IAT 04



**ANGLE HOLE SET SCREW TOOL**  
(for True Set Retainers) Cat. No. IAO 01

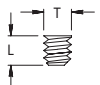
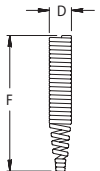
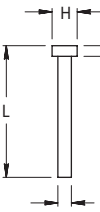


# EJECTOR COMPONENTS

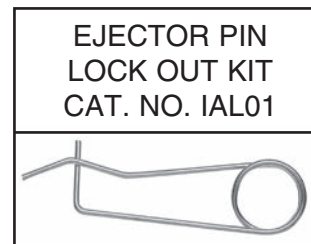
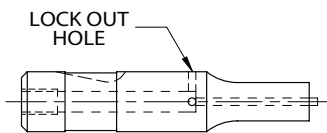
## EJECTOR COMPONENT SPECIFICATIONS

SHANK DIA. D	EJECTOR SPECIFICATION	DRILL PIN HOLE	SIZE SPRING HOLE	SCREW SIZE	CROSS HOLE SIZE	PIN EXTENSION
.1875 ALL	IAE 02	#72 (.025)	#44 (.086)	#3-48	.032	.032±.010
.2500 ALL	IAE 03	#1/32 (.031)	7/64 (.109)	#5-40	.032	.032±.010
.3125 SHOULDER .375 BALL LOCK	IAE 04	3/64 (.046)	9/64 (.140)	#8-32	.062	.062±.015
.3750 SHOULDER .4375 SHOULDER .5000 ALL .6250 BALL LOCK	IAE 06	1/16 (.062)	11/64 (.172)	#10-32	.062	.062±.015
.6250 SHOULDER .7500 ALL .8750 ALL 1.0000 ALL 1.2500 BALL LOCK 1.2500 SHOULDER	IAE 09	3/32 (.093)	#2 (.221)	#1/4-28	.062	.062±.015
CONSULT FACTORY	IAE 12	1/8 (.125)	9/32 (.281)	#5/16-24	—	.062±.015

## PUNCH EJECTOR COMPONENTS

PART DESCRIPTION	SPEC. DESCRIPTION	IAE 02	IAE 03	IAE 04	IAE 06	IAE 09	IAE 12
SET SCREW 	THREAD SIZE "T"	3-48	5-40	8-32	10-32	1/4-28	5/16-24
	LENGTH "L"	.19	.19	.19	.19	.25	.25
SPRING 	DIAMETER "D" $\begin{matrix} +.000 \\ -.010 \end{matrix}$	.078	.094	.130	.164	.216	.270
	FREE-LENGTH "F" $\begin{matrix} +.060 \\ -.010 \end{matrix}$	2.38	2.38	3.19	3.19	3.19	3.19
	PRESSURE (1/8" PRE-LOAD) lbs.	.5	.75	1	1.5	2	2.5
PIN 	BODY DIAMETER "N" $\begin{matrix} +.001 \\ -.002 \end{matrix}$	.019	.027	.041	.058	.089	.120
	LENGTH "L" $\begin{matrix} +.062 \\ -.000 \end{matrix}$	1.38	1.38	1.94	1.94	2.50	3.00
	HEAD DIAMETER "H" $\begin{matrix} +.001 \\ -.002 \end{matrix}$	.048	.078	.094	.125	.158	.188
	HEAD THICKNESS "T" $\begin{matrix} +.005 \\ -.005 \end{matrix}$	.032	.046	.062	.062	.094	.094

CATALOG NUMBERS			
ASSEMBLY	PIN	SPRING	SCREW
IAE 02	IAE 02P	IAE 02S	IAE 02C
IAE 03	IAE 03P	IAE 03S	IAE 03C
IAE 04	IAE 04P	IAE 04S	IAE 04C
IAE 06	IAE 06P	IAE 06S	IAE 06C
IAE 09	IAE 09P	IAE 09S	IAE 09C
IAE 12	IAE 12P	IAE 12S	IAE 12C



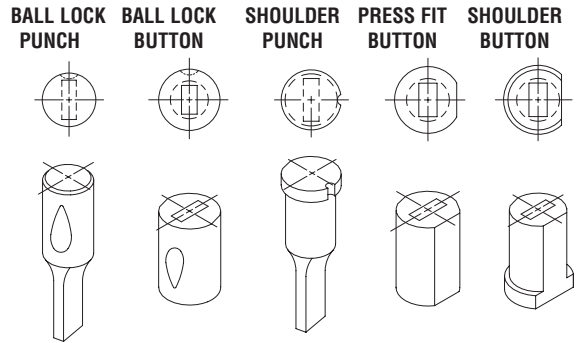
Set includes 12 pcs of each size.

# 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 @ \_\_\_°.

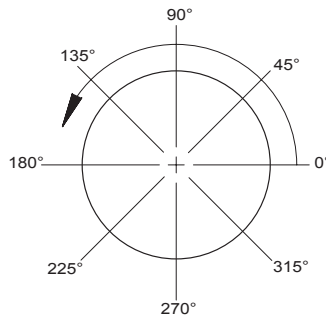
Ball lock punch example: IHR 050-300 P=.375 W=.250 B/S @ 0°  
Button flat example: IDO100-125 P=.500 W=.375 F1@90°



## CUSTOM LOCATIONS

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

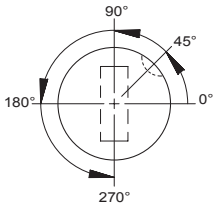
Note: Parts are viewed in die position looking from above the die. Punches are viewed looking through the shanks. Buttons are viewed through top face.



## TYPICAL EXAMPLES:

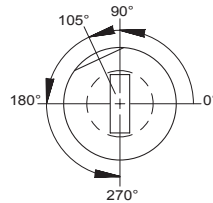
CUSTOM BALL SEAT LOCATION PUNCH

**BS@45°**

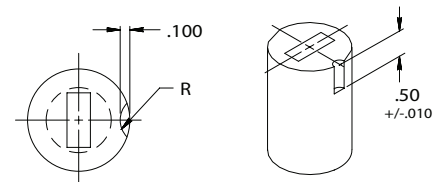


CUSTOM FLAT LOCATION DIE BUTTON

**F2@105°**



## WINDSOR LOCK



**W2**

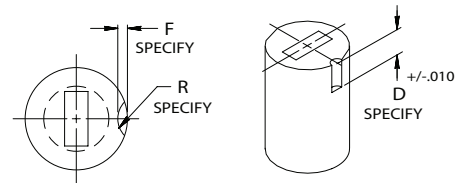
1/4 WINDSOR LOCK R = .125 RAD

**W3**

3/8 WINDSOR LOCK R = .188 RAD

**W5**

1/2 WINDSOR LOCK R = .250 RAD



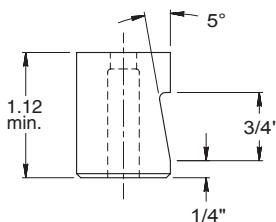
**WX**

USER DEFINED must specify "F", "R" and "D" Dimensions

## WHISTLE NOTCH

**W1**

### BUTTONS



NOTE: Must specify radial location on shaped products.

## BALL SEAT

**GB**

BALL SEAT GRIND CHARGE

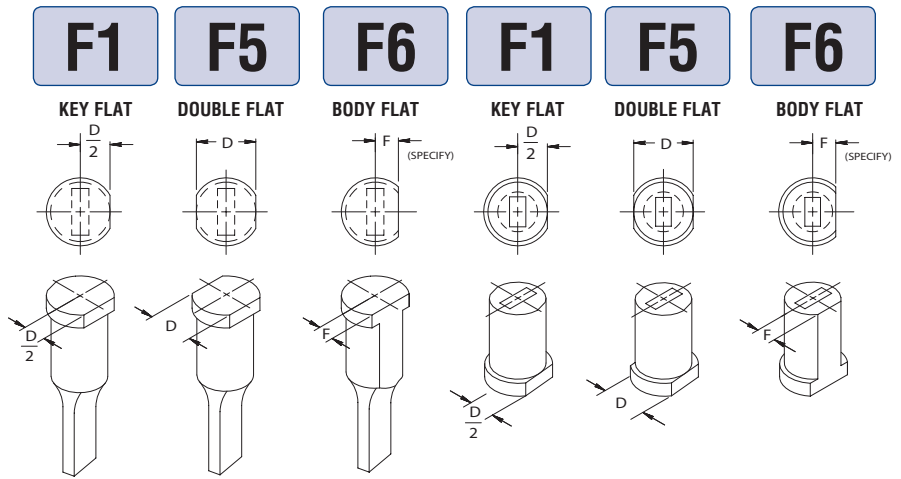
NOTE: Specify a radial location if a double ballseat is required.



# LOCATING DEVICES

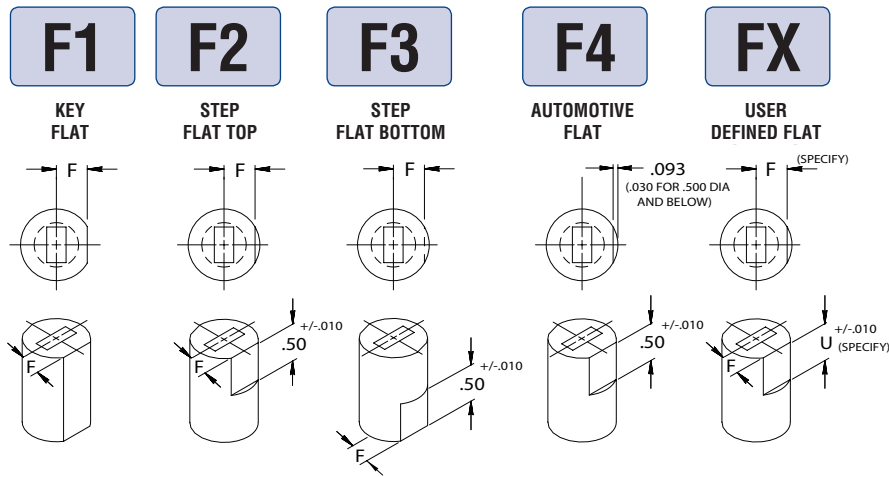
## FLATS ON SHOULDER PRODUCTS

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

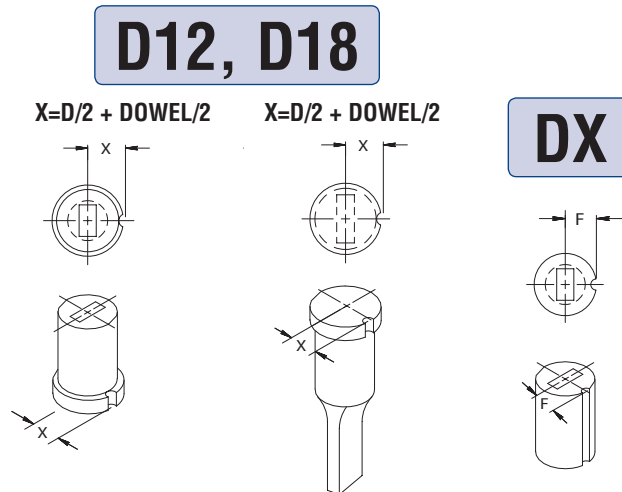
F1 uses "F" dimension as defined in chart unless an alternate "F" dimension is specified with order. F2 and F3 use "F" dimension as defined in chart. FX is a user defined flat and requires an "F" and "U" dimension specified with order.



BODY DIAMETER	"F"
.2500	+.001 -.000
.3125	.110
.3750	.135
.4375	.165
.5000	.190
.6250	.220
.7500	.270
.8750	.325
1.000	.380
1.250	.435
1.500	.540
1.750	.650
2.000	.775
2.250	.900
2.500	1.025
2.750	1.150
3.000	1.275
	1.400

## DOWEL GROOVES

D12, D18 are standard 1/8, 3/16 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	D12 .1250 DOWEL	D18 .1875 DOWEL
	"F" DIM	"F" DIM	"F" DIM
.2500	SPECIFY	.1625	.1938
.3125	SPECIFY	.1875	.2188
.3750	SPECIFY	.2125	.2438
.4375	SPECIFY	.2375	.2688
.5000	SPECIFY	.2625	.2938
.6250-3.0000	SPECIFY	D/2	D/2

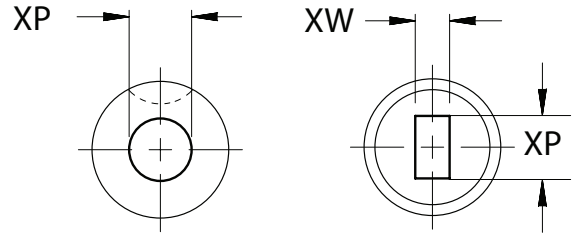
# STANDARD ALTERATIONS

**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

### MIN P ROUNDS

SHANK D	MAX B	MAX B	MAX B	MAX B	MAX B
	.625	.750	1.000	1.250	1.500
18	.050	.060	.060	—	—
25	.050	.060	.060	—	—
31	.060	.060	.060	.090	.125
37	.060	.060	.090	.125	.125
43	—	.090	.090	.125	.125
50	—	.090	.090	.125	.125
62	—	.156	.156	.187	.187
75	—	.250	.250	.250	.250
87	—	.312	.312	.312	.312
100	—	.375	.375	.375	.375
125	—	.437	.437	.437	.437

### MIN W SHAPES

SHANK D	MAX B	MAX B	MAX B	MAX B	MAX B
	.625	.750	1.000	1.250	1.500
18	.050	.060	.060	—	—
25	.050	.060	.060	—	—
31	.060	.060	.060	.090	.125
37	.060	.060	.090	.125	.125
43	—	.090	.090	.125	.125
50	—	.090	.090	.125	.125
62	—	.156	.156	.156	.187
75	—	.250	.250	.250	.250
87	—	.250	.250	.250	.250
100	—	.250	.250	.250	.250
125	—	.250	.250	.250	.250

## HEAVY DUTY EJECTOR PUNCHES

### MIN P ROUNDS

SHANK D	2.75 MIN			3.00 MIN			3.25 MIN		
	O.A.L.			O.A.L.			O.A.L.		
	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B
37	.110	—	—	—	—	—	—	—	—
50	.156	.156	.156	—	—	—	—	—	—
62	.187	.187	.187	—	—	—	—	—	—
75	.250	.250	.250	—	—	—	—	—	—
87	—	.312	.312	—	—	—	—	—	—
100	—	.375	.375	—	—	—	—	—	—
125	—	.437	.437	—	—	—	—	—	—

### MIN W SHAPES

SHANK D	2.75 MIN			3.00 MIN			3.25 MIN		
	O.A.L.			O.A.L.			O.A.L.		
	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B
37	.110	—	—	—	—	—	—	—	—
50	.156	.156	.156	—	—	—	—	—	—
62	.156	.156	.156	—	—	—	—	—	—
75	.187	.187	.187	—	—	—	—	—	—
87	—	.218	.218	—	—	—	—	—	—
100	—	.250	.250	—	—	—	—	—	—
125	—	.281	.281	—	—	—	—	—	—

## SHOULDER BASIC/SELECTIVE EJECTOR PUNCHES

### MIN P ROUNDS

SHANK D	1.50 MIN					1.75 MIN					2.00 MIN					2.25 MIN					2.50 MIN						
	O.A.L.					O.A.L.					O.A.L.					O.A.L.					O.A.L.						
	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B
18	.062	.062	.062	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25	.078	.078	.078	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
31	.110	.110	.110	.125	.125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
37	—	.156	.156	.156	.187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
43	—	.156	.156	.156	.187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
50	—	—	.156	.156	.187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
62	—	—	.218	.218	.250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
75	—	—	—	.312	.312	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
87	—	—	—	.312	.312	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
100	—	—	—	.312	.375	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
125	—	—	—	.437	.437	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

### MIN W SHAPES

SHANK D	1.50 MIN					1.75 MIN					2.00 MIN					2.25 MIN					2.50 MIN						
	O.A.L.					O.A.L.					O.A.L.					O.A.L.					O.A.L.						
	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B	MAX B
18	.062	.062	.062	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25	.078	.078	.078	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
31	.110	.110	.110	.125	.125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
37	—	.156	.156	.156	.187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
43	—	.156	.156	.156	.187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
50	—	—	.156	.156	.187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
62	—	—	.218	.218	.250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
75	—	—	—	.218	.250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
87	—	—	—	.218	.250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
100	—	—	—	.218	.250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
125	—	—	—	.250	.250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

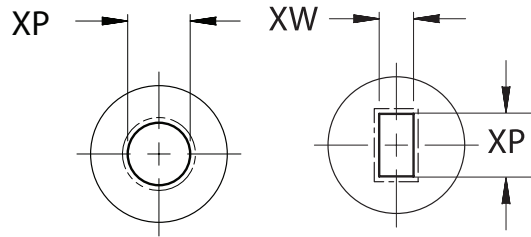
# STANDARD ALTERATIONS

**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

BODY	MIN P DIA	MIN W DIM	MAX P/G
25	.062	.062	.140
31	.062	.062	.180
37	.062	.062	.220
43	.078	.078	.280
50	.078	.078	.320
62	.078	.078	.365
75	.125	.125	.490
87	.250	.125	.593
100	.312	.125	.688
125	.437	.156	.875
150	.500	.156	1.125
175	.625	.156	1.438
200	.750	.250	1.688
225	.875	.250	1.875
250	1.000	.250	2.125
275	1.125	.250	2.375
300	1.250	.250	2.625

### SHOULDER ULTRA LIFE TAPER RELIEF

MIN P DIA	MIN W DIM	MAX P/G
.062	.062	.140
.062	.062	.180
.062	.062	.220
.078	.078	.280
.078	.078	.320
.078	.078	.365
.125	.125	.490
.250	.125	.593
.312	.125	.688
.437	.156	.875
.500	.156	1.125
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

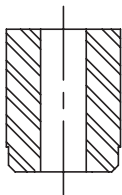
### BALL LOCK ULTRA LIFE TAPER RELIEF

MIN P DIA	MIN W DIM	MAX P/G
—	—	—
—	—	—
—	—	—
—	—	—
.078	.078	.250
.078	.078	.375
.125	.125	.437
.250	.125	.562
.312	.125	.688
.437	.156	.875
.500	.156	1.125
.624	.156	1.250
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

**XR**

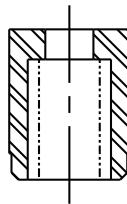
## NO RELIEF

Button shape/ I.D. through hole no relief



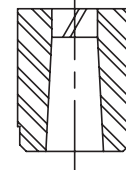
**XO**

## OPEN RELIEF



**XS**

## SLUG CONTROL ALTERATION



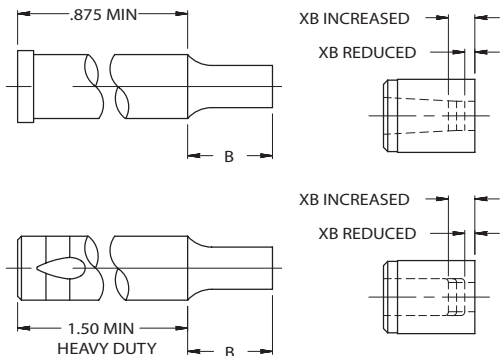
NOTE: Advise material thickness and die clearance, per side at time of order.

To accommodate XP or XG alteration. Order Example: XS MT=0.09 C=0.009

**XB**

## ALTERED POINT LENGTH OR LAND DIMENSION

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



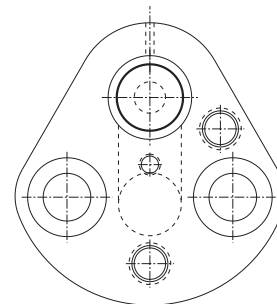
**AE**

## AIR EJECTOR APPLICATION

Filled cross pin hole with no ejector components.

**SR**

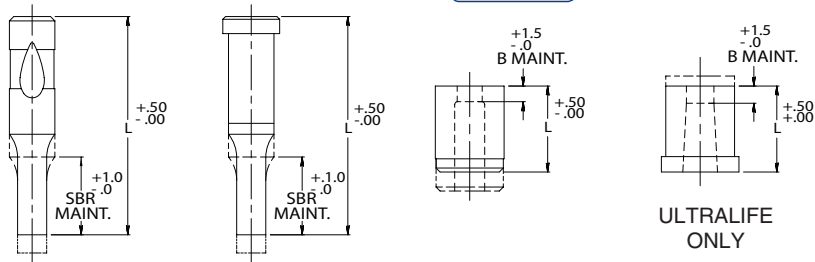
## OPEN IN-LINE DOWEL FOR SLUG RELIEF



# STANDARD ALTERATIONS

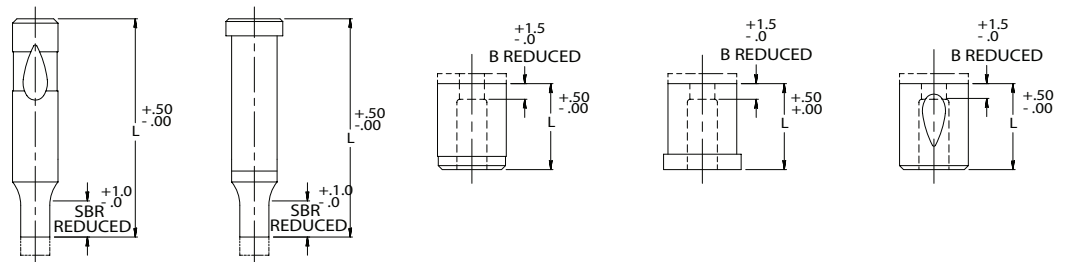
## OVERALL LENGTH REDUCTIONS

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



**X1**

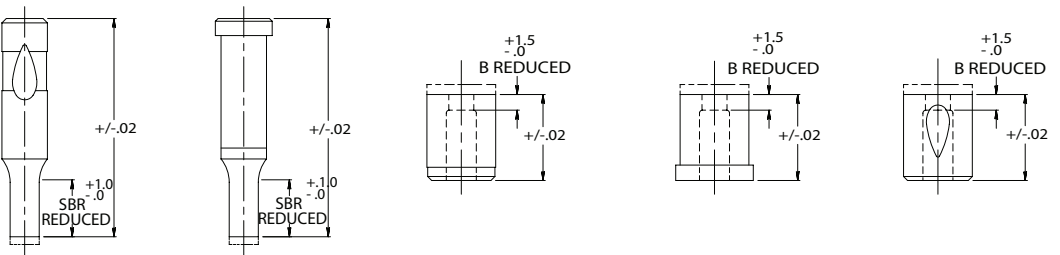
Reduces punch or button length but also reduces "B" dimension or land length.



**X2**

Provides a precision overall length of +/- .001

Note: .020 maximum stock removal

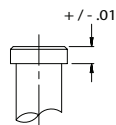


**X3**

## HEAD ALTERATIONS

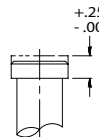
**X4**

Provides a precision head length but reduces overall length



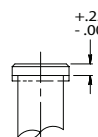
**X5**

Reduces head length but reduces overall length



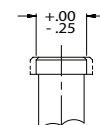
**X6**

Reduces head length while maintaining overall length



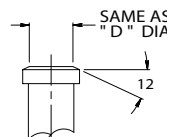
**X7**

Reduces head diameter



**X8**

Angle on head face to improve strength



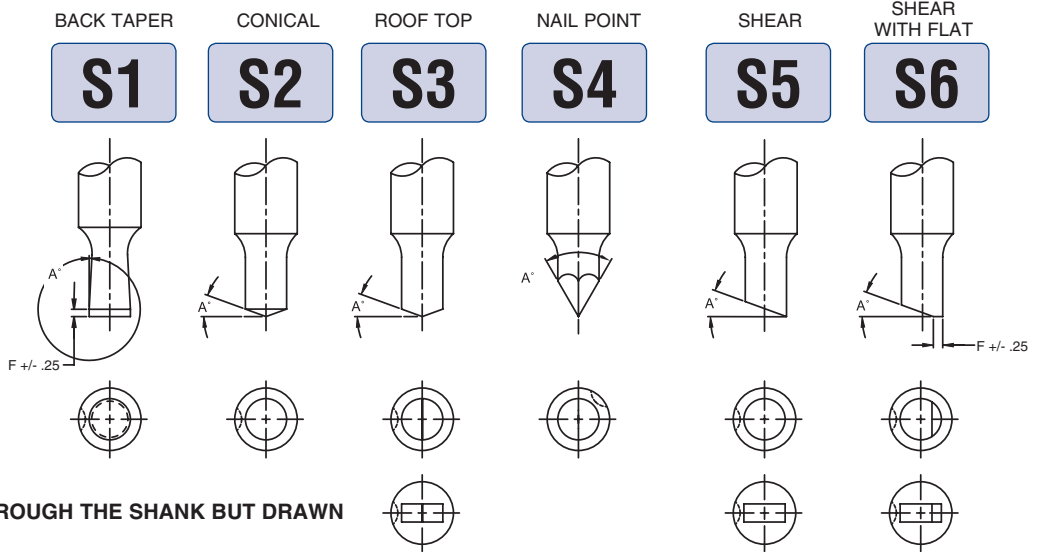
# SPECIAL ALTERATIONS

## 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°.



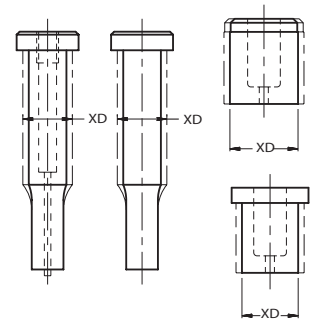
VIEWS ARE SHOWN LOOKING THROUGH THE SHANK BUT DRAWN WITH SOLID LINES FOR CLARITY.

## XD REDUCTION OF SHANK DIMENSION

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

Example: IDO 075-100  
P=.400 W=.125, XD=.714

BODY	18	25	31	37	43	50	62	75	87	100	125	150
PUNCH SOLID MIN D	.126	.188	.251	.313	.376	.438	.563	.688	.751	.938	1.188	—
PUNCH EJECTOR MIN D	.172	.219	.282	.344	.376	.438	.563	.688	.751	.938	1.188	—
BUTTON MIN D		.230	.282	.344	.407	.470	.583	.688	.813	.938	1.125	1.375

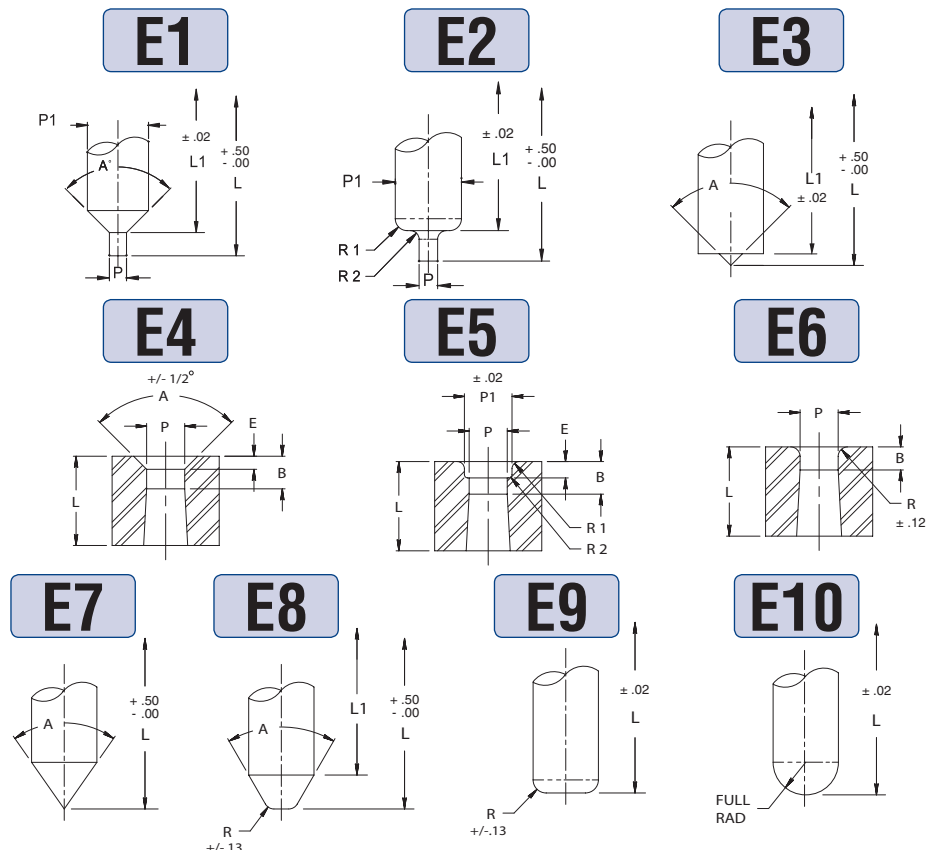


## EXTRUSION TOOLS

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.



## Alcrona Pro™ – Aluminum Chromium Nitride Based

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

Oerlikon Balzers Alcrona Pro provides excellent all-around performance, thermal stability, and low coefficient of friction, for most piercing and forming applications, including high-strength steels

**Technical Information:**

*Thickness 2-5 $\mu$  • Hardness 3200HV • Coefficient of Friction ~0.35 • Max. Service Temp. 1,100°C/2012°F*

- Recommended for piercing and forming high-strength steels
- Excellent for hot stamping applications and applications which introduce thermal shock
- Exceptionally low coefficient of friction
- Extraordinarily high wear resistance and thermal stability
- Excellent for applications with high mechanical loads
- Allows increased press stroke speeds



## Oerlikon Balzers Formera Plus

**Alteration Code: FMP • Add 3 days to Delivery**

**Technical Information:**

*Thickness 6.5-8 $\mu$  • Nitride Case Depth Approx. .003"-.004" • Hardness 3000HV  
Coefficient of Friction 0.35 • Max. Service Temp. 900°C/1652°F*

- Works excellent on any draw application of steel or stainless part material
- Duplex nitride process is applied prior to Formera Plus
- Superior to any other coatings available on AHSS Forming Applications up to 1180DP
- Works excellent on all Stainless Steel forming applications—exception 409 stainless

## Oerlikon Balzers Alcrona Pro Advanced

**Alteration Code: ACA • Add 7 days to Delivery**

Oerlikon Balzers Alcrona Pro Advanced combines the benefits of Alcrona Pro with “Advanced” thin-layer nitride technology to provide increased tool life over Alcrona Pro for tough piercing applications.

**Technical Information:**

*Thickness 2-5 $\mu$  • Nitride Case Depth Approx. 30 $\mu$  • Hardness 3200HV • Coefficient of Friction ~0.35  
Max. Service Temp. 1,100°C/2012°F*

- Thin nitride layer provides excellent toughness for piercing application
- Exceptionally low coefficient of friction
- Extraordinarily high toughness, wear resistance, and thermal stability

## Oerlikon Balzers Alcrona Pro Duplex

**Alteration Code: ACD • Add 5 days to Delivery**

Oerlikon Balzers Alcrona Pro Duplex combines the benefits of Alcrona Pro with “Duplex” deep-layer nitride technology to provide increased tool life over Alcrona Pro for tough forming applications.

**Technical Information:**

*Thickness 2-5 $\mu$  • Nitride Case Depth Approx. 200 $\mu$  • Hardness 3200HV • Coefficient of Friction ~0.35 • Max. Service Temp. 1,100°C/2012°F*

- Deep nitride layer provides excellent toughness for forming application
- Exceptionally low coefficient of friction
- Extraordinarily high wear resistance and thermal stability

### COATINGS FOR ALUMINUM APPLICATIONS

## Oerlikon Balzers Hard Carbon (ta-C)

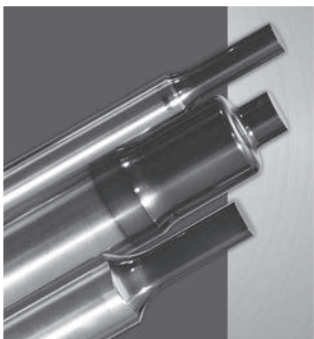
**Alteration Code: HCB • Add 5 days to Delivery**

Oerlikon Balzers Hard Carbon is the premier coatings for piercing and forming aluminum, as well as other non-ferrous materials, such as copper and plastics.

**Technical Information:**

*Thickness 1-2 $\mu$  • Hardness 5000HV • Coefficient of Friction 0.15 • Max. Service Temp. 500°C/932°F*

- The ultimate solution for piercing and forming aluminum, and other non-ferrous materials
- Extreme protection against abrasive wear and galling
- Smooth coating surface provides a low coefficient of friction
- Retains sharp cutting edges
- High thermal stability



		FORMING & EXTRUDING						PIERCING & TRIMMING			
	Draw/Flange	Extruding	Forging	Hot Forming	Coin/Emboss	Pierce & Trim	Hot Stamping	Fine Blanking	Shave/Lance		
<b>Non-alloyed Steel</b>	TAN	TAN MWU* ACD	TAN MWU* ACD	TAN MWU* ACD	TCN TAN MWE MTN	TAN ACN	ACN TAN TCN	TCN ACN ACA	TCN ACN		
<b>Steel &lt; 250 Mpa</b>	TIN TCN	ACN MWU* ACD MWE MTN			TCN MWN MWE MTD	TIN TCN		TIN ACN	TIN TCN ACN		
<b>Steel &lt; 400 Mpa</b>	TCN ACN	ACN MWU*			TCN ACN	ACN MWU* ACA		TAN ACN	TAN TCN ACN		
<b>High Strength Steels</b>	TCN ACN	ACN TCN TAN		ACN MWU* ACD	TCN ACN MWU*	ACN MWU* ACA	ACN TCN MWU* ACA	TAN ACN	TAN ACN		
<b>Aluminum**</b>	HCB DLC	HCB DLC	HCB MWU* ACD		HCB DLC TCN	HCB DLC		HCB DLC	HCB DLC		
<b>Stainless Steels</b>	TCN ACN MWU* FMP ACD	TCN ACN MWU* FMP ACD	TCN ACN MWU* FMP ACD		TCN MWU* ACD	ACN TCN MWU* ACA MSP		ACN TCN	ACN TCN		
<b>Brass/Bronze/Copper</b>	CRN ACD	CRN MWU* ACD	CRN MWU* ACD		CRN MWU* ACD	CRN ACN TAN		CRN ACN TAN	CRN ACN TAN		

\* M-Wear Ultra includes Moeller's Enhanced Surface Finish \*\* Moeller Enhanced Surface Finish is recommended for all aluminum applications

- TIN - TIN
- TCN - TiCN
- TAN - TiAlN
- ACN - AlCrnoa Pro
- ACD - AlCrnoa Pro Duplex
- ACA - AlCrnoa Pro Advanced
- FMP - Formera Plus
- MST - MoST
- CRN - CrN
- DLC - α-C:H
- HCB - Hard Carbon
- MWU\* - M-Wear Ultra
- MSP - Moeller Special Process
- MWN - M-Wear
- MWE - M-Wear Extreme
- LAP - M-LAP
- MTN - M-Tride
- ESF - Enhanced Surface Finish
- EGB - Edge Break
- CDF - Cryogenic Deep Freeze



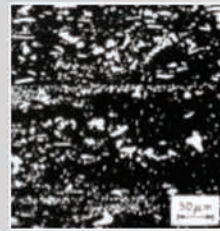
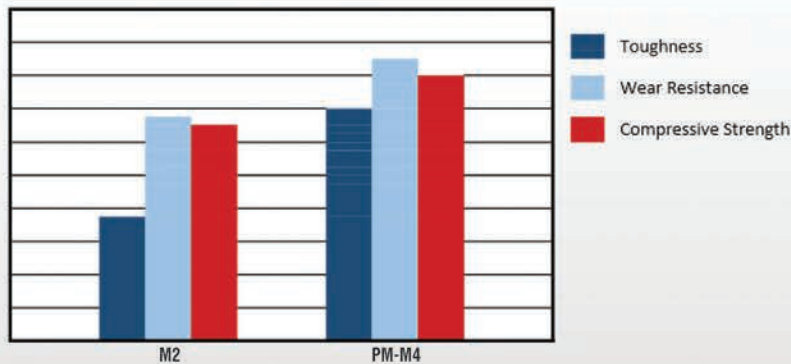
EXCEEDING INDUSTRY STANDARDS FOR OVER 60 YEARS

## IMPROVE TOOL LIFE AND REDUCE DOWN TIME

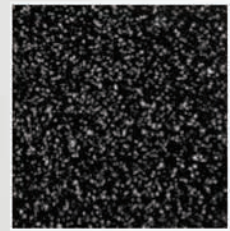
As the art of metalforming continues to evolve, today's industry faces increasingly difficult challenges in processing high-strength and complex lightweight materials. Moeller's tooling for Advanced Stamping Applications provides solutions, which allow our customers to exceed the increased demands of modern materials.

### PM-M4 vs M2 Punches

It is no longer just a question of TOUGHNESS vs. WEAR. Want to improve tool life and reduce downtime while stamping modern materials, such as high strength, martensitic steel, and aluminum? You need the optimum combination of toughness, wear resistance, and superior compressive strength. Moeller's new **Advanced Tooling Solutions** now offer a complete line of standard **PM-M4** punches. **PM-M4** provides an outstanding balance of toughness, wear resistance, and tensile strength, and will perform in the most demanding applications.



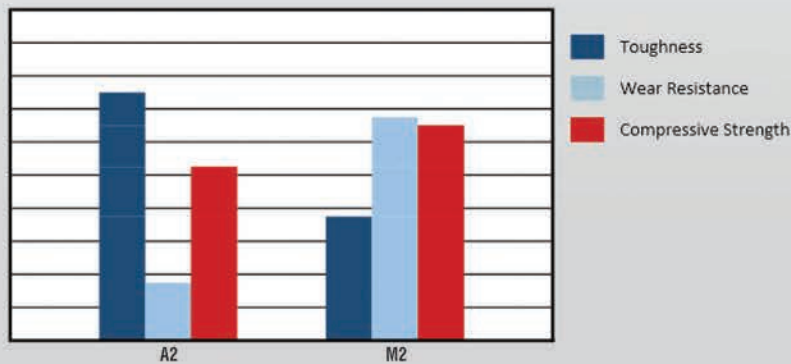
Standard (Non-PM) tool steel cross section. Large, non-uniform, disbursement of carbides allow cracking, chipping and premature wear.



PM-M4 microstructure is uniform with fine disbursement of carbides providing greatly improved performance.

### M2 vs A2 Punches

Stamping modern materials does not only require superior punch performance. The mating die buttons are also under increased demand. Moeller's **Advanced Tooling** M2 die buttons offer greatly increased wear resistance over A2 die buttons, and are the solution to many die problems associated with premature wear and edge breakdown.



Contact a Moeller representative today to learn about our wide array of advanced solutions for your advanced application, including specialized performance coatings, unique punch configurations for unparalleled strength, and exclusive retainer geometry for improved punch retention.



# NOTES

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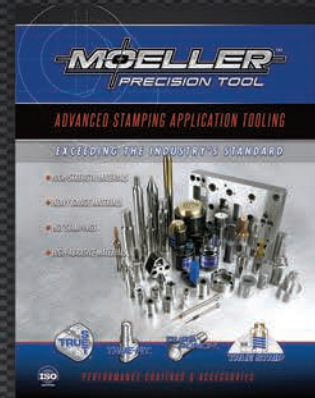
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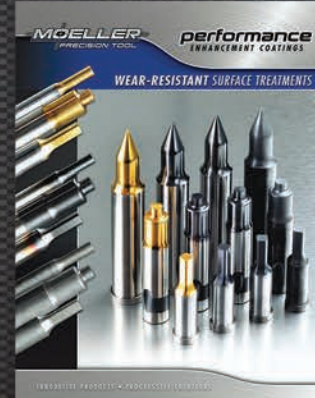
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# MOELLER PRECISION TOOL

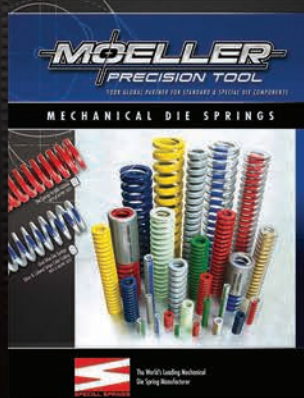
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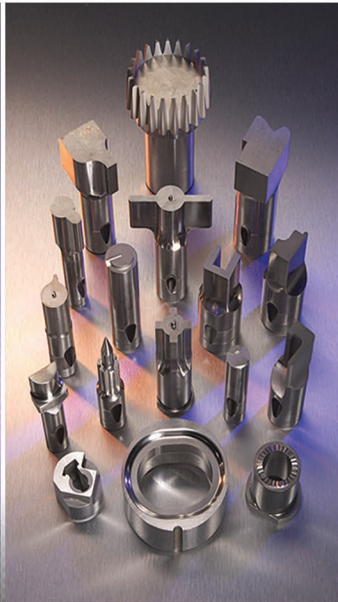


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