
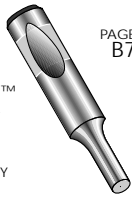
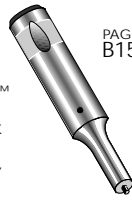
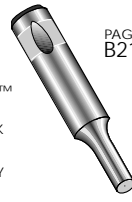
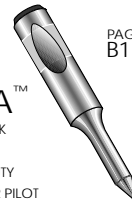
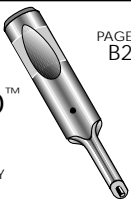
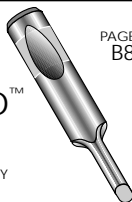

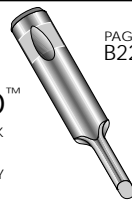

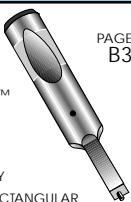
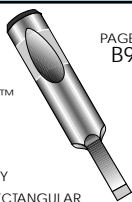
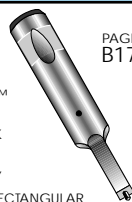
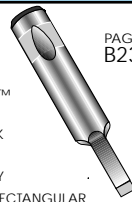






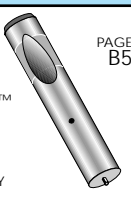
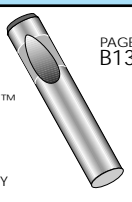
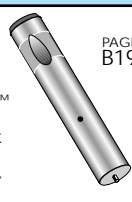

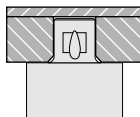
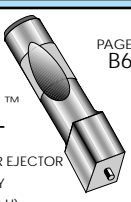
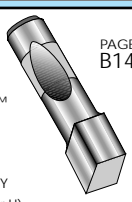
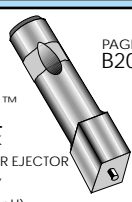
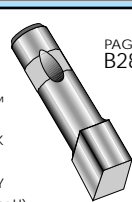





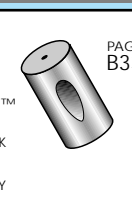

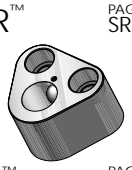
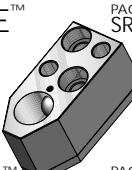

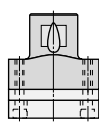




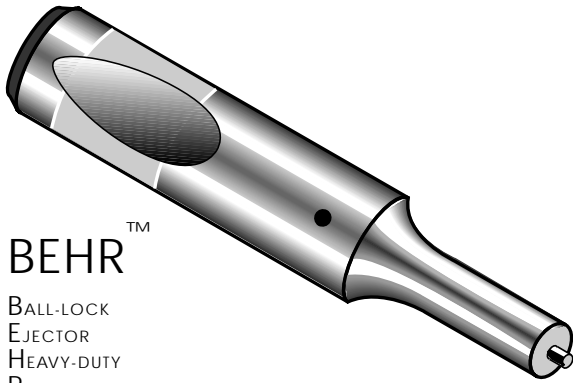


Ball-Lock TABLE OF CONTENTS

 <p>BEHR™ BALL-LOCK EJECTOR HEAVY-DUTY ROUND</p> <p>PAGE B1</p>	 <p>BPHR™ BALL-LOCK PUNCH HEAVY-DUTY ROUND</p> <p>PAGE B7</p>	 <p>BELR™ BALL-LOCK EJECTOR LIGHT-DUTY ROUND</p> <p>PAGE B15</p>	 <p>BPLR™ BALL-LOCK PUNCH LIGHT-DUTY ROUND</p> <p>PAGE B21</p>	 <p>BPHA™ BALL-LOCK PUNCH HEAVY-DUTY ANGULAR PILOT</p> <p>PAGE B11</p>
 <p>BEHO™ BALL-LOCK EJECTOR HEAVY-DUTY OBLONG</p> <p>PAGE B2</p>	 <p>BPHO™ BALL-LOCK PUNCH HEAVY-DUTY OBLONG</p> <p>PAGE B8</p>	 <p>BELO™ BALL-LOCK EJECTOR LIGHT-DUTY OBLONG</p> <p>PAGE B16</p>	 <p>BPLO™ BALL-LOCK PUNCH LIGHT-DUTY OBLONG</p> <p>PAGE B22</p>	 <p>BPHP™ BALL-LOCK PUNCH HEAVY-DUTY PARABOLIC PILOT</p> <p>PAGE B12</p>
 <p>BEHS™ BALL-LOCK EJECTOR HEAVY-DUTY SQUARE/RECTANGULAR</p> <p>PAGE B3</p>	 <p>BPHS™ BALL-LOCK PUNCH HEAVY-DUTY SQUARE/RECTANGULAR</p> <p>PAGE B9</p>	 <p>BELS™ BALL-LOCK EJECTOR LIGHT-DUTY SQUARE/RECTANGULAR</p> <p>PAGE B17</p>	 <p>BPLS™ BALL-LOCK PUNCH LIGHT-DUTY SQUARE/RECTANGULAR</p> <p>PAGE B23</p>	 <p>BPLA™ BALL-LOCK PUNCH LIGHT-DUTY ANGULAR PILOT</p> <p>PAGE B25</p>
 <p>BEHH™ BALL-LOCK EJECTOR HEAVY-DUTY HIGH PRODUCTION</p> <p>PAGE B4</p>	 <p>BPHH™ BALL-LOCK PUNCH HEAVY-DUTY HIGH PRODUCTION</p> <p>PAGE B10</p>	 <p>BELH™ BALL-LOCK EJECTOR LIGHT-DUTY HIGH PRODUCTION</p> <p>PAGE B18</p>	 <p>BPLH™ BALL-LOCK PUNCH LIGHT-DUTY HIGH PRODUCTION</p> <p>PAGE B24</p>	 <p>BPLP™ BALL-LOCK PUNCH LIGHT-DUTY PARABOLIC PILOT</p> <p>PAGE B26</p>
 <p>BEHB™ BALL-LOCK EJECTOR HEAVY-DUTY BLANK</p> <p>PAGE B5</p>	 <p>BPHB™ BALL-LOCK PUNCH HEAVY-DUTY BLANK</p> <p>PAGE B13</p>	 <p>BELB™ BALL-LOCK EJECTOR LIGHT-DUTY BLANK</p> <p>PAGE B19</p>	 <p>BPLB™ BALL-LOCK PUNCH LIGHT-DUTY BLANK</p> <p>PAGE B27</p>	 <p>Z-BOTTOMING PUNCH</p> <p>PAGE B30</p>
 <p>BNH™ BALL-LOCK NOSE-OVER EJECTOR HEAVY-DUTY _ (R, O, S, or H)</p> <p>PAGE B6</p>	 <p>BIH™ BALL-LOCK INVERTED HEAVY-DUTY _ (R, O, S, or H)</p> <p>PAGE B14</p>	 <p>BNL™ BALL-LOCK NOSE-OVER EJECTOR LIGHT-DUTY _ (R, O, S, or H)</p> <p>PAGE B20</p>	 <p>BIL™ BALL-LOCK INVERTED LIGHT-DUTY _ (R, O, S, or H)</p> <p>PAGE B28</p>	 <p>BPE™ BALL-LOCK PUNCH EXTRA-HEAVY DUTY _ (R, O, S, or H)</p> <p>PAGE B29</p>
 <p>BBLR™ BALL-LOCK BUTTON LIGHT-DUTY ROUND</p> <p>PAGE B31</p>	 <p>BBLO™ BALL-LOCK BUTTON LIGHT-DUTY OBLONG</p> <p>PAGE B31</p>	 <p>BBLS™ BALL-LOCK BUTTON LIGHT-DUTY SQUARE/RECTANGULAR</p> <p>PAGE B32</p>	 <p>BBLH™ BALL-LOCK BUTTON LIGHT-DUTY HIGH PRODUCTION</p> <p>PAGE B32</p>	 <p>BBLB™ BALL-LOCK BUTTON LIGHT-DUTY BLANK</p> <p>PAGE B33</p>
 <p>BRHT™</p> <p>PAGE SR1</p>	 <p>BRHR™</p> <p>PAGE SR3</p>	 <p>BRHE™</p> <p>PAGE SR5</p>	 <p>BRHS™</p> <p>PAGE SR7</p>	 <p>STAMPS, HOLDERS & RETAINERS</p> <p>PAGE S7</p>
 <p>BRLT™</p> <p>PAGE SR2</p>	 <p>BRLR™</p> <p>PAGE SR4</p>	 <p>BRLE™</p> <p>PAGE SR6</p>	 <p>BRES™</p> <p>PAGE SR8</p>	

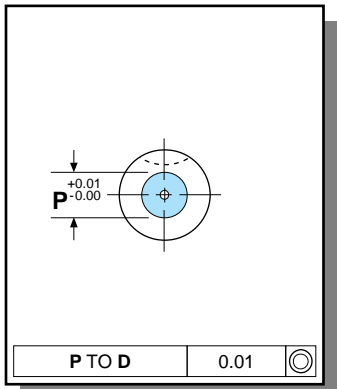
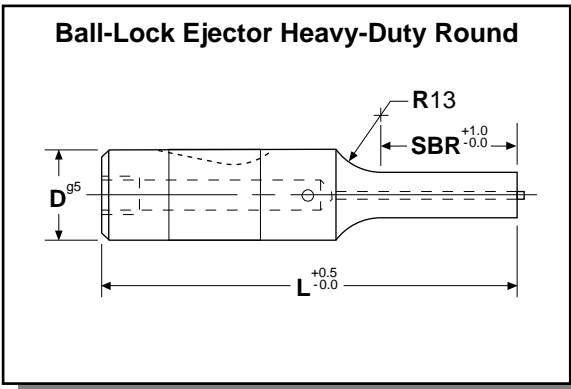


BEHR™

BALL-LOCK
EJECTOR
HEAVY-DUTY
ROUND

**Ordering Example:
(12) BEHR 13-13-71 M2 P10.1**

M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"							MIN. "P"	EJECT. TYPE
		10	13	19	25	32	63	71	80	90	100	110	125		
BEHR	10	10	13	19			63	71	80	90	100			2.9	E4M
BEHR	13		13	19			63	71	80	90	100	110	125	4.0	E6M
BEHR	16		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHR	20		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHR	25		13	19	25			71	80	90	100	110	125	8.0	E9M
BEHR	32		13	19	25			71	80	90	100	110	125	10.0	E12M
BEHR	40			19	25	32			80	90	100	110	125	12.0	E12M

For Matching Die Buttons:

General (Press-Fit)
see page G25

Ball-Lock
see page B31

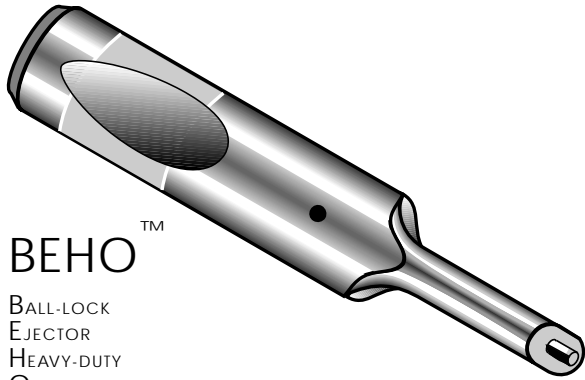
Formula for Calculating "B" Dimension

EXAMPLE:

BEHR 13-13-71 M2 P10.1
R = 13, D = 13, SBR = 13, P = 10.1

$$B = \sqrt{13^2 - \left(13 - \left(\frac{13 - 10.1}{2}\right)\right)^2} + 13$$

B = 18.9

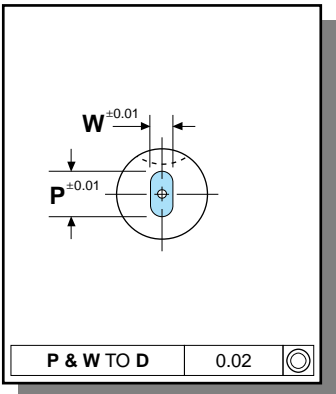
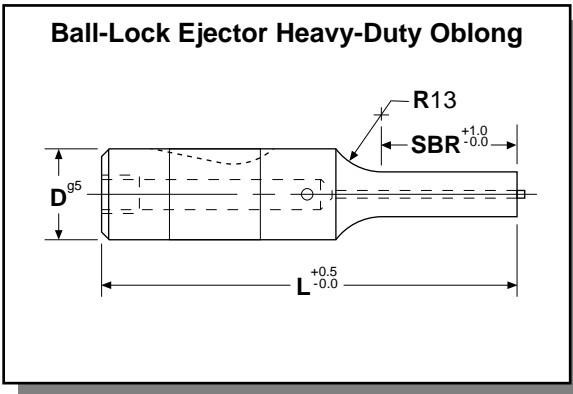
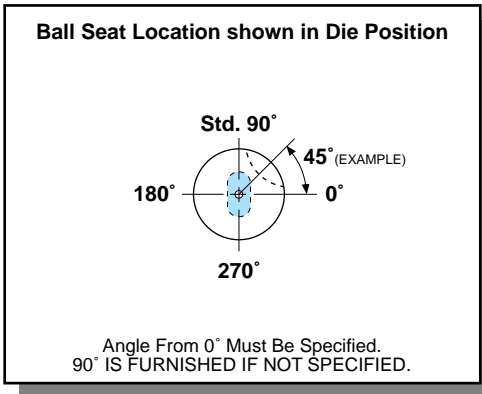


BEHO™

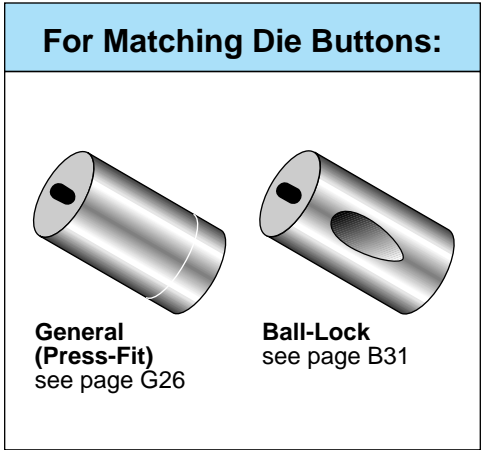
BALL-LOCK
EJECTOR
HEAVY-DUTY
OBLONG

Ordering Example:
(12) BEHO 20-19-80 M2 P18.2 W9.5 BS-90B

M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"							MIN. "W"	EJECT. TYPE
		10	13	19	25	32	63	71	80	90	100	110	125		
BEHO	10	10	13	19			63	71	80	90	100			2.9	E4M
BEHO	13		13	19			63	71	80	90	100	110	125	4.0	E6M
BEHO	16		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHO	20		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHO	25		13	19	25			71	80	90	100	110	125	8.0	E9M
BEHO	32		13	19	25			71	80	90	100	110	125	10.0	E12M
BEHO	40			19	25	32			80	90	100	110	125	12.0	E12M



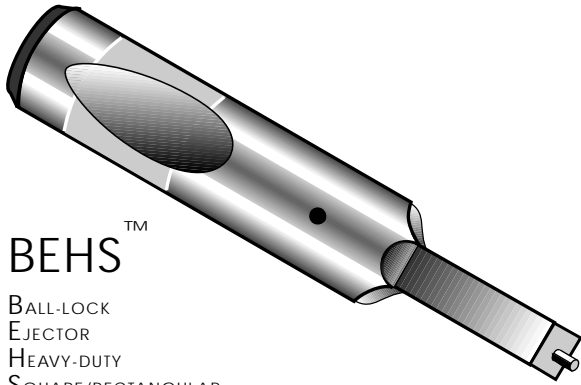
Formula for Calculating "B" Dimension

EXAMPLE:

BEHO 20-19-80 M2 P18.2 W9.5 BS-90°
R = 13, D = 20, SBR = 19, W = 9.5

$$B = \sqrt{13^2 - \left(13 - \left(\frac{20 - 9.5}{2}\right)\right)^2} + 19$$

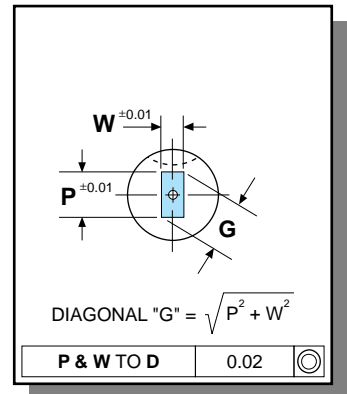
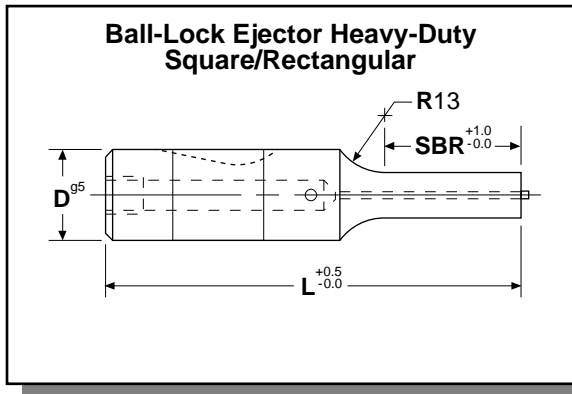
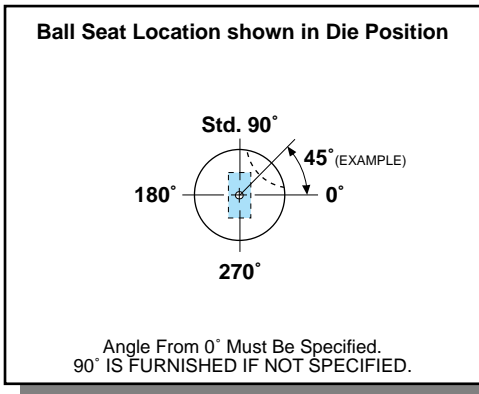
B = 29.4



BEHS™
BALL-LOCK
EJECTOR
HEAVY-DUTY
SQUARE/RECTANGULAR

Ordering Example:
(15) BEHS 16-25-80 M2 P9.4 W9.4 BS-90;

M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"							MIN. "W"	EJECT. TYPE
		10	13	19	25	32	63	71	80	90	100	110	125		
BEHS	10	10	13	19			63	71	80	90	100			2.9	E4M
BEHS	13		13	19			63	71	80	90	100	110	125	4.0	E6M
BEHS	16		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHS	20		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHS	25		13	19	25			71	80	90	100	110	125	8.0	E9M
BEHS	32		13	19	25			71	80	90	100	110	125	10.0	E12M
BEHS	40			19	25	32			80	90	100	110	125	12.0	E12M

For Matching Die Buttons:

General (Press-Fit)
see page G27

Ball-Lock
see page B32

Formula for Calculating "B" Dimension

R13
SBR
D
W
B

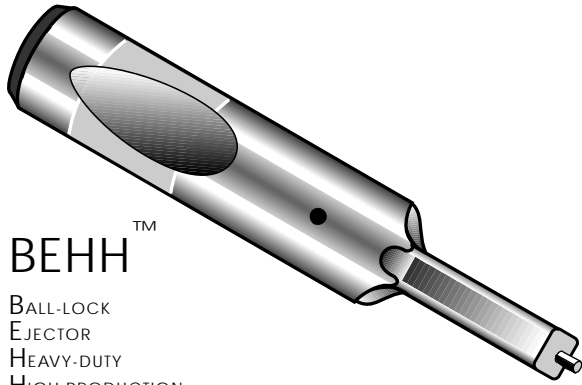
$$B = \sqrt{R^2 - \left(R - \left(\frac{D-W}{2} \right) \right)^2} + SBR$$

EXAMPLE:

BEHS 16-25-80 M2 P9.4 W9.4 BS-90°
R = 13, D = 16, SBR = 25, W = 9.4

$$B = \sqrt{13^2 - \left(13 - \left(\frac{16 - 9.4}{2} \right) \right)^2} + 25$$

B = 33.7

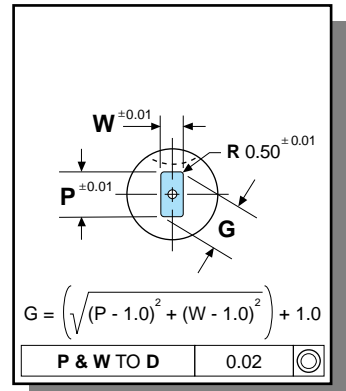
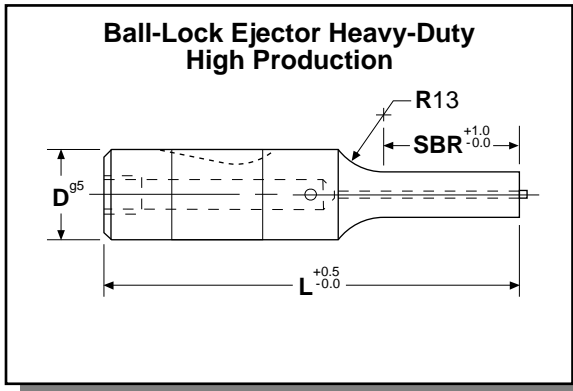
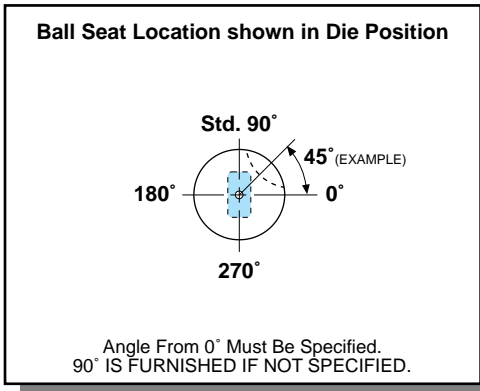


BEHH™
 BALL-LOCK
 EJECTOR
 HEAVY-DUTY
 HIGH PRODUCTION

The Lane "H" High Production punch and die will outproduce any sharp cornered rectangle or square, same steel, same clearance, punch to die.

**Ordering Example:
 (12) BEHH 10-19-63 M2 P3.1 W1.7 BS-0B**

M2, R/c 61-63 triple tempered

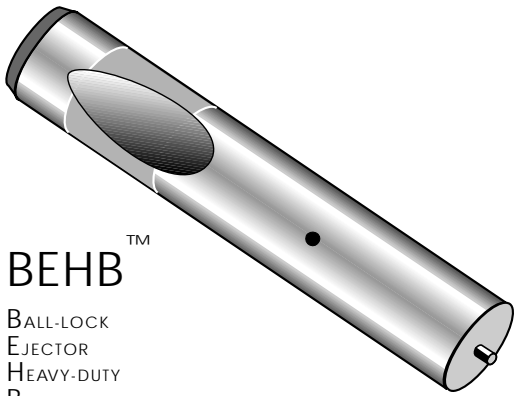


TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"							MIN. "W"	EJECT. TYPE
		10	13	19	25	32	63	71	80	90	100	110	125		
BEHH	10	10	13	19			63	71	80	90	100			2.9	E4M
BEHH	13		13	19			63	71	80	90	100	110	125	4.0	E6M
BEHH	16		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHH	20		13	19	25		63	71	80	90	100	110	125	6.0	E9M
BEHH	25		13	19	25			71	80	90	100	110	125	8.0	E9M
BEHH	32		13	19	25			71	80	90	100	110	125	10.0	E12M
BEHH	40			19	25	32			80	90	100	110	125	12.0	E12M

For Matching Die Buttons:

General (Press-Fit)
 see page G28

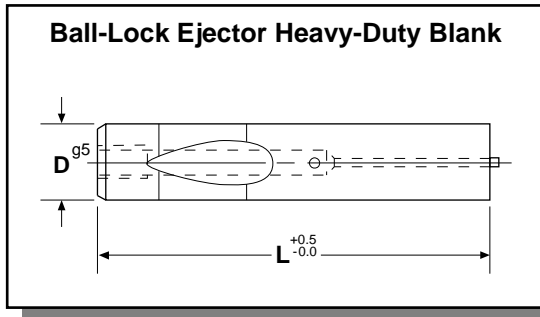
Ball-Lock
 see page B32



BEHB[™]
BALL-LOCK
EJECTOR
HEAVY-DUTY
BLANK

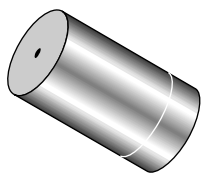
Ordering Example:
(15) BEHB 32-90 M2

M2, R/c 61-63 triple tempered

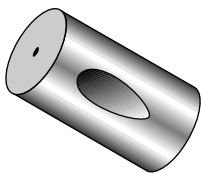


TYPE	"D"	OVERALL LENGTH "L"							EJECT. TYPE
		63	71	80	90	100	110	125	
BEHB	10	63	71	80	90	100			E4M
BEHB	13	63	71	80	90	100	110	125	E6M
BEHB	16	63	71	80	90	100	110	125	E9M
BEHB	20	63	71	80	90	100	110	125	E9M
BEHB	25		71	80	90	100	110	125	E9M
BEHB	32		71	80	90	100	110	125	E12M
BEHB	40			80	90	100	110	125	E12M

For Matching Die Buttons:

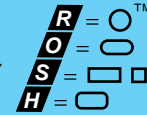


General (Press-Fit)
see page G29

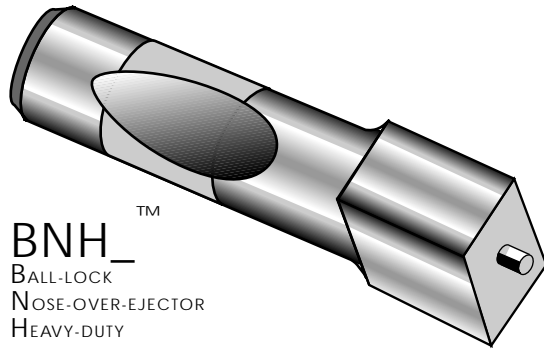


Ball-Lock
see page B33

Ball-Lock Nose-Over-Ejector Heavy Duty

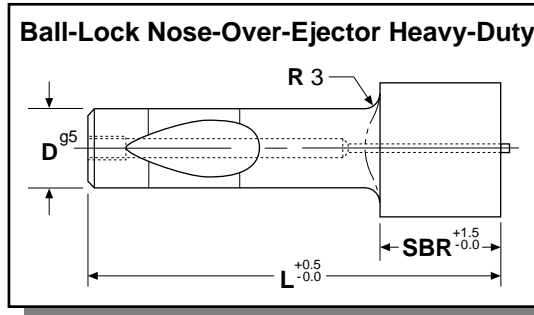
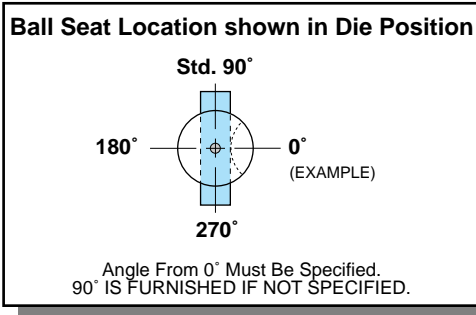


ANSI B94.18.1-1977



BNH_{__}
 BALL-LOCK
 NOSE-OVER-EJECTOR
 HEAVY-DUTY
 __ (R, O, S, or H)

Ordering Example:
(8) BNHR 25-25-90 M2 P32.4

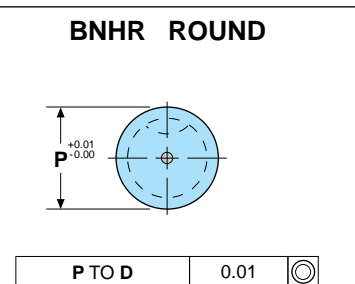


M2, R/c 61-63 triple tempered

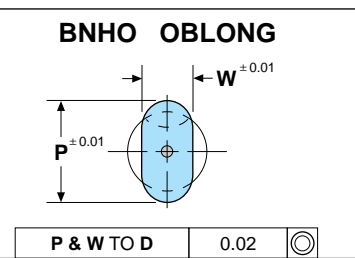
BNHS "G" = $\sqrt{P^2 + W^2}$

BNHH "G" = $\left(\sqrt{(P - 1.0)^2 + (W - 1.0)^2}\right) + 1.0$

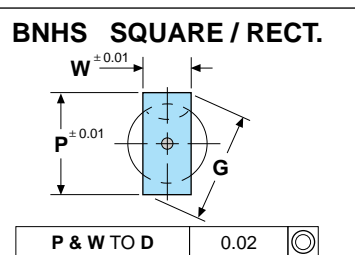
TYPE	"D"	POINT LENGTH "SBR"	OVERALL LENGTH "L"				MIN. "P"	MAX. "P"	EJECT. TYPE
			71	80	90	100			
BNHR	13	20	71	80	90	100	13.1	32.0	E6M
BNHR	16	25	71	80	90	100	16.1	38.0	E9M
BNHR	20	25	71	80	90	100	20.1	38.0	E9M
BNHR	25	25	71	80	90	100	25.1	45.0	E9M
BNHR	32	32		80	90	100	32.1	50.0	E12M
BNHR	40	32		80	90	100	40.1	63.5	E12M



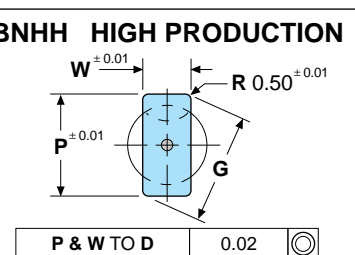
TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "P"	EJECT. TYPE
			71	80	90	100			
BNHO	13	20	71	80	90	100	5.0	32.0	E6M
BNHO	16	25	71	80	90	100	6.5	38.0	E9M
BNHO	20	25	71	80	90	100	8.0	38.0	E9M
BNHO	25	25	71	80	90	100	11.0	45.0	E9M
BNHO	32	32		80	90	100	12.5	50.0	E12M
BNHO	40	32		80	90	100	14.0	63.5	E12M

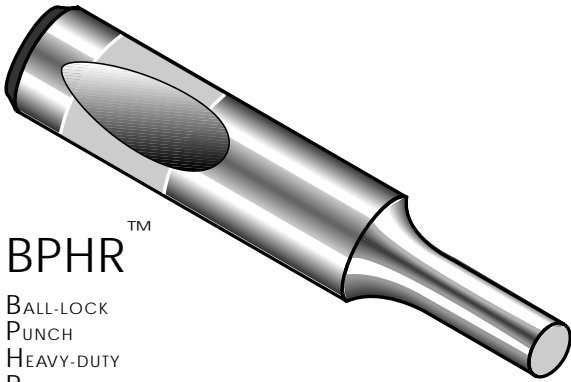


TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "G"	EJECT. TYPE
			71	80	90	100			
BNHS	13	20	71	80	90	100	5.0	32.0	E6M
BNHS	16	25	71	80	90	100	6.5	38.0	E9M
BNHS	20	25	71	80	90	100	8.0	38.0	E9M
BNHS	25	25	71	80	90	100	11.0	45.0	E9M
BNHS	32	32		80	90	100	12.5	50.0	E12M
BNHS	40	32		80	90	100	14.0	63.5	E12M



TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "G"	EJECT. TYPE
			71	80	90	100			
BNHH	13	20	71	80	90	100	5.0	32.0	E6M
BNHH	16	25	71	80	90	100	6.5	38.0	E9M
BNHH	20	25	71	80	90	100	8.0	38.0	E9M
BNHH	25	25	71	80	90	100	11.0	45.0	E9M
BNHH	32	32		80	90	100	12.5	50.0	E12M
BNHH	40	32		80	90	100	14.0	63.5	E12M

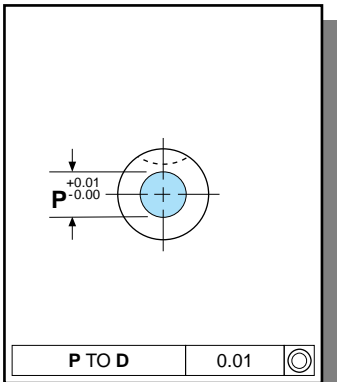
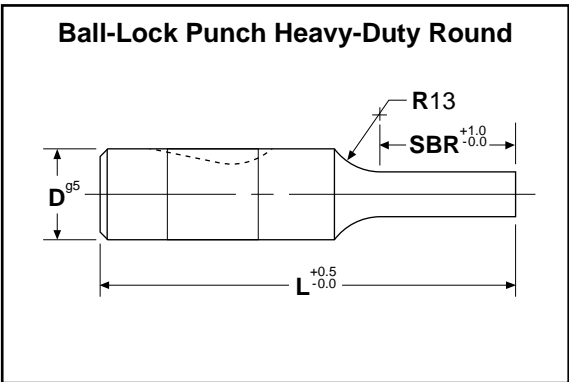




BPHR™
BALL-LOCK
PUNCH
HEAVY-DUTY
ROUND

Ordering Example:
(12) BPHR 13-13-71 M2 P10.1

M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"							MIN. "P"
		10	13	19	25	32	63	71	80	90	100	110	125	
BPHR	10	10	13	19			63	71	80	90	100			1.4
BPHR	13		13	19			63	71	80	90	100	110	125	2.1
BPHR	16		13	19	25		63	71	80	90	100	110	125	5.0
BPHR	20		13	19	25		63	71	80	90	100	110	125	6.0
BPHR	25		13	19	25			71	80	90	100	110	125	8.0
BPHR	32		13	19	25			71	80	90	100	110	125	10.0
BPHR	40			19	25	32			80	90	100	110	125	12.0

For Matching Die Buttons:

General (Press-Fit)
see page G25

Ball-Lock
see page B31

Formula for Calculating "B" Dimension

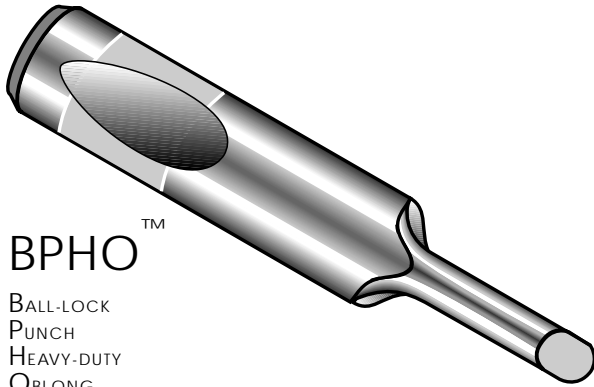
$$B = \sqrt{R^2 - \left(R - \left(\frac{D - P}{2}\right)\right)^2} + SBR$$

EXAMPLE:

BPHR 13-13-71 M2 P10.1
R = 13, D = 13, SBR = 13, P = 10.1

$$B = \sqrt{13^2 - \left(13 - \left(\frac{13 - 10.1}{2}\right)\right)^2} + 13$$

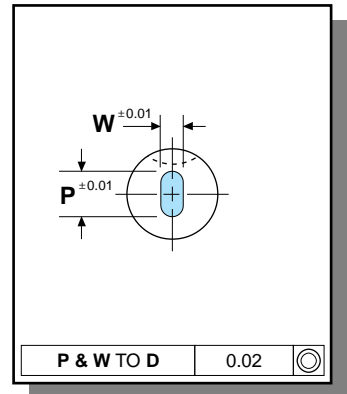
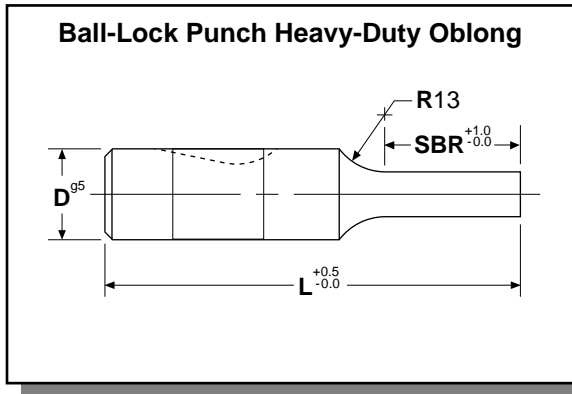
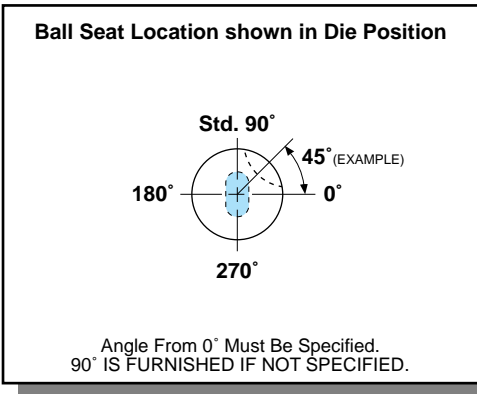
B = 18.9



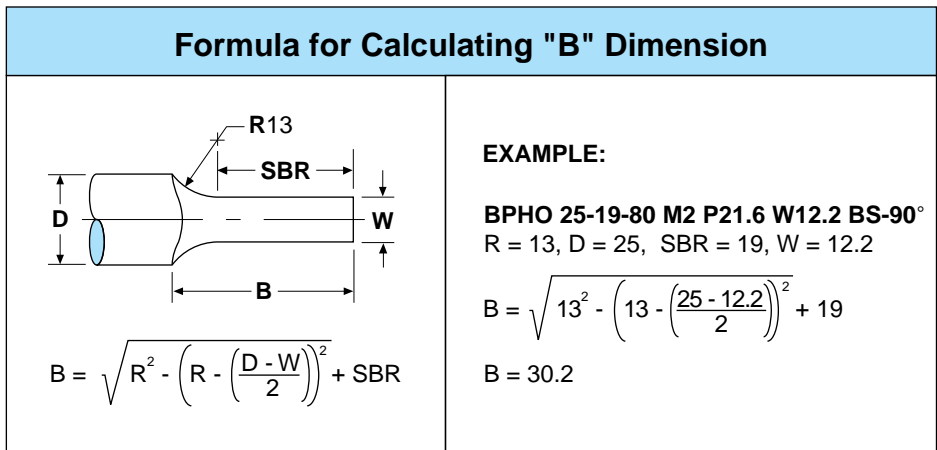
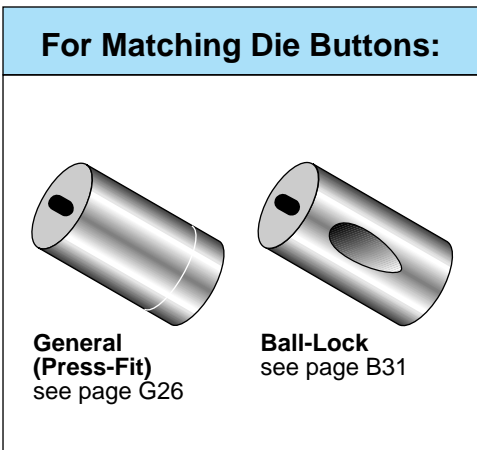
BPHO™
 BALL-LOCK
 PUNCH
 HEAVY-DUTY
 OBLONG

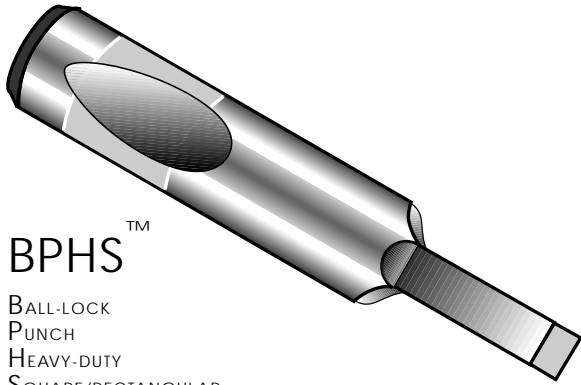
Ordering Example:
(15) BPHO 25-19-80 M2 P21.6 W12.2 BS-90B

M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"								MIN. "W"
		10	13	19	25	32	63	71	80	90	100	110	125		
BPHO	10	10	13	19			63	71	80	90	100			1.4	
BPHO	13		13	19			63	71	80	90	100	110	125	2.1	
BPHO	16		13	19	25		63	71	80	90	100	110	125	5.0	
BPHO	20		13	19	25		63	71	80	90	100	110	125	6.0	
BPHO	25		13	19	25			71	80	90	100	110	125	8.0	
BPHO	32		13	19	25			71	80	90	100	110	125	10.0	
BPHO	40			19	25	32			80	90	100	110	125	12.0	

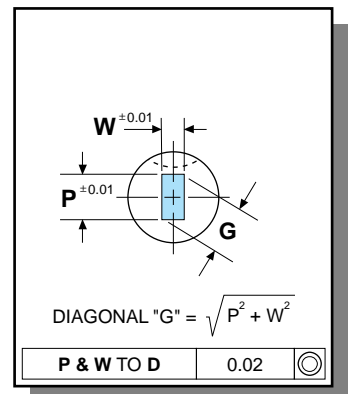
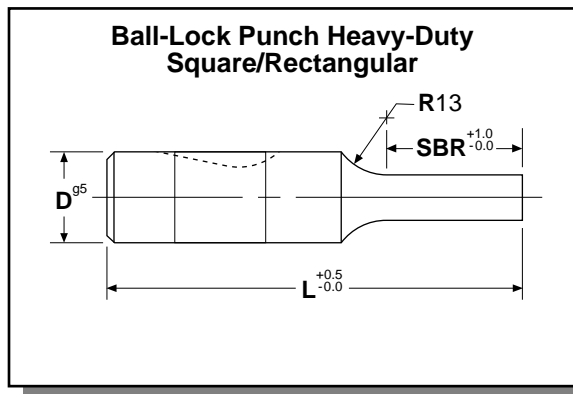
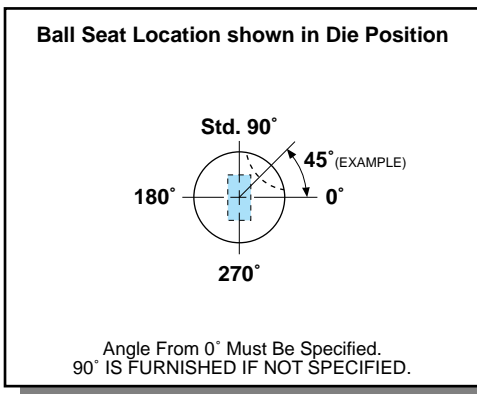




BPHSTM
BALL-LOCK
PUNCH
HEAVY-DUTY
SQUARE/RECTANGULAR

Ordering Example:
(10) BPHS 32-25-90 M2 P24.2 W18.6 BS-90;

M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"							MIN. "W"
		10	13	19	25	32	63	71	80	90	100	110	125	
BPHS	10	10	13	19			63	71	80	90	100			1.4
BPHS	13		13	19			63	71	80	90	100	110	125	2.1
BPHS	16		13	19	25		63	71	80	90	100	110	125	5.0
BPHS	20		13	19	25		63	71	80	90	100	110	125	6.0
BPHS	25		13	19	25			71	80	90	100	110	125	8.0
BPHS	32		13	19	25			71	80	90	100	110	125	10.0
BPHS	40			19	25	32			80	90	100	110	125	12.0

For Matching Die Buttons:

General (Press-Fit)
see page G27

Ball-Lock
see page B32

Formula for Calculating "B" Dimension

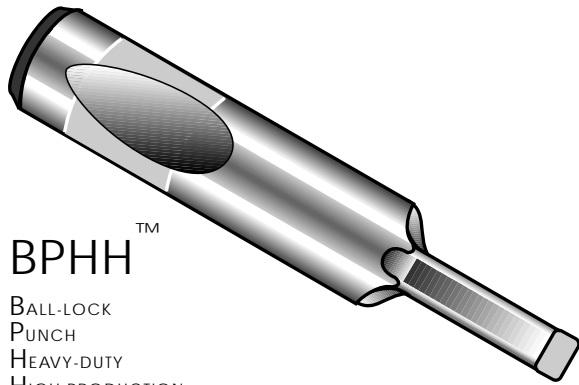
$$B = \sqrt{R^2 - \left(R - \left(\frac{D-W}{2}\right)\right)^2} + SBR$$

EXAMPLE:

BPHS 32-25-90 M2 P24.2 W18.6 BS-90°
R = 13, D = 32, SBR = 25, W = 18.6

$$B = \sqrt{13^2 - \left(13 - \left(\frac{32-18.6}{2}\right)\right)^2} + 25$$

B = 36.4

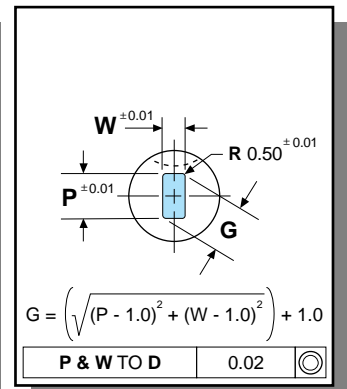
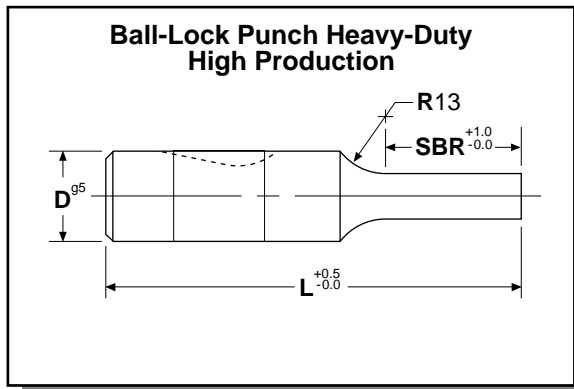
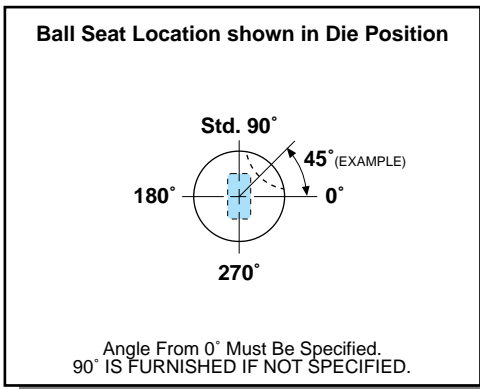


BPHH™
 BALL-LOCK
 PUNCH
 HEAVY-DUTY
 HIGH PRODUCTION

The Lane "H" High Production punch and die will outproduce any sharp cornered rectangle or square, same steel, same clearance, punch to die.

Ordering Example:
(12) BPHH 32-19-100 M2 P19.8 W17.4 BS-0B

M2, R/c 61-63 triple tempered

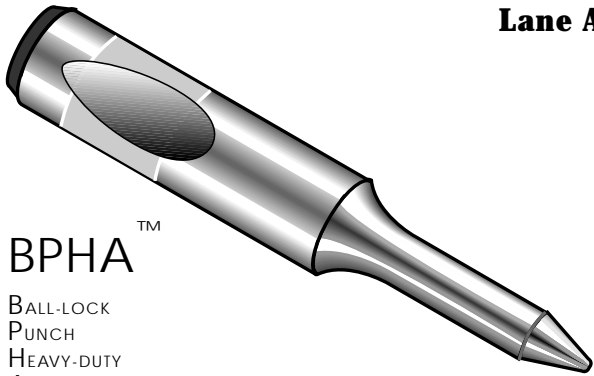


TYPE	"D"	POINT LENGTH "SBR"					OVERALL LENGTH "L"							MIN. "W"
		10	13	19	25	32	63	71	80	90	100	110	125	
BPHH	10	10	13	19			63	71	80	90	100			1.4
BPHH	13		13	19			63	71	80	90	100	110	125	2.1
BPHH	16		13	19	25		63	71	80	90	100	110	125	5.0
BPHH	20		13	19	25		63	71	80	90	100	110	125	6.0
BPHH	25		13	19	25			71	80	90	100	110	125	8.0
BPHH	32		13	19	25			71	80	90	100	110	125	10.0
BPHH	40			19	25	32			80	90	100	110	125	12.0

For Matching Die Buttons:

General (Press-Fit)
 see page G28

Ball-Lock
 see page B32



BPHA™
BALL-LOCK
PUNCH
HEAVY-DUTY
ANGULAR PILOT

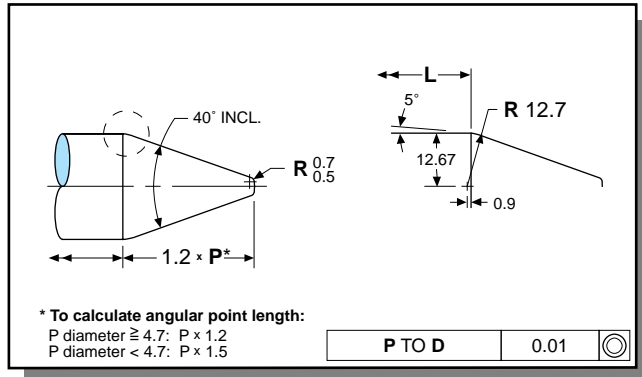
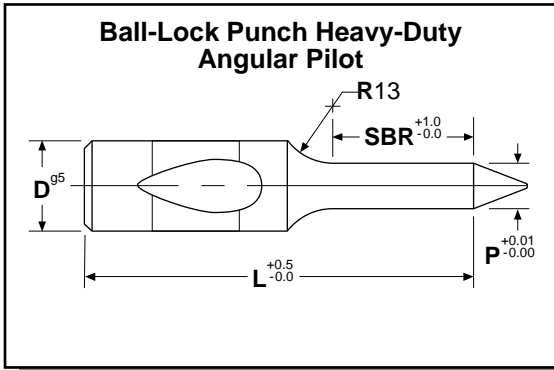
Lane Angular Pilots provide greater positioning (movement) of stock than Conventional Pilots.

Recommended for large Panel Dies or Transfer Dies common to the Automotive and Major Appliance Industries.

The Polished Angular Point (lead) reduces friction resulting in longer wear, less part distortion and improved stamping quality.

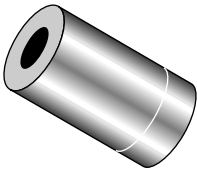
Ordering Example:
(12) BPHA 10-19-71 M2 P5.2

M2, R/c 61-63 triple tempered

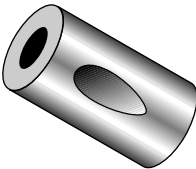


TYPE	"D"	POINT LENGTH "SBR"					LENGTH "L"										MIN. "P"
		10	13	19	25	32	63	71	80	90	100	110	125	140	150		
BPHA	10	10	13	19			63	71	80	90	100	110				1.3	
BPHA	13		13	19				71	80	90	100	110	125	140		2.0	
BPHA	16		13	19	25			71	80	90	100	110	125	140	150	4.9	
BPHA	20		13	19	25			71	80	90	100	110	125	140	150	5.9	
BPHA	25		13	19	25				80	90	100	110	125	140	150	7.9	
BPHA	32		13	19	25				80	90	100	110	125	140	150	9.9	
BPHA	40			19	25	32			80	90	100	110	125	140	150	11.9	

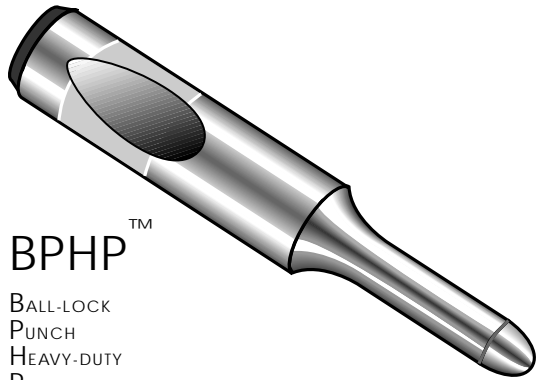
For Matching Die Buttons:



General (Press-Fit)
see page G25



Ball-Lock
see page B31



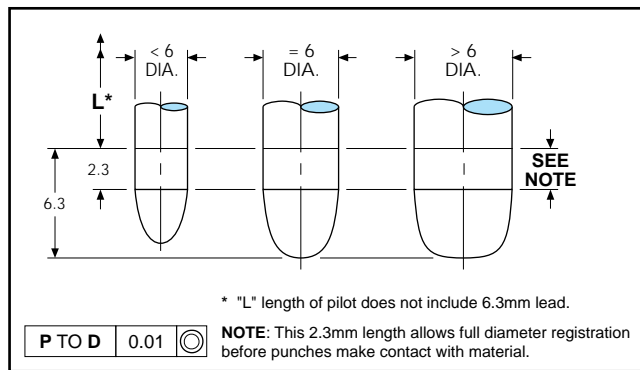
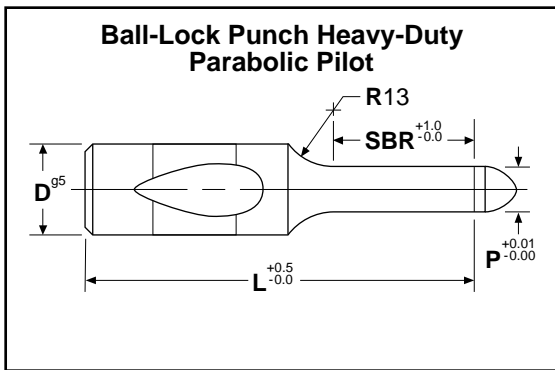
BPHP™
 BALL-LOCK
 PUNCH
 HEAVY-DUTY
 PARABOLIC PILOT

Lane Parabolic Pilots are recommended for light-gage, high-speed applications.

The Polished Parabolic Point (lead) reduces friction resulting in longer wear, less part distortion and improved stamping quality.

Ordering Example:
(15) BPHP 16-19-63 M2 P8.8

M2, R/c 61-63 triple tempered

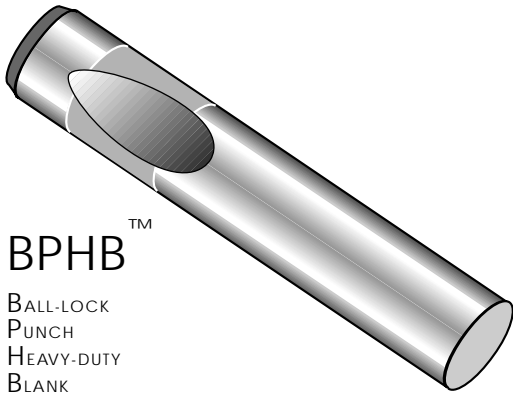


TYPE	"D"	POINT LENGTH "SBR"					LENGTH "L"							MIN. "P"
		10	13	19	25	32	63	71	80	90	100	110	125	
BPHP	10	10	13	19			63	71	80	90	100			1.3
BPHP	13		13	19			63	71	80	90	100	110	125	2.0
BPHP	16		13	19	25		63	71	80	90	100	110	125	4.9
BPHP	20		13	19	25		63	71	80	90	100	110	125	5.9
BPHP	25		13	19	25		63	71	80	90	100	110	125	7.9
BPHP	32		13	19	25			71	80	90	100	110	125	9.9
BPHP	40			19	25	32			80	90	100	110	125	11.9

For Matching Die Buttons:

General (Press-Fit)
see page G25

Ball-Lock
see page B31

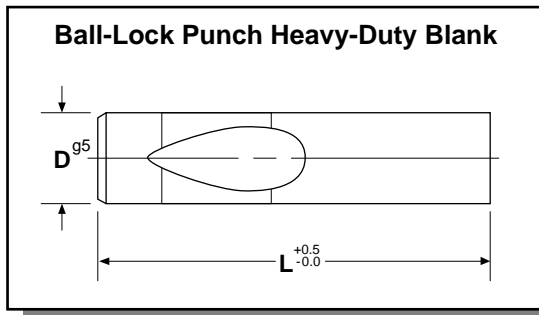


BPHB™

BALL-LOCK
PUNCH
HEAVY-DUTY
BLANK

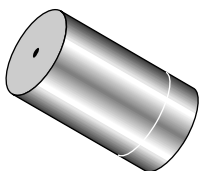
Ordering Example:
(12) BPHB 32-125 M2

M2, R/c 61-63 triple tempered

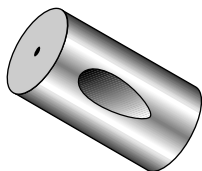


TYPE	"D"	OVERALL LENGTH "L"										
		63	71	80	90	100	110	125	140	150	175	200
BPHB	10	63	71	80	90	100	110	125				
BPHB	13	63	71	80	90	100	110	125	140	150	175	
BPHB	16	63	71	80	90	100	110	125	140	150	175	
BPHB	20	63	71	80	90	100	110	125	140	150	175	
BPHB	25		71	80	90	100	110	125	140	150	175	200
BPHB	32		71	80	90	100	110	125	140	150	175	200
BPHB	40			80	90	100	110	125	140	150	175	200

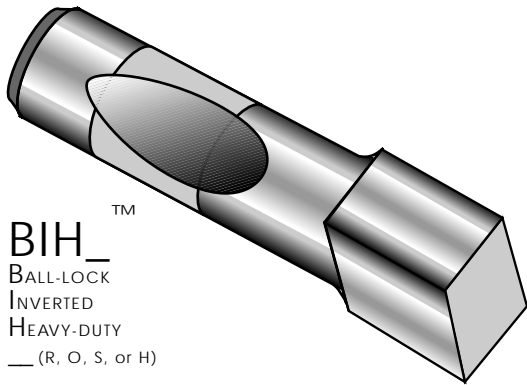
For Matching Die Buttons:



General (Press-Fit)
see page G29



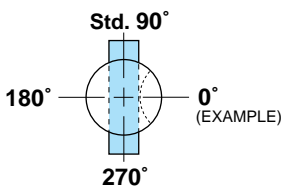
Ball-Lock
see page B33



BIH_—
BALL-LOCK
INVERTED
HEAVY-DUTY
— (R, O, S, or H)

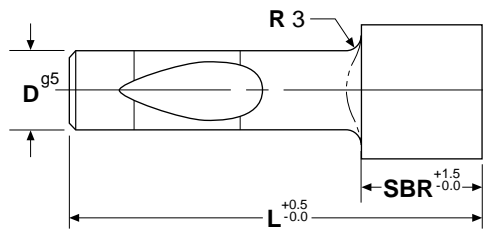
Ordering Example:
(9) BIHR 25-25-90 M2 P32.4

Ball Seat Location shown in Die Position



Angle From 0° Must Be Specified.
90° IS FURNISHED IF NOT SPECIFIED.

Ball-Lock Inverted Heavy-Duty



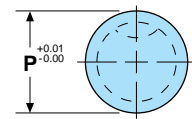
M2, R/c 61-63 triple tempered

$$\text{BIHS "G"} = \sqrt{P^2 + W^2}$$

$$\text{BIHH "G"} = \left(\sqrt{(P - 1.0)^2 + (W - 1.0)^2} \right) + 1.0$$

TYPE	"D"	POINT LENGTH "SBR"	OVERALL LENGTH "L"				MIN. "P"	MAX. "P"
			71	80	90	100		
BIHR	13	20	71	80	90	100	13.1	32.0
BIHR	16	25	71	80	90	100	16.1	38.0
BIHR	20	25	71	80	90	100	20.1	38.0
BIHR	25	25	71	80	90	100	25.1	45.0
BIHR	32	32		80	90	100	32.1	50.0
BIHR	40	32		80	90	100	40.1	63.5

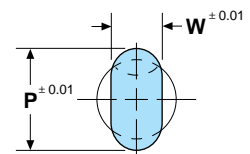
BIHR ROUND



P TO D 0.01

TYPE	"D"	"SBR"	71	80	90	100	MIN. "W"	MAX. "P"
BIHO	13	20	71	80	90	100	5.0	32.0
BIHO	16	25	71	80	90	100	6.5	38.0
BIHO	20	25	71	80	90	100	8.0	38.0
BIHO	25	25	71	80	90	100	11.0	45.0
BIHO	32	32		80	90	100	12.5	50.0
BIHO	40	32		80	90	100	14.0	63.5

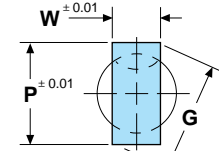
BIHO OBLONG



P & W TO D 0.02

TYPE	"D"	"SBR"	71	80	90	100	MIN. "W"	MAX. "G"
BIHS	13	20	71	80	90	100	5.0	32.0
BIHS	16	25	71	80	90	100	6.5	38.0
BIHS	20	25	71	80	90	100	8.0	38.0
BIHS	25	25	71	80	90	100	11.0	45.0
BIHS	32	32		80	90	100	12.5	50.0
BIHS	40	32		80	90	100	14.0	63.5

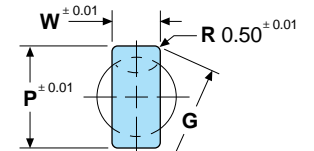
BIHS SQUARE / RECT.



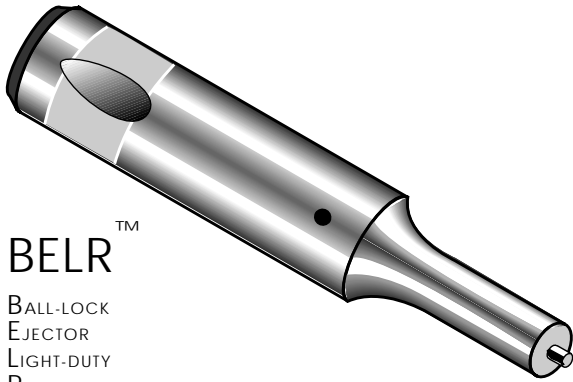
P & W TO D 0.02

TYPE	"D"	"SBR"	71	80	90	100	MIN. "W"	MAX. "G"
BIHH	13	20	71	80	90	100	5.0	32.0
BIHH	16	25	71	80	90	100	6.5	38.0
BIHH	20	25	71	80	90	100	8.0	38.0
BIHH	25	25	71	80	90	100	11.0	45.0
BIHH	32	32		80	90	100	12.5	50.0
BIHH	40	32		80	90	100	14.0	63.5

BIHH HIGH PRODUCTION



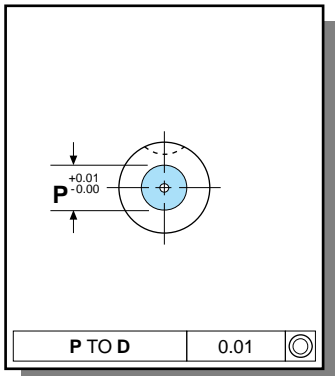
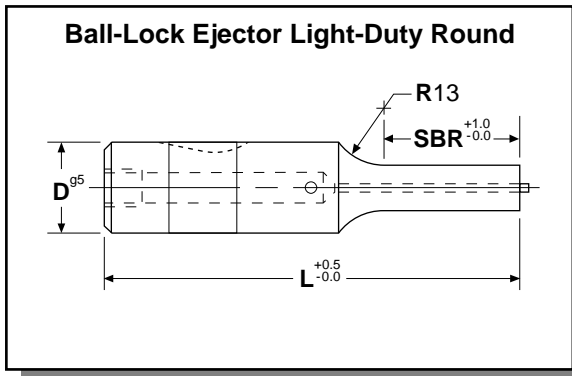
P & W TO D 0.02



BELR™
BALL-LOCK
EJECTOR
LIGHT-DUTY
ROUND

Ordering Example:
(12) BELR 13-13-71 M2 P10.1

A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"							MIN. "P"	EJECT. TYPE
		8	13	19	25	50	56	63	71	80	90	100		
BELR	6	8	13			50	56	63	71	80			1.9	E2AM
BELR	10		13	19		50	56	63	71	80	90	100	2.9	E4M
BELR	13		13	19		50	56	63	71	80	90	100	4.0	E6M
BELR	16		13	19	25		56	63	71	80	90	100	6.0	E9M
BELR	20		13	19	25		56	63	71	80	90	100	6.0	E9M
BELR	25		13	19	25		56	63	71	80	90	100	8.0	E9M
BELR	32		13	19	25				71	80	90	100	10.0	E12M
BELR	38			19	25					80	90	100	12.0	E12M

L = 50, max. SBR = 13
L = 56, max. SBR = 19

For Matching Die Buttons:

General (Press-Fit)
see page G25

Ball-Lock
see page B31

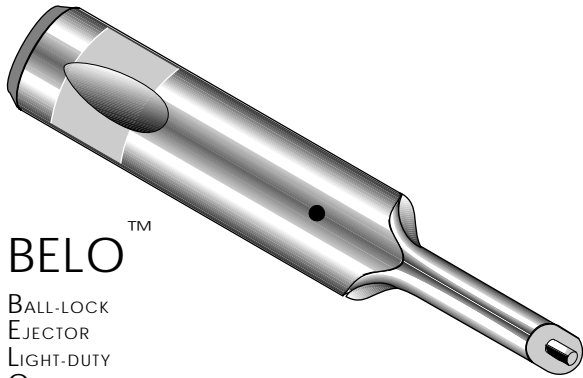
Formula for Calculating "B" Dimension

EXAMPLE:

BELR 13-13-71 M2 P10.1
R = 13, D = 13, SBR = 13, P = 10.1

$$B = \sqrt{13^2 - \left(13 - \left(\frac{13 - 10.1}{2}\right)\right)^2} + 13$$

B = 18.9

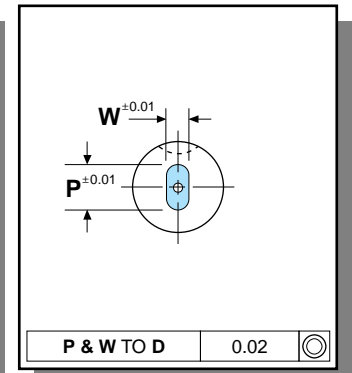
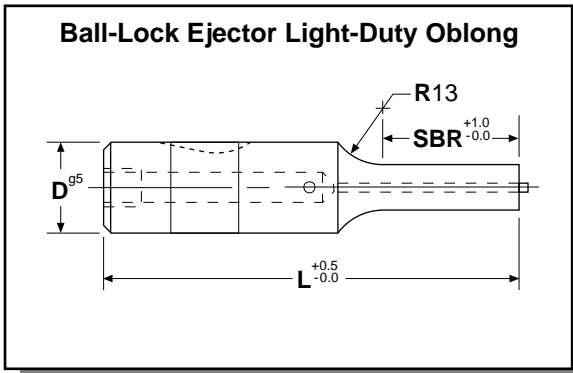
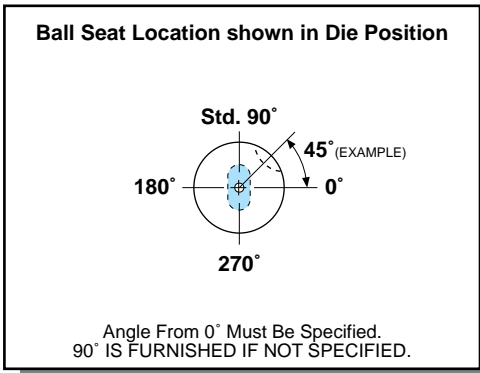


BELO™

BALL-LOCK
EJECTOR
LIGHT-DUTY
OBLONG

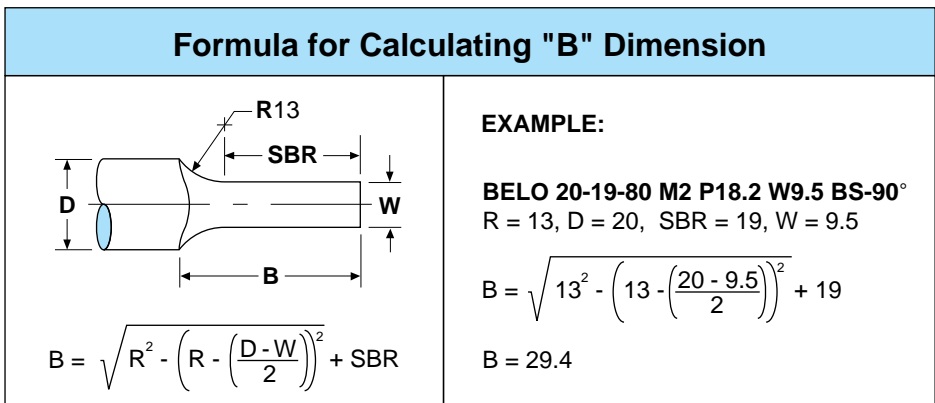
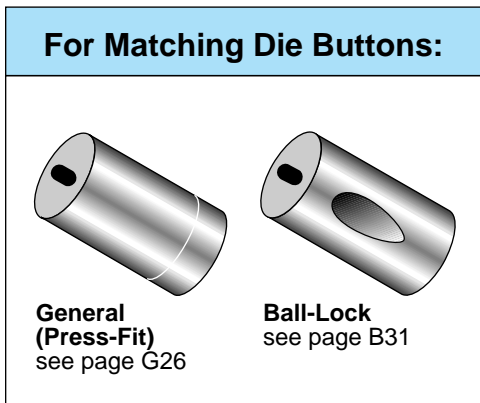
**Ordering Example:
(12) BELO 20-19-80 M2 P18.2 W9.5 BS-90B**

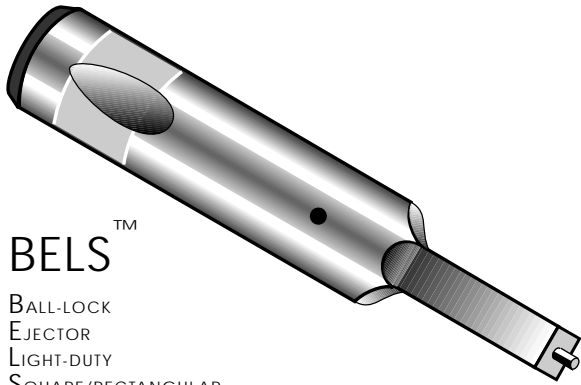
A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"							MIN. "W"	EJECT. TYPE
		8	13	19	25	50	56	63	71	80	90	100		
BELO	6	8	13			50	56	63	71	80			1.9	E2AM
BELO	10		13	19		50	56	63	71	80	90	100	2.9	E4M
BELO	13		13	19		50	56	63	71	80	90	100	4.0	E6M
BELO	16		13	19	25		56	63	71	80	90	100	6.0	E9M
BELO	20		13	19	25		56	63	71	80	90	100	6.0	E9M
BELO	25		13	19	25		56	63	71	80	90	100	8.0	E9M
BELO	32		13	19	25				71	80	90	100	10.0	E12M
BELO	38			19	25					80	90	100	12.0	E12M

L = 50, max. SBR = 13
L = 56, max. SBR = 19

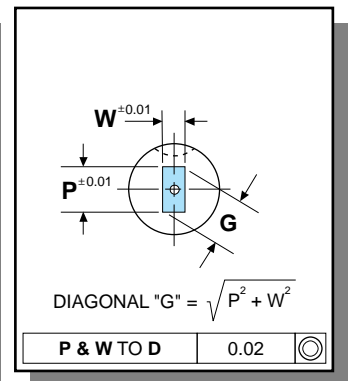
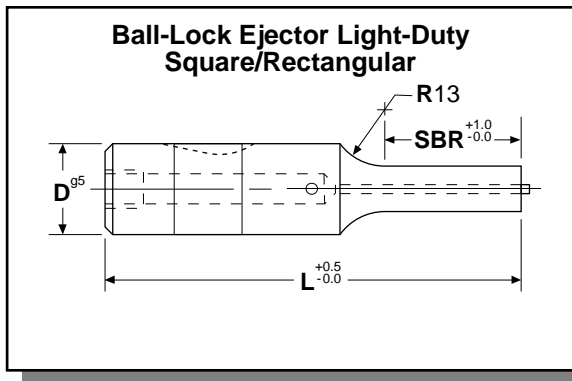
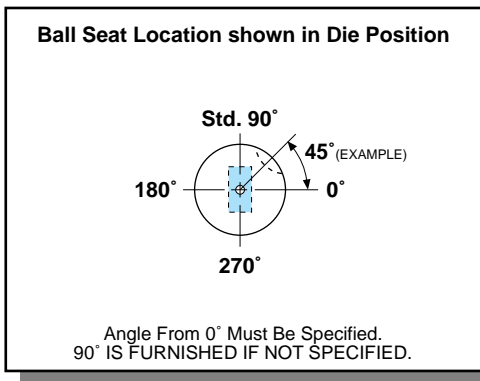




BELS™
BALL-LOCK
EJECTOR
LIGHT-DUTY
SQUARE/RECTANGULAR

Ordering Example:
(15) BELS 16-25-80 M2 P9.4 W9.4 BS-90;

A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"								MIN. "W"	EJECT. TYPE
		8	13	19	25	50	56	63	71	80	90	100			
BELS	6	8	13			50	56	63	71	80			1.9	E2AM	
BELS	10		13	19		50	56	63	71	80	90	100	2.9	E4M	
BELS	13		13	19		50	56	63	71	80	90	100	4.0	E6M	
BELS	16		13	19	25		56	63	71	80	90	100	6.0	E9M	
BELS	20		13	19	25		56	63	71	80	90	100	6.0	E9M	
BELS	25		13	19	25		56	63	71	80	90	100	8.0	E9M	
BELS	32		13	19	25				71	80	90	100	10.0	E12M	
BELS	38			19	25					80	90	100	12.0	E12M	

L = 50, max. SBR = 13
L = 56, max. SBR = 19

For Matching Die Buttons:

General (Press-Fit)
see page G27

Ball-Lock
see page B32

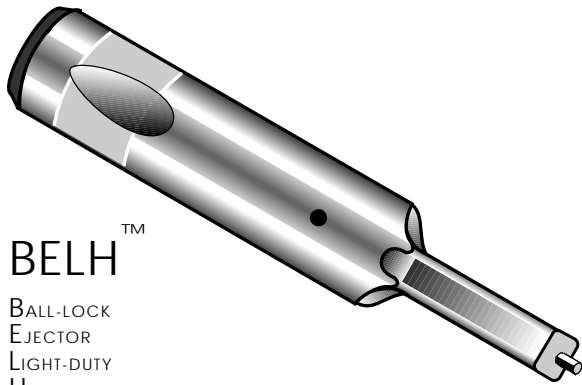
Formula for Calculating "B" Dimension

EXAMPLE:

BELS 16-25-80 M2 P9.4 W9.4 BS-90°
R = 13, D = 16, SBR = 25, W = 9.4

$$B = \sqrt{13^2 - \left(13 - \left(\frac{16 - 9.4}{2}\right)\right)^2} + 25$$

B = 33.7

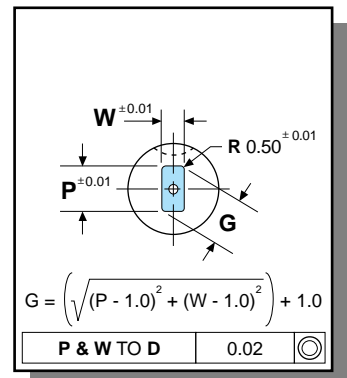
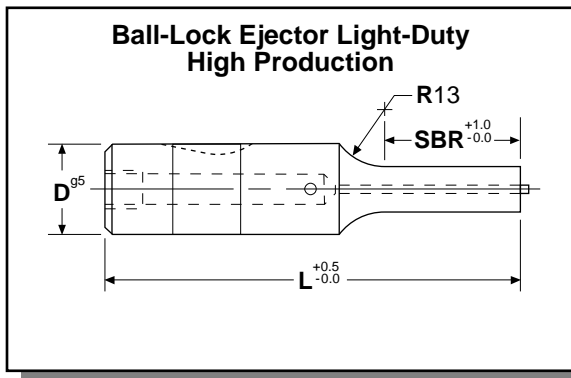
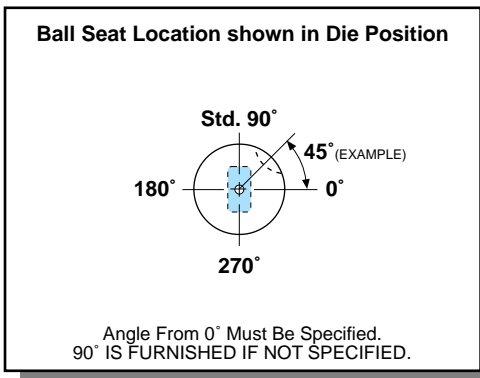


BELH™
BALL-LOCK
EJECTOR
LIGHT-DUTY
HIGH PRODUCTION

The Lane "H" High Production punch and die will outproduce any sharp cornered rectangle or square, same steel, same clearance, punch to die.

**Ordering Example:
(12) BELH 10-19-63 M2 P3.1 W2.9 BS-0B**

A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered



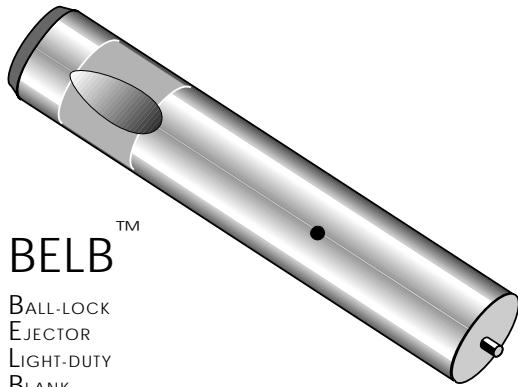
TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"							MIN. "W"	EJECT. TYPE
		8	13	19	25	50	56	63	71	80	90	100		
BELH	6	8	13			50	56	63	71	80			1.9	E2AM
BELH	10		13	19		50	56	63	71	80	90	100	2.9	E4M
BELH	13		13	19		50	56	63	71	80	90	100	4.0	E6M
BELH	16		13	19	25		56	63	71	80	90	100	6.0	E9M
BELH	20		13	19	25		56	63	71	80	90	100	6.0	E9M
BELH	25		13	19	25		56	63	71	80	90	100	8.0	E9M
BELH	32		13	19	25				71	80	90	100	10.0	E12M
BELH	38			19	25					80	90	100	12.0	E12M

L = 50, max. SBR = 13
L = 56, max. SBR = 19

For Matching Die Buttons:

General (Press-Fit)
see page G28

Ball-Lock
see page B32

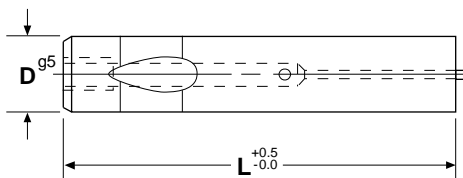


BELB™
BALL-LOCK
EJECTOR
LIGHT-DUTY
BLANK

Ordering Example:
(15) BELB 32-90 M2

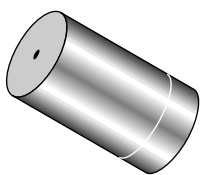
A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered

Ball-Lock Ejector Light-Duty Blank

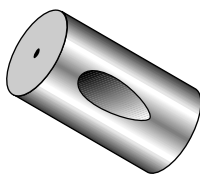


TYPE	"D"	OVERALL LENGTH "L"							EJECT. TYPE
		50	56	63	71	80	90	100	
BELB	6	50	56	63	71	80			E2AM
BELB	10	50	56	63	71	80	90	100	E4M
BELB	13	50	56	63	71	80	90	100	E6M
BELB	16		56	63	71	80	90	100	E9M
BELB	20		56	63	71	80	90	100	E9M
BELB	25		56	63	71	80	90	100	E9M
BELB	32				71	80	90	100	E12M
BELB	38					80	90	100	E12M

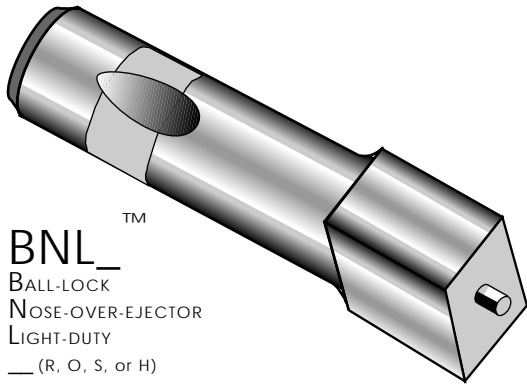
For Matching Die Buttons:



General (Press-Fit)
see page G29

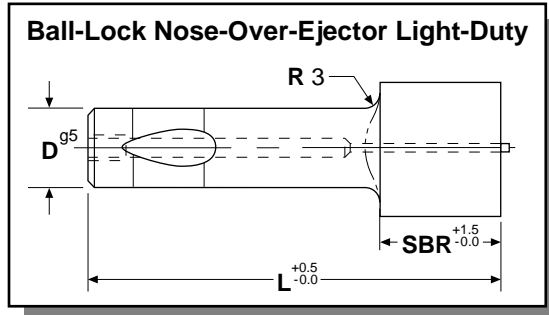
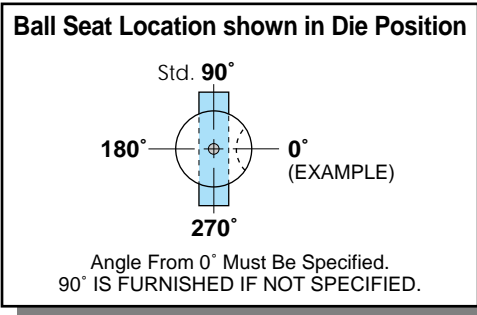


Ball-Lock
see page B33



BNLTM
 BALL-LOCK
 NOSE-OVER-EJECTOR
 LIGHT-DUTY
 ___ (R, O, S, or H)

Ordering Example:
(8) BNLR 25-25-90 M2 P32.4

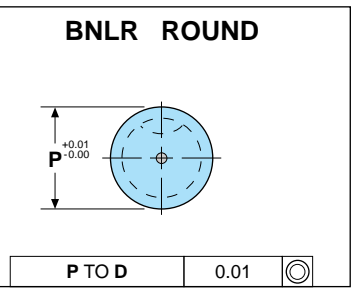


M2, R/c 61-63 triple tempered

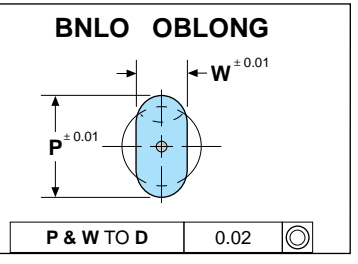
$$\text{BNLS "G"} = \sqrt{P^2 + W^2}$$

$$\text{BNLH "G"} = \left(\sqrt{(P - 1.0)^2 + (W - 1.0)^2} \right) + 1.0$$

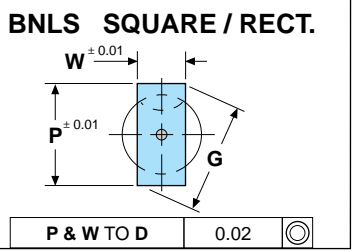
TYPE	"D"	POINT LENGTH "SBR"	OVERALL LENGTH "L"				MIN. "P"	MAX. "P"	EJECT. TYPE
			71	80	90	100			
BNLR	10	16	71	80	90	100	10.1	22.0	E4M
BNLR	13	20	71	80	90	100	13.1	32.0	E6M
BNLR	16	25	71	80	90	100	16.1	38.0	E9M
BNLR	20	25	71	80	90	100	20.1	38.0	E9M
BNLR	25	25	71	80	90	100	25.1	45.0	E9M
BNLR	32	32		80	90	100	32.1	50.0	E12M



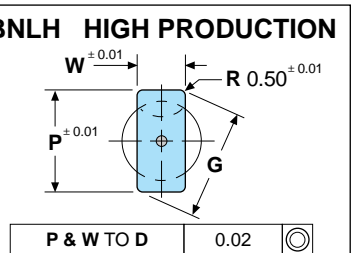
TYPE	"D"	"SBR"	71	80	90	100	MIN. "W"	MAX. "P"	EJECT. TYPE
BNLO	10	16	71	80	90	100	4.5	22.0	E4M
BNLO	13	20	71	80	90	100	5.0	32.0	E6M
BNLO	16	25	71	80	90	100	6.5	38.0	E9M
BNLO	20	25	71	80	90	100	8.0	38.0	E9M
BNLO	25	25	71	80	90	100	11.0	45.0	E9M
BNLO	32	32		80	90	100	12.5	50.0	E12M

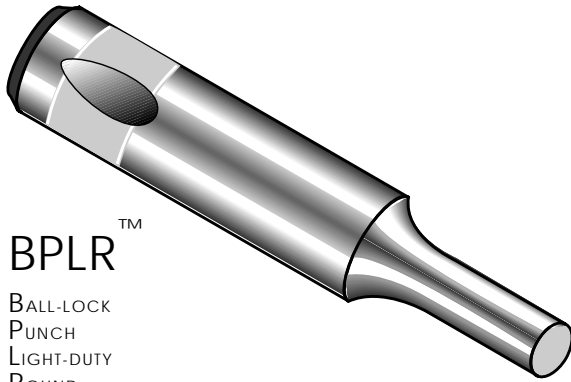


TYPE	"D"	"SBR"	71	80	90	100	MIN. "W"	MAX. "G"	EJECT. TYPE
BNLS	10	16	71	80	90	100	4.5	22.0	E4M
BNLS	13	20	71	80	90	100	5.0	32.0	E6M
BNLS	16	25	71	80	90	100	6.5	38.0	E9M
BNLS	20	25	71	80	90	100	8.0	38.0	E9M
BNLS	25	25	71	80	90	100	11.0	45.0	E9M
BNLS	32	32		80	90	100	12.5	50.0	E12M



TYPE	"D"	"SBR"	71	80	90	100	MIN. "W"	MAX. "G"	EJECT. TYPE
BNLH	10	16	71	80	90	100	4.5	22.0	E4M
BNLH	13	20	71	80	90	100	5.0	32.0	E6M
BNLH	16	25	71	80	90	100	6.5	38.0	E9M
BNLH	20	25	71	80	90	100	8.0	38.0	E9M
BNLH	25	25	71	80	90	100	11.0	45.0	E9M
BNLH	32	32		80	90	100	12.5	50.0	E12M

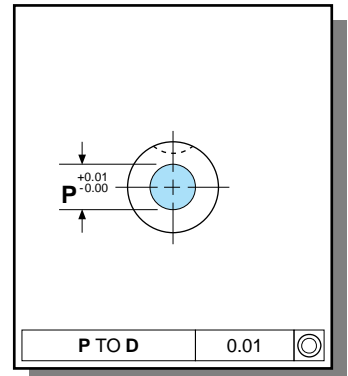
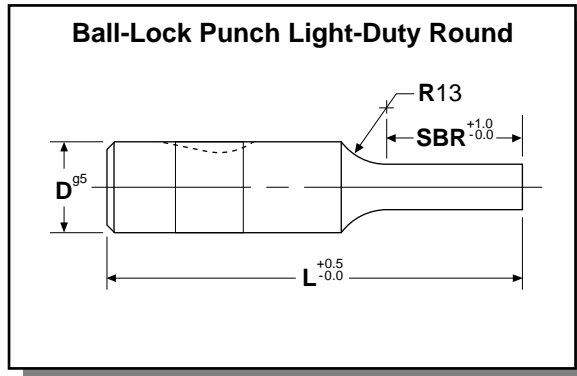




BPLR™
BALL-LOCK
PUNCH
LIGHT-DUTY
ROUND

Ordering Example:
(12) BPLR 6-13-63 M2 P4.2

A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"							MIN. "P"
		8	13	19	25	50	56	63	71	80	90	100	
BPLR	6	8	13			50	56	63	71	80			1.4
BPLR	10		13	19		50	56	63	71	80	90	100	1.4
BPLR	13		13	19		50	56	63	71	80	90	100	4.0
BPLR	16		13	19	25		56	63	71	80	90	100	6.0
BPLR	20		13	19	25		56	63	71	80	90	100	6.0
BPLR	25		13	19	25		56	63	71	80	90	100	8.0
BPLR	32		13	19	25				71	80	90	100	10.0
BPLR	38			19	25					80	90	100	12.0

L = 50, max. SBR = 13
L = 56, max. SBR = 19

For Matching Die Buttons:

General (Press-Fit)
see page G25

Ball-Lock
see page B31

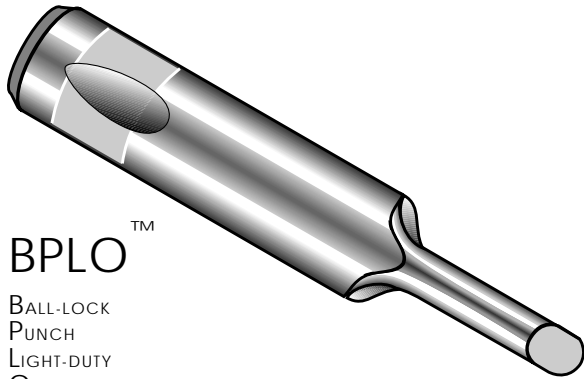
Formula for Calculating "B" Dimension

$$B = \sqrt{R^2 - \left(R - \left(\frac{D-P}{2}\right)\right)^2} + SBR$$

EXAMPLE:
BPLR 6-13-63 M2 P4.2
R = 13, D = 6, SBR = 13, P = 4.2

$$B = \sqrt{13^2 - \left(13 - \left(\frac{6 - 4.2}{2}\right)\right)^2} + 13$$

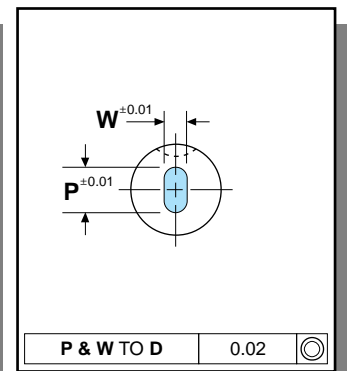
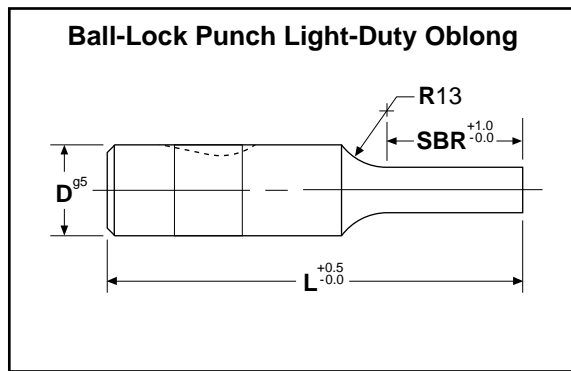
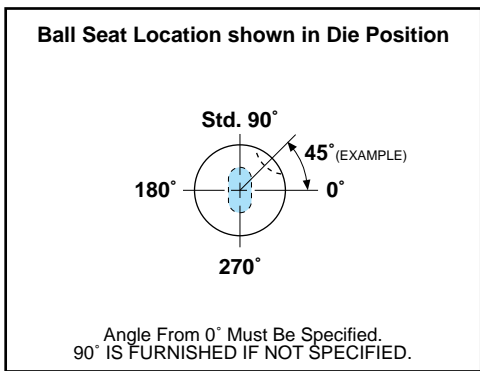
B = 17.8



BPLO™
 BALL-LOCK
 PUNCH
 LIGHT-DUTY
 OBLONG

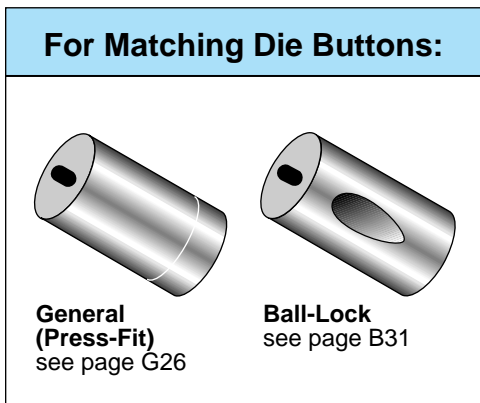
Ordering Example:
(15) BPLO 25-19-80 M2 P21.6 W12.2 BS-90B

A2, R/c 59-61 double tempered
 M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"							MIN. "W"
		8	13	19	25	50	56	63	71	80	90	100	
BPLO	6	8	13			50	56	63	71	80			1.4
BPLO	10		13	19		50	56	63	71	80	90	100	1.4
BPLO	13		13	19		50	56	63	71	80	90	100	4.0
BPLO	16		13	19	25		56	63	71	80	90	100	6.0
BPLO	20		13	19	25		56	63	71	80	90	100	6.0
BPLO	25		13	19	25		56	63	71	80	90	100	8.0
BPLO	32		13	19	25				71	80	90	100	10.0
BPLO	38			19	25					80	90	100	12.0

L = 50, max. SBR = 13
 L = 56, max. SBR = 19

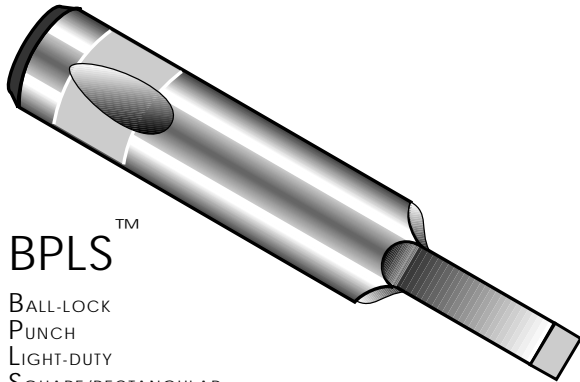


Formula for Calculating "B" Dimension

EXAMPLE:
BPLO 25-19-80 M2 P21.6 W12.2 BS-90°
 R = 13, D = 25, SBR = 19, W = 12.2

$$B = \sqrt{13^2 - \left(13 - \left(\frac{25 - 12.2}{2}\right)\right)^2} + 19$$

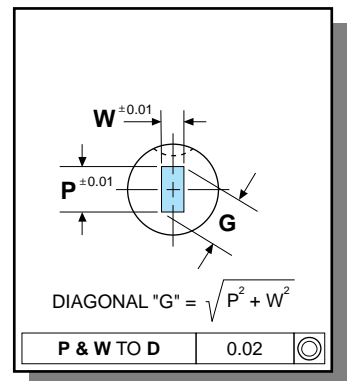
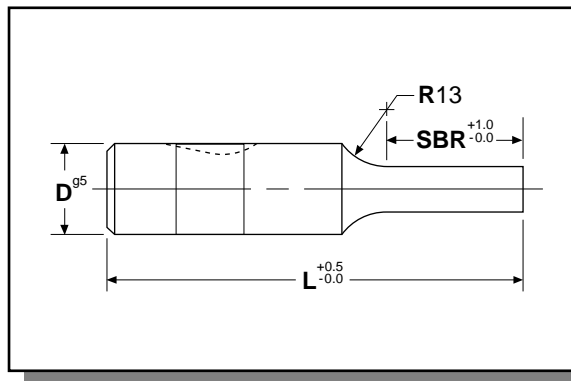
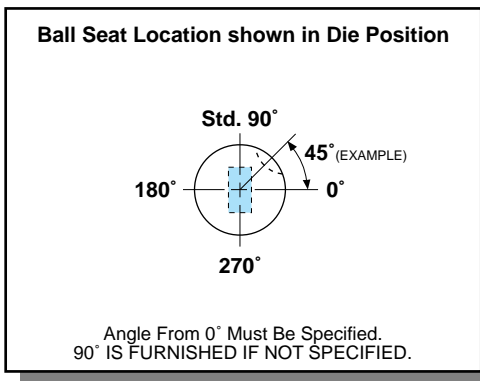
B = 30.2



BPLS™
BALL-LOCK
PUNCH
LIGHT-DUTY
SQUARE/RECTANGULAR

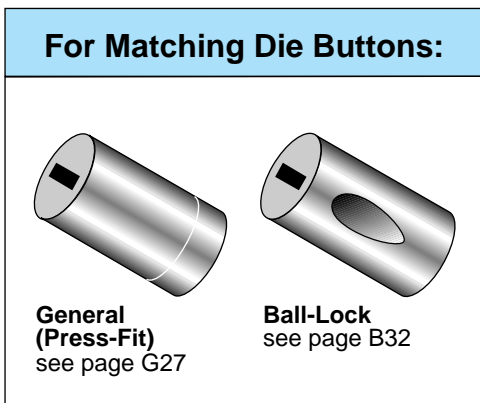
Ordering Example:
(10) BPLS 32-25-90 M2 P24.2 W18.6 BS-90;

A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered



TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"							MIN. "W"
		8	13	19	25	50	56	63	71	80	90	100	
BPLS	6	8	13			50	56	63	71	80			1.4
BPLS	10		13	19		50	56	63	71	80	90	100	1.4
BPLS	13		13	19		50	56	63	71	80	90	100	4.0
BPLS	16		13	19	25		56	63	71	80	90	100	6.0
BPLS	20		13	19	25		56	63	71	80	90	100	6.0
BPLS	25		13	19	25		56	63	71	80	90	100	8.0
BPLS	32		13	19	25				71	80	90	100	10.0
BPLS	38			19	25					80	90	100	12.0

L = 50, max. SBR = 13
L = 56, max. SBR = 19



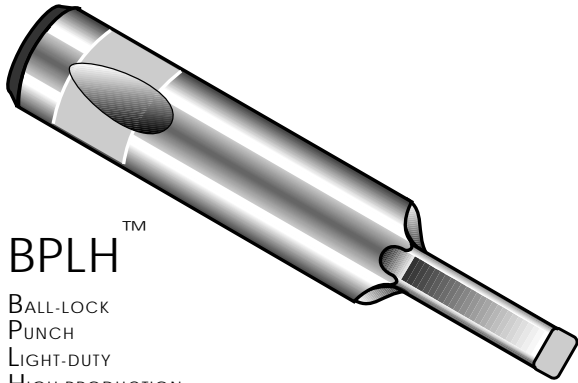
Formula for Calculating "B" Dimension

EXAMPLE:

BPLS 32-25-90 M2 P24.2 W18.6 BS-90°
R = 13, D = 32, SBR = 25, W = 18.6

$$B = \sqrt{13^2 - \left(13 - \left(\frac{32 - 18.6}{2}\right)\right)^2} + 25$$

B = 36.4

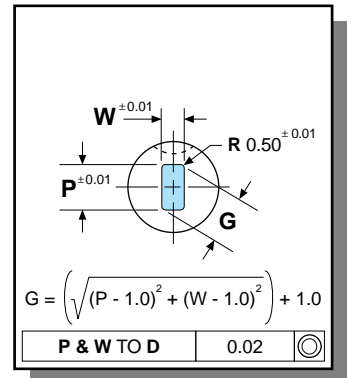
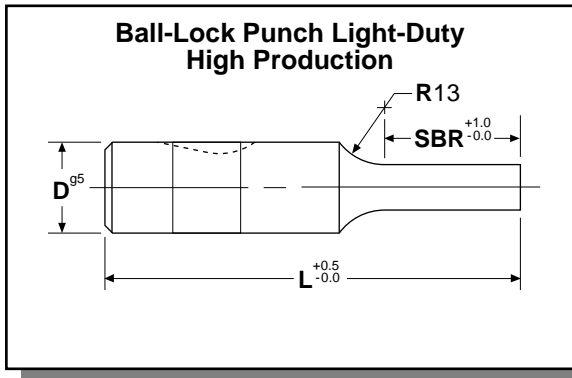
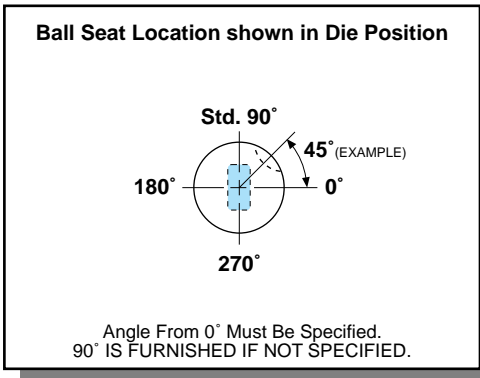


BPLH™
BALL-LOCK
PUNCH
LIGHT-DUTY
HIGH PRODUCTION

The Lane "H" High Production punch and die will outproduce any sharp cornered rectangle or square, same steel, same clearance, punch to die.

**Ordering Example:
(12) BPLH 38-19-100 M2 P19.8 W17.4 BS-0B**

A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered



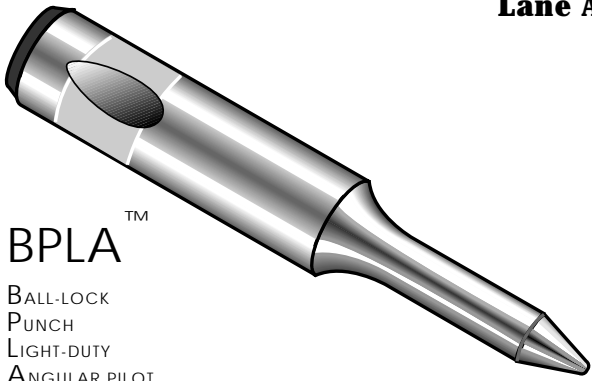
TYPE	"D"	POINT LENGTH "SBR"				OVERALL LENGTH "L"							MIN. "W"
		8	13	19	25	50	56	63	71	80	90	100	
BPLH	6	8	13			50	56	63	71	80			1.4
BPLH	10		13	19		50	56	63	71	80	90	100	1.4
BPLH	13		13	19		50	56	63	71	80	90	100	4.0
BPLH	16		13	19	25		56	63	71	80	90	100	6.0
BPLH	20		13	19	25		56	63	71	80	90	100	6.0
BPLH	25		13	19	25		56	63	71	80	90	100	8.0
BPLH	32		13	19	25				71	80	90	100	10.0
BPLH	38			19	25					80	90	100	12.0

L = 50, max. SBR = 13
L = 56, max. SBR = 19

For Matching Die Buttons:

General (Press-Fit)
see page G28

Ball-Lock
see page B32



BPLA™
BALL-LOCK
PUNCH
LIGHT-DUTY
ANGULAR PILOT

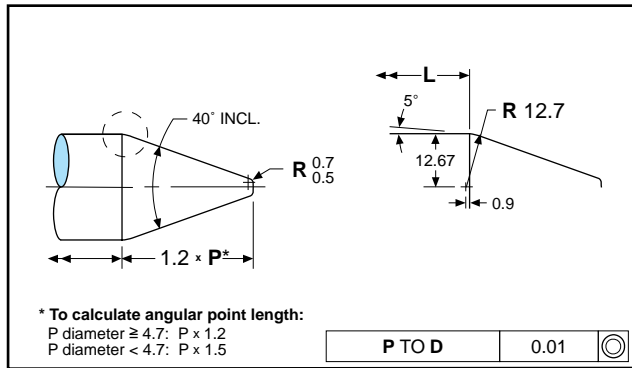
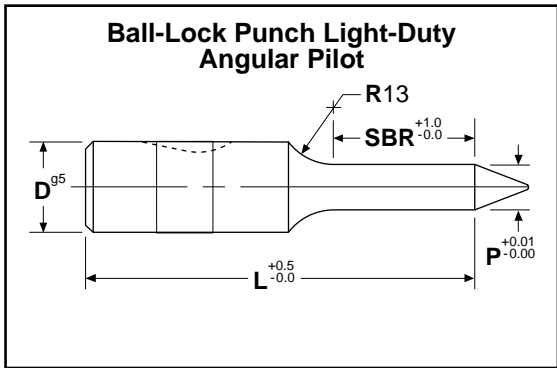
Lane Angular Pilots provide greater positioning (movement) of stock than Conventional Pilots.

Recommended for large Panel Dies or Transfer Dies common to the Automotive and Major Appliance Industries.

The Polished Angular Point (lead) reduces friction resulting in longer wear, less part distortion and improved stamping quality.

Ordering Example:
(12) BPLA 10-19-71 M2 P5.2

M2, R/c 61-63 triple tempered

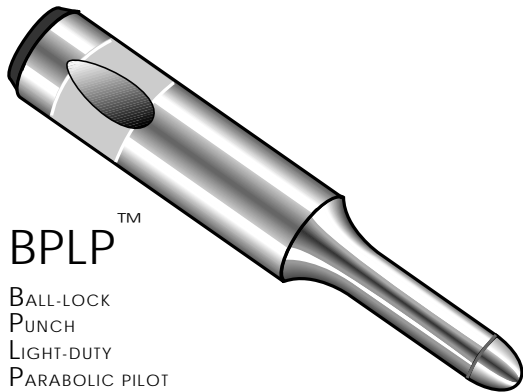


TYPE	"D"	POINT LENGTH "SBR"				LENGTH "L"									MIN. "P"
		8	13	19	25	63	71	80	90	100	110	125	140	150	
BPLA	6	8	13			63	71	80	90						1.3
BPLA	10		13	19		63	71	80	90	100	110				1.3
BPLA	13		13	19		63	71	80	90	100	110	125	140		3.9
BPLA	16		13	19	25		71	80	90	100	110	125	140	150	5.9
BPLA	20		13	19	25		71	80	90	100	110	125	140	150	5.9
BPLA	25		13	19	25		71	80	90	100	110	125	140	150	7.9
BPLA	32		13	19	25			80	90	100	110	125	140	150	9.9
BPLA	38			19	25			80	90	100	110	125	140	150	11.9

For Matching Die Buttons:

General (Press-Fit)
see page G25

Ball-Lock
see page B31



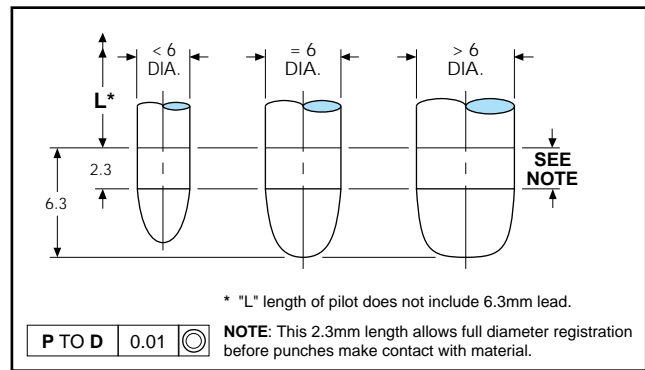
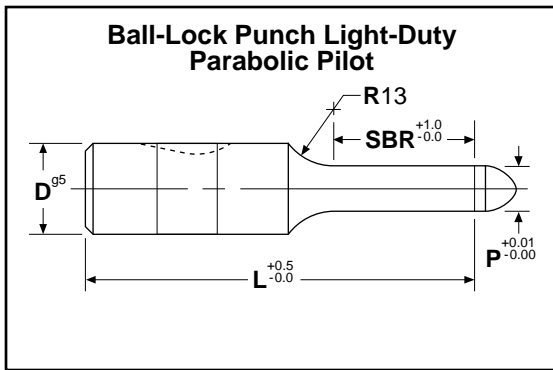
BPLP™
 BALL-LOCK
 PUNCH
 LIGHT-DUTY
 PARABOLIC PILOT

Lane Parabolic Pilots are recommended for light-gage, high-speed applications.

The Polished Parabolic Point (lead) reduces friction resulting in longer wear, less part distortion and improved stamping quality.

Ordering Example:
(15) BPLP 16-19-63 M2 P8.8

M2, R/c 61-63 triple tempered



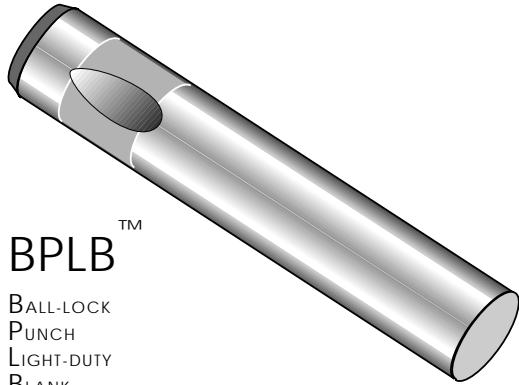
TYPE	"D"	POINT LENGTH "SBR"				LENGTH "L"							MIN. "P"
		8	13	19	25	50	56	63	71	80	90	100	
BPLP	6	8	13			50	56	63	71	80			1.3
BPLP	10		13	19		50	56	63	71	80	90	100	1.3
BPLP	13		13	19		50	56	63	71	80	90	100	3.9
BPLP	16		13	19	25		56	63	71	80	90	100	5.9
BPLP	20		13	19	25		56	63	71	80	90	100	5.9
BPLP	25		13	19	25		56	63	71	80	90	100	7.9
BPLP	32		13	19	25				71	80	90	100	9.9
BPLP	38			19	25					80	90	100	11.9

For Matching Die Buttons:

General (Press-Fit)
see page G25

Ball-Lock
see page B31

L = 50, max. SBR = 13
 L = 56, max. SBR = 19

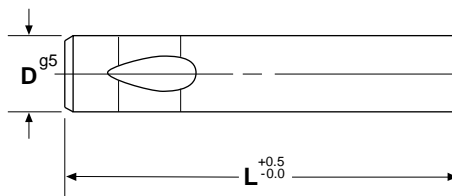


BPLBTM
BALL-LOCK
PUNCH
LIGHT-DUTY
BLANK

**Ordering Example:
(12) BPLB 32-125 M2**

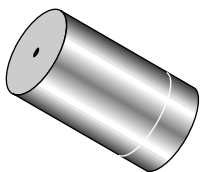
A2, R/c 59-61 double tempered
M2, R/c 61-63 triple tempered

Ball-Lock Punch Light-Duty Blank

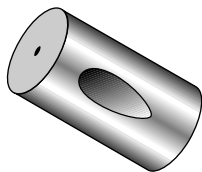


TYPE	"D"	OVERALL LENGTH "L"												
		50	56	63	71	80	90	100	110	125	140	150	175	200
BPLB	6	50	56	63	71	80	90	100						
BPLB	10	50	56	63	71	80	90	100	110	125	140			
BPLB	13	50	56	63	71	80	90	100	110	125	140	150	175	
BPLB	16		56	63	71	80	90	100	110	125	140	150	175	
BPLB	20		56	63	71	80	90	100	110	125	140	150	175	
BPLB	25		56	63	71	80	90	100	110	125	140	150	175	
BPLB	32				71	80	90	100	110	125	140	150	175	200
BPLB	38					80	90	100	110	125	140	150	175	200

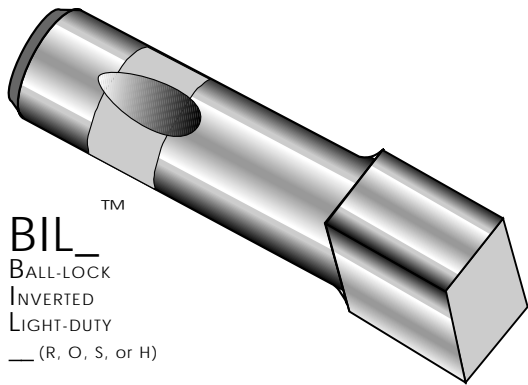
For Matching Die Buttons:



**General
(Press-Fit)**
see page G29

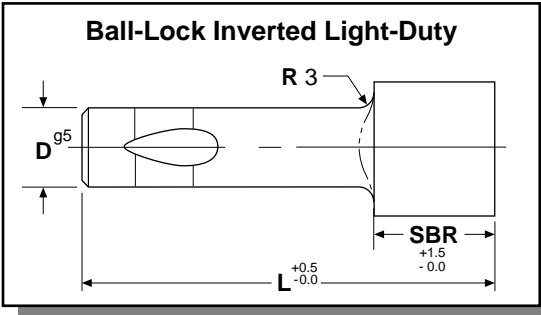
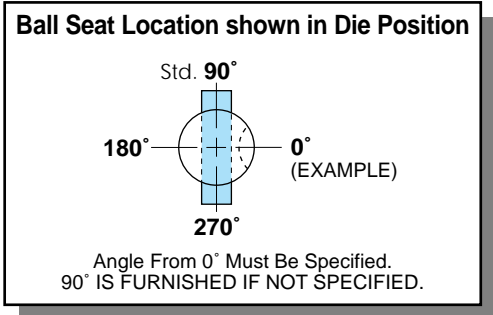


Ball-Lock
see page B33



BIL_{__}
 BALL-LOCK
 INVERTED
 LIGHT-DUTY
 __ (R, O, S, or H)

Ordering Example:
(9) BILR 25-25-90 M2 P32.4

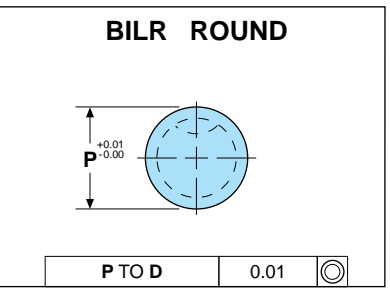


M2, R/c 61-63 triple tempered

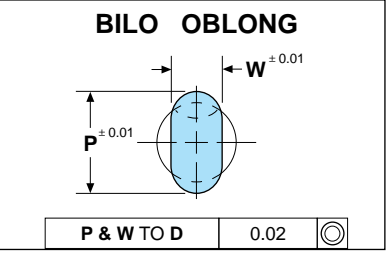
BILS "G" = $\sqrt{P^2 + W^2}$

BILH "G" = $\left(\sqrt{(P - 1.0)^2 + (W - 1.0)^2} \right) + 1.0$

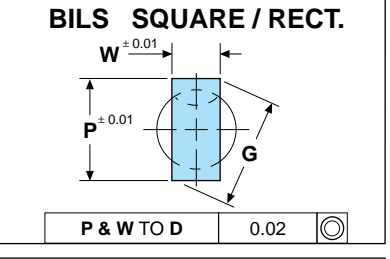
TYPE	"D"	POINT LENGTH "SBR"	OVERALL LENGTH "L"				MIN. "P"	MAX. "P"
			71	80	90	100		
BILR	10	16	71	80	90	100	10.1	22.0
BILR	13	20	71	80	90	100	13.1	32.0
BILR	16	25	71	80	90	100	16.1	38.0
BILR	20	25	71	80	90	100	20.1	38.0
BILR	25	25	71	80	90	100	25.1	45.0
BILR	32	32		80	90	100	32.1	50.0



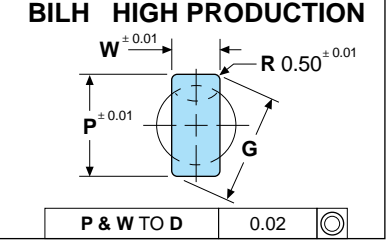
TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "P"
			71	80	90	100		
BILO	10	16	71	80	90	100	4.5	22.0
BILO	13	20	71	80	90	100	5.0	32.0
BILO	16	25	71	80	90	100	6.5	38.0
BILO	20	25	71	80	90	100	8.0	38.0
BILO	25	25	71	80	90	100	11.0	45.0
BILO	32	32		80	90	100	12.5	50.0

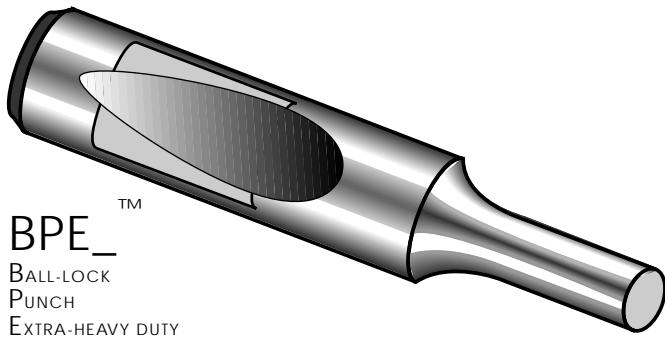


TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "G"
			71	80	90	100		
BILS	10	16	71	80	90	100	4.5	22.0
BILS	13	20	71	80	90	100	5.0	32.0
BILS	16	25	71	80	90	100	6.5	38.0
BILS	20	25	71	80	90	100	8.0	38.0
BILS	25	25	71	80	90	100	11.0	45.0
BILS	32	32		80	90	100	12.5	50.0



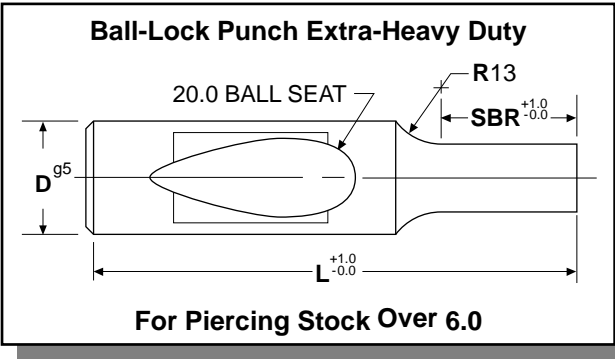
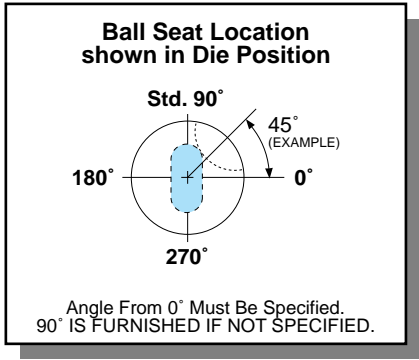
TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "G"
			71	80	90	100		
BILH	10	16	71	80	90	100	4.5	22.0
BILH	13	20	71	80	90	100	5.0	32.0
BILH	16	25	71	80	90	100	6.5	38.0
BILH	20	25	71	80	90	100	8.0	38.0
BILH	25	25	71	80	90	100	11.0	45.0
BILH	32	32		80	90	100	12.5	50.0





BPE_—TM
BALL-LOCK
PUNCH
EXTRA-HEAVY DUTY
— (R, O, S, or H)

Ordering Example:
(9) BPER 25-25-100 M2 P24.0

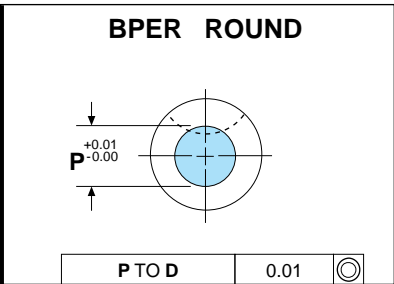


M2, R/c 61-63 triple tempered

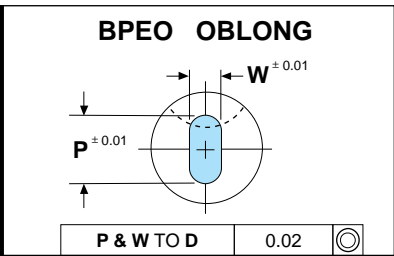
BPES "G" = $\sqrt{P^2 + W^2}$

BPEH "G" = $\left(\sqrt{(P - 1.0)^2 + (W - 1.0)^2}\right) + 1.0$

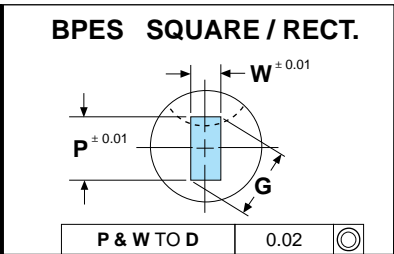
TYPE	"D"	POINT LENGTH "SBR"	OVERALL LENGTH "L"				MIN. "P"	MAX. "P"
			100	110	125	140		
BPER	25	25	100	110	125	140	16.0	25.0
BPER	32	32	100	110	125	140	20.0	32.0
BPER	40	32	100	110	125	140	25.0	40.0
BPER	45	32	100	110	125	140	32.0	45.0
BPER	50	32	100	110	125	140	40.0	50.0
BPER	56	38		110	125	140	45.0	56.0
BPER	63	38		110	125	140	50.0	63.0



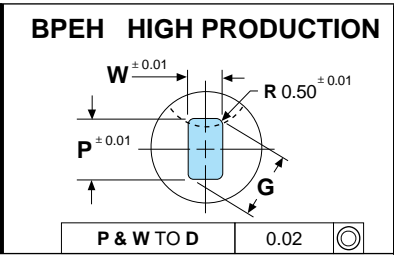
TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "P"
			100	110	125	140		
BPEO	25	25	100	110	125	140	9.5	25.0
BPEO	32	32	100	110	125	140	12.0	32.0
BPEO	40	32	100	110	125	140	13.0	40.0
BPEO	45	32	100	110	125	140	16.0	45.0
BPEO	50	32	100	110	125	140	18.0	50.0
BPEO	56	38		110	125	140	20.0	56.0
BPEO	63	38		110	125	140	25.0	63.0



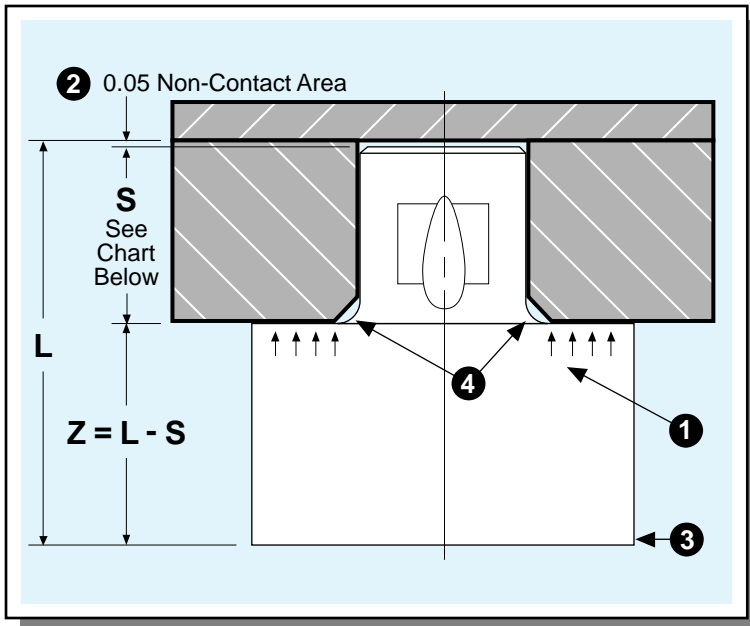
TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "G"
			100	110	125	140		
BPES	25	25	100	110	125	140	9.5	25.0
BPES	32	32	100	110	125	140	12.0	32.0
BPES	40	32	100	110	125	140	13.0	40.0
BPES	45	32	100	110	125	140	16.0	45.0
BPES	50	32	100	110	125	140	18.0	50.0
BPES	56	38		110	125	140	20.0	56.0
BPES	63	38		110	125	140	25.0	63.0



TYPE	"D"	"SBR"	OVERALL LENGTH "L"				MIN. "W"	MAX. "G"
			100	110	125	140		
BPEH	25	25	100	110	125	140	9.5	25.0
BPEH	32	32	100	110	125	140	12.0	32.0
BPEH	40	32	100	110	125	140	13.0	40.0
BPEH	45	32	100	110	125	140	16.0	45.0
BPEH	50	32	100	110	125	140	18.0	50.0
BPEH	56	38		110	125	140	20.0	56.0
BPEH	63	38		110	125	140	25.0	63.0



Z-Bottoming Punches



❶ Z-Engineered Point Support:

- Resists **deflection**.
- Absorbs impact **shock**.
- Permits off-center design.
- Greater point **rigidity**.
- Longer punch life.
- Less down time.

❷ Z-Engineered Shank Length (S):

- **Reduces** shank & backing plate breakage.
- Redistributes shock over **greater area**.

❸ Through-Ground Punch Point:

- No radius blend to interfere.
- **Ease of removal** through stripper.
- Long life, many sharpenings of punch.
- Replacement in minutes, not hours.

❹ Coordinated Punch - Retainer Design:

- For greatest strength, punch is **matched to Retainer and Retainer is altered to punch** (See Retainer ordering example below).
- Radius is cleared to **remove Stress-Riser**.
- Provides maximum punch life.
- Longer production runs.

SHANK LENGTH	LIGHT-DUTY	HEAVY-DUTY	EXTRA-HEAVY DUTY
S	24.95	34.95	62.95

INVERTED POINT SHAPE CHART	LIGHT-DUTY	LIGHT-DUTY EJECTOR	HEAVY-DUTY	HEAVY-DUTY EJECTOR	EXTRA-HEAVY DUTY
ROUND Page	BILR B28	BNLR B20	BIHR B14	BNHR B6	BPER B29
OBLONG Page	BILO B28	BNLO B20	BIHO B14	BNHO B6	BPEO B29
SQUARE/ RECT. Page	BILS B28	BNLS B20	BIHS B14	BNHS B6	BPES B29
HIGH PRODUCTION RADIUSED RECT. Page	BILH B28	BNLH B20	BIHH B14	BNHH B6	BPEH B29
SPECIALS DESIGN ASSISTANCE	SEE TECHNICAL SECTION OR CALL ANY PLANT FOR ASSISTANCE.				
RETAINERS	SEE STANDARD RETAINER SECTION.				

ORDERING EXAMPLE:

1. Select Punch catalog letters from chart above. Select length, steel, etc., from page listed.
2. Insert the letter "Z" to specify punch to *bottom on retainer top surface*.
3. The Retainer must be altered to the punch to eliminate interference. Please select Retainer from Standard Retainer section.

Ordering Examples:

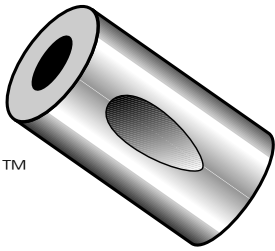
1. PUNCH, Catalog Standard:
(3) BIHS 32-Z100 M2 P40.0 W20.0
2. PUNCH, Custom Per Your Drawing:
(2) BIHC 32-Z100 per print attached.
3. RETAINER:
(2) BRHT 32 with 3 x 45; chamfer .

The **Punch Stripping**

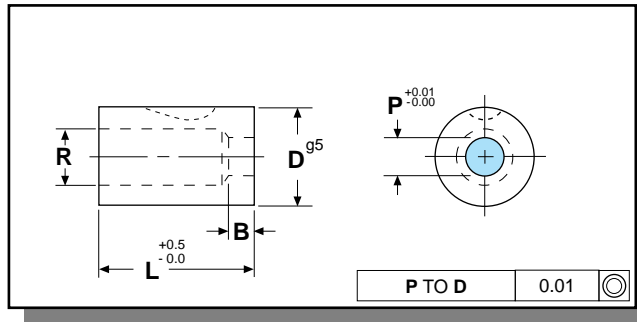
Force formula and the **Retainer Stripping**

Force Resistance

chart are in the Technical Section.



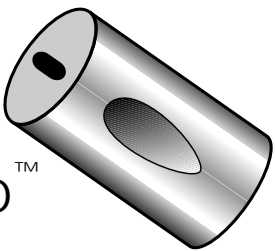
BBLR™
BALL-LOCK
BUTTON
LIGHT-DUTY
ROUND



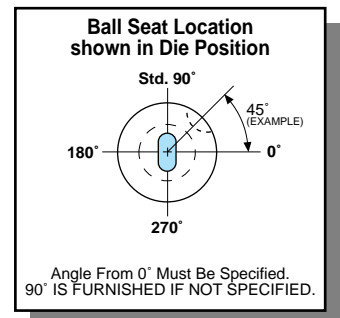
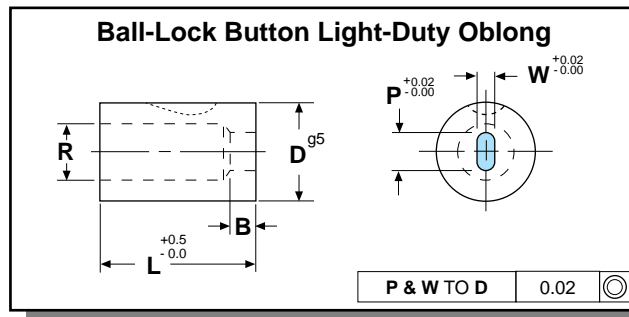
Ordering Example:
(10) BBLR 20-32 A2 P9.8

A2, R/c 59-61 double tempered

TYPE	"D"	LAND "B"	LENGTH "L"	MIN. "P"	MAX. "P"	MAX. "R"
BBLR	13	4.0	32	1.5	5.0	5.8
BBLR	16	5.0	32	3.2	7.2	8.0
BBLR	20	5.0	32	4.0	11.0	11.9
BBLR	25	6.0	32	8.0	15.0	16.0
BBLR	32	6.0	32	11.0	19.0	20.0
BBLR	38	8.0	32	16.5	26.0	27.0



BBLO™
BALL-LOCK
BUTTON
LIGHT-DUTY
OBLONG

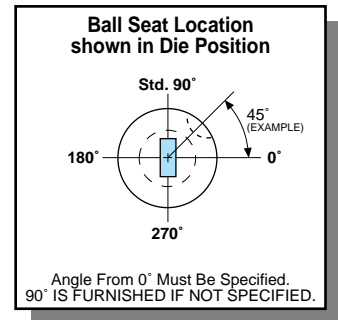
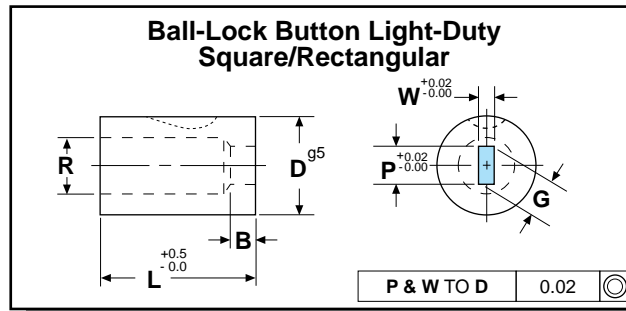
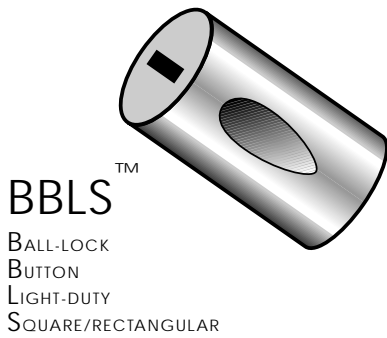


Ordering Example:
(10) BBLO 13-32 A2 P4.4 W1.3 BS-90;

A2, R/c 59-61 double tempered

TYPE	"D"	LAND "B"	LENGTH "L"	MIN. "W"	MAX. "P"	MAX. "R"
BBLO	13	4.0	32	1.2	5.0	5.8
BBLO	16	5.0	32	2.0	7.2	8.0
BBLO	20	5.0	32	2.4	11.0	11.9
BBLO	25	6.0	32	4.0	15.0	16.0
BBLO	32	6.0	32	4.8	19.0	20.0
BBLO	38	8.0	32	6.4	26.0	27.0

ANSI B94.29.1-1977



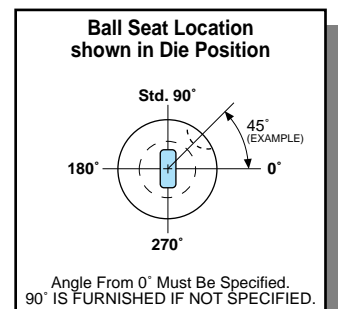
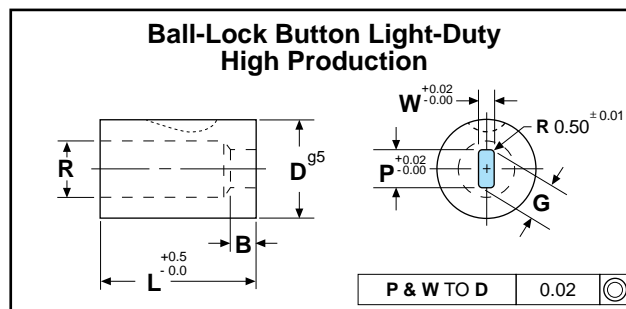
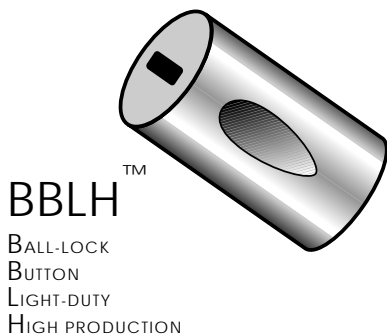
Ordering Example:
(10) BBLS 20-32 A2 P8.9 W6.2 BS-0;

A2, R/c 59-61 double tempered

$$\text{BBLS "G"} = \sqrt{P^2 + W^2}$$

TYPE	"D"	LAND "B"	LENGTH "L"	MIN. "W"	MAX. "G"	MAX. "R"
BBLS	13	4.0	32	1.2	5.0	5.8
BBLS	16	5.0	32	2.0	7.2	8.0
BBLS	20	5.0	32	2.4	11.0	11.9
BBLS	25	6.0	32	4.0	15.0	16.0
BBLS	32	6.0	32	4.8	19.0	20.0
BBLS	38	8.0	32	6.4	26.0	27.0

ANSI B94.29.1-1977



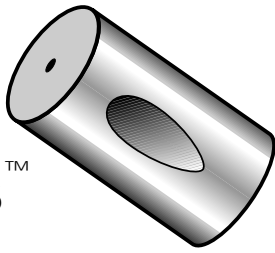
Ordering Example:
(10) BBLH 13-32 A2 P3.9 W3.3 BS-90;

A2, R/c 59-61 double tempered

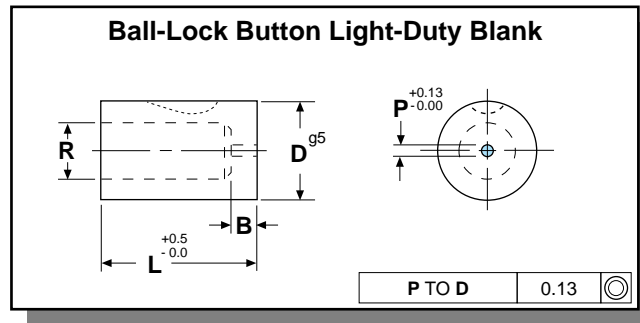
$$\text{BBLH "G"} = \left(\sqrt{(P - 1.0)^2 + (W - 1.0)^2} \right) + 1.0$$

The Lane "H" punch and die will outproduce any sharp cornered rectangle or square, same steel, same clearance, punch to die.

TYPE	"D"	LAND "B"	LENGTH "L"	MIN. "W"	MAX. "G"	MAX. "R"
BBLH	13	4.0	32	1.2	5.0	5.8
BBLH	16	5.0	32	2.0	7.2	8.0
BBLH	20	5.0	32	2.4	11.0	11.9
BBLH	25	6.0	32	4.0	15.0	16.0
BBLH	32	6.0	32	4.8	19.0	20.0
BBLH	38	8.0	32	6.4	26.0	27.0



BBLB[™]
BALL-LOCK
BUTTON
LIGHT-DUTY
BLANK

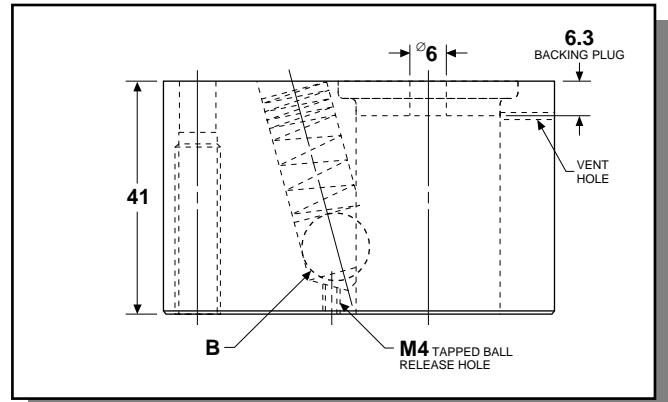
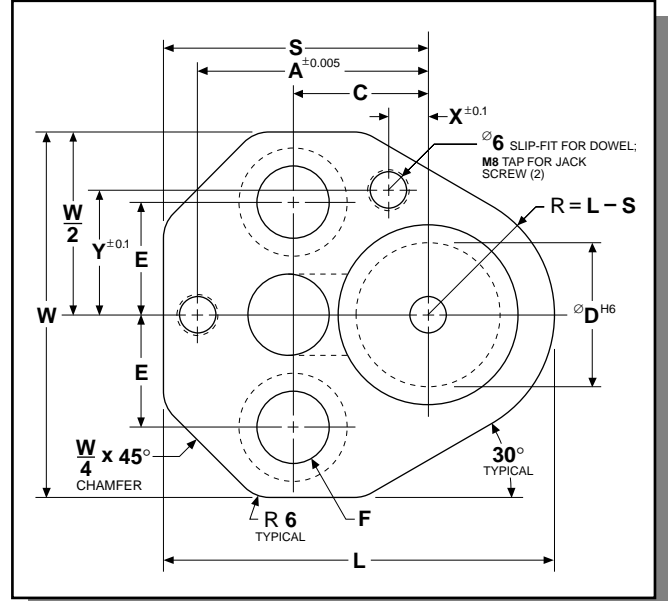


Ordering Example:
(10) BBLB 20-32 A2

A2, R/c 59-61 double tempered

TYPE	"D"	LAND "B"	LENGTH "L"	DRILL "P"	MAX. "R"
BBLB	13	4.0	32	0.8	5.8
BBLB	16	5.0	32	1.2	8.0
BBLB	20	5.0	32	1.5	11.9
BBLB	25	6.0	32	3.2	16.0
BBLB	32	6.0	32	3.2	20.0
BBLB	38	8.0	32	3.2	27.0

BRHT™
BALL-LOCK
RETAINER
HEAVY-DUTY
TRU-LOCK



Heavy-duty Lane **TRU-LOCK®** Retainers are recommended for most applications.

Simple typical mounting:

1. Drill and tap for two (2) screws.
2. Drill and ream (or bore) for dowels.
3. Insert dowels into die plate, slip retainer onto dowels and tighten screws.

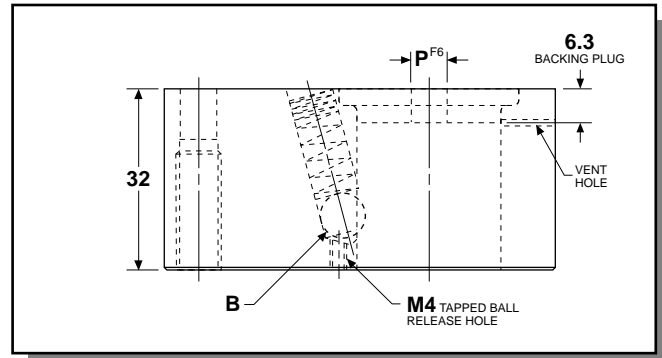
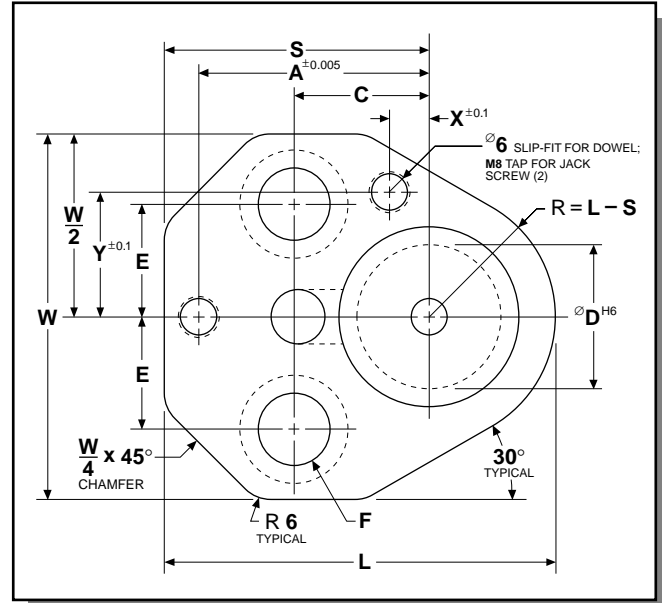
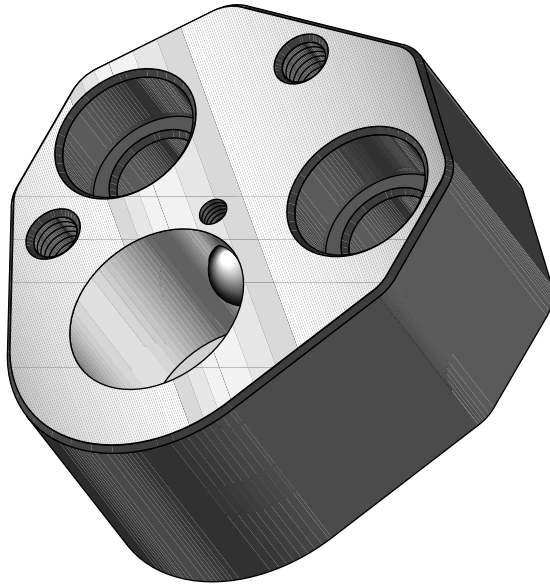
Ordering Example:
(36) BRHT 25

Retainer set includes:
2 Socket head cap screws.
2 Vented and tapped dowels.
1 Ball release set screw.



TYPE	"D"	"W"	"L"	"S"	"A"	"C"	"E"	"X"	"Y"	"B"	"F"
BRHT	10	41.0	43.5	34.0	26.924	19.05	11.12	7.5	9.0	10.0	M8
BRHT	13	48.5	49.6	37.0	29.972	19.05	14.27	6.5	12.0	12.0	M8
BRHT	16	51.7	52.7	38.6	31.750	19.05	15.87	6.0	13.5	12.0	M8
BRHT	20	56.8	59.3	41.9	33.528	19.05	17.47	5.0	16.5	12.0	M10
BRHT	25	64.5	68.9	46.7	40.640	23.82	19.84	7.0	22.0	12.0	M12
BRHT	32	64.5	68.9	46.7	40.640	23.82	19.84	7.0	22.0	12.0	M12
BRHT	40	72.9	76.4	50.5	43.993	27.00	24.00	10.0	26.0	12.0	M12

BRLTTM
BALL-LOCK
RETAINER
LIGHT-DUTY
TRU-LOCK



Lane TRU-LOCK® Retainers...

Offer more strength:
they're made from through-hardened
chromium-vanadium steel (AISI 6150).

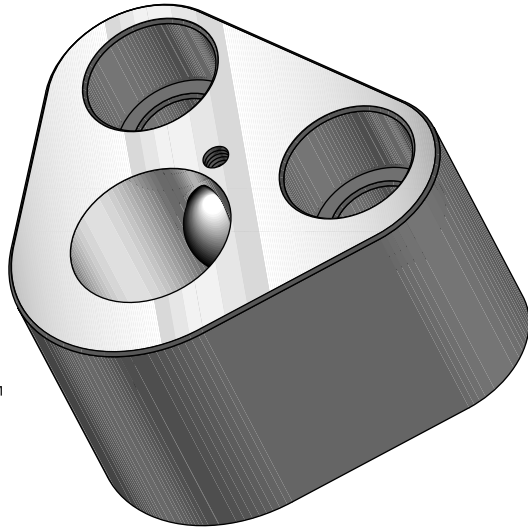
Are the ultimate in precision for standard
retainers, having a radial accuracy of ± 0.003 .

Ordering Example:
(24) BRLT 25

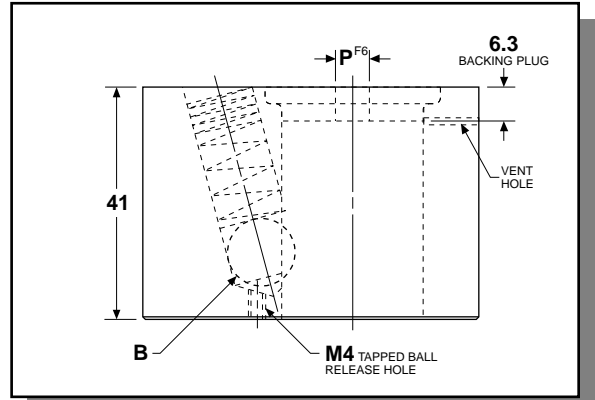
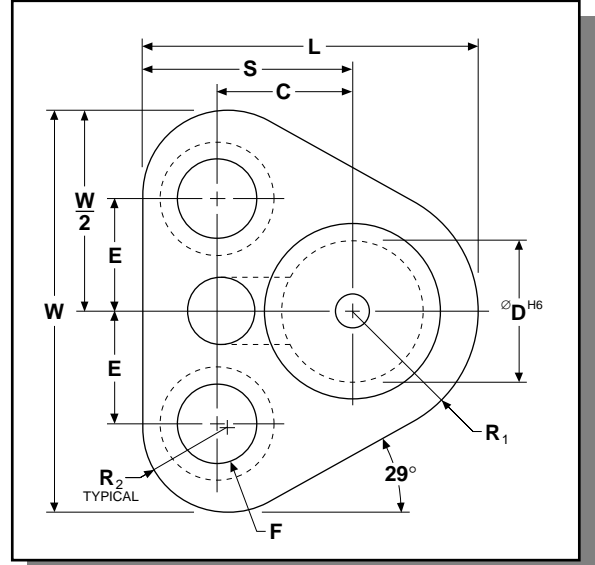
Retainer set includes:
2 Socket head cap screws.
2 Vented and tapped dowels.
1 Ball release set screw.

TYPE	"D"	"W"	"L"	"S"	"A"	"C"	"E"	"X"	"Y"	"B"	"P"	"F"
BRLT	6	41.0	43.5	34.0	26.924	19.05	11.12	7.5	9.0	6.0	3.0	M8
BRLT	10	41.0	43.5	34.0	26.924	19.05	11.12	7.5	9.0	8.0	6.0	M8
BRLT	13	48.5	49.6	37.0	29.972	19.05	14.27	6.5	12.0	8.0	6.0	M8
BRLT	16	51.7	52.7	38.6	31.750	19.05	15.87	6.0	13.5	8.0	6.0	M8
BRLT	20	56.8	59.3	41.9	33.528	19.05	17.47	5.0	16.5	8.0	6.0	M10
BRLT	25	64.5	68.9	46.7	40.640	23.82	19.84	7.0	22.0	8.0	6.0	M12
BRLT	32	64.5	68.9	46.7	40.640	23.82	19.84	7.0	22.0	8.0	6.0	M12
BRLT	38	72.9	76.4	50.5	43.993	27.00	24.00	10.0	26.0	8.0	6.0	M12





BRHR™
BALL-LOCK
RETAINER
HEAVY-DUTY
ROUND



Lane Economy™ Ball-Lock Retainers:

A cost saving innovation from Lane Punch Corporation made for retaining Round Pointed Punches.

Compared to Lane's Tru-Lock retainers, 2 dowels have been eliminated and the retainer's outside shape has been reduced.

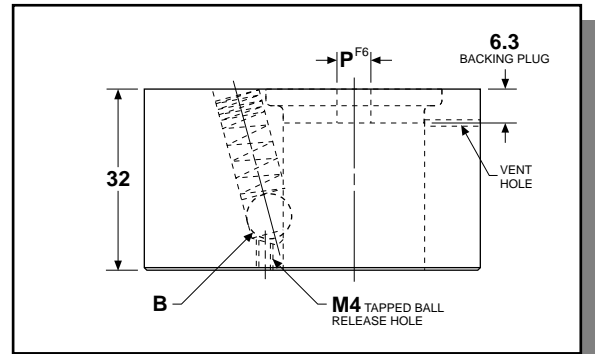
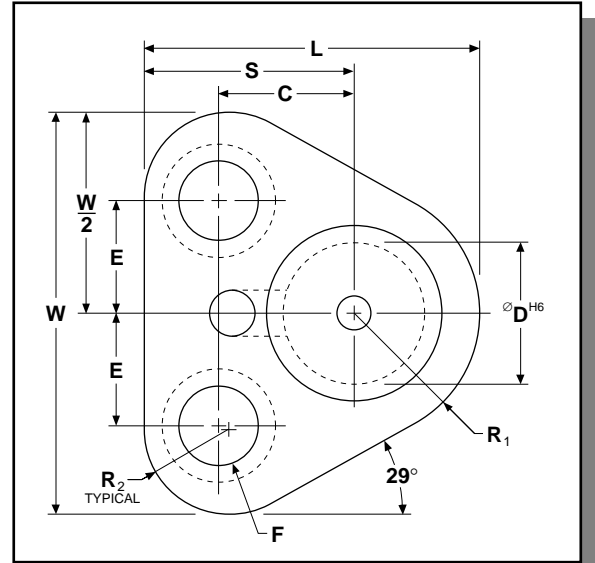
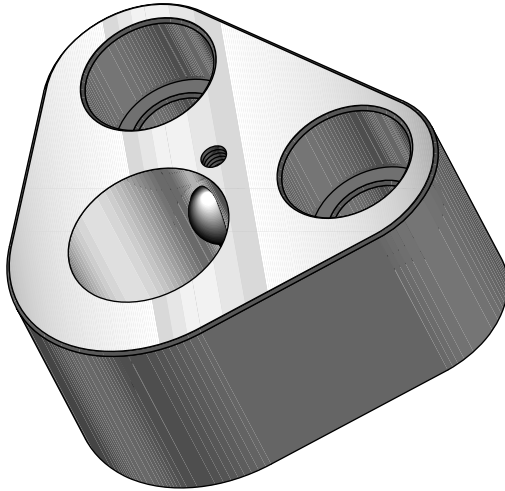
Ordering Example:
(12) BRHR 25

Retainer set includes
2 Socket head cap screws
1 Vented and tapped dowel
1 Ball release set screw



TYPE	"D"	"W"	"L"	"S"	"R ₁ "	"R ₂ "	"C"	"E"	"B"	"P"	"F"
BRHR	10	40.61	38.5	29	9.5	9.5	19.05	11.12	10.0	6.0	M8
BRHR	13	47.93	41.7	29	12.7	9.5	19.05	14.27	12.0	6.0	M8
BRHR	16	51.59	43.3	29	14.3	9.5	19.05	15.87	12.0	6.0	M8
BRHR	20	57.93	47.5	30	17.5	11.0	19.05	17.47	12.0	6.0	M10
BRHR	25	70.85	59.2	37	22.2	15.0	23.82	19.84	12.0	6.0	M12
BRHR	32	70.85	59.2	37	22.2	15.0	23.82	19.84	12.0	6.0	M12

BRLR™
 BALL-LOCK
 RETAINER
 LIGHT-DUTY
 ROUND



Lane Economy™ Ball-Lock Retainers:

A cost saving innovation from Lane Punch Corporation made for retaining Round Pointed Punches.

Compared to Lane's Tru-Lock retainers, 2 dowels have been eliminated and the retainer's outside shape has been reduced.

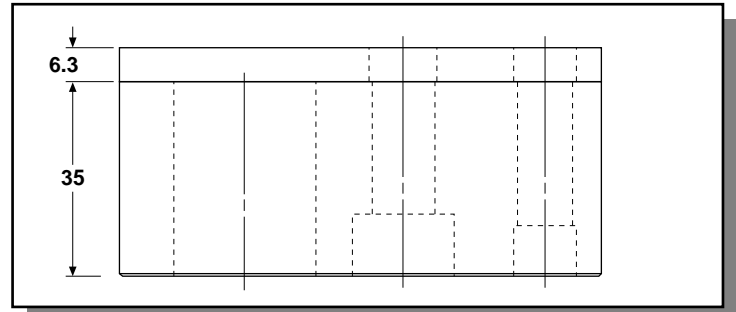
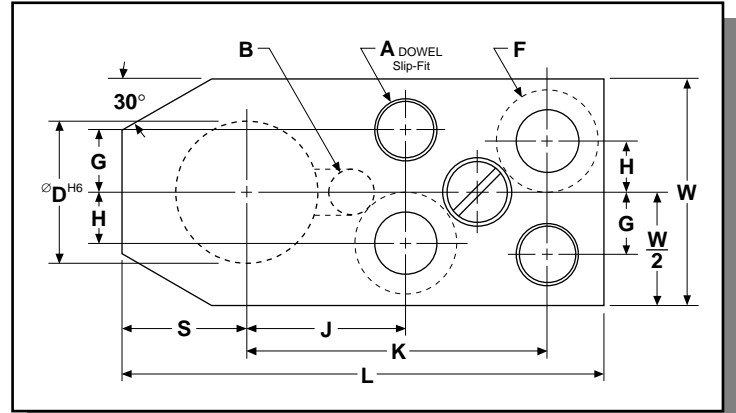
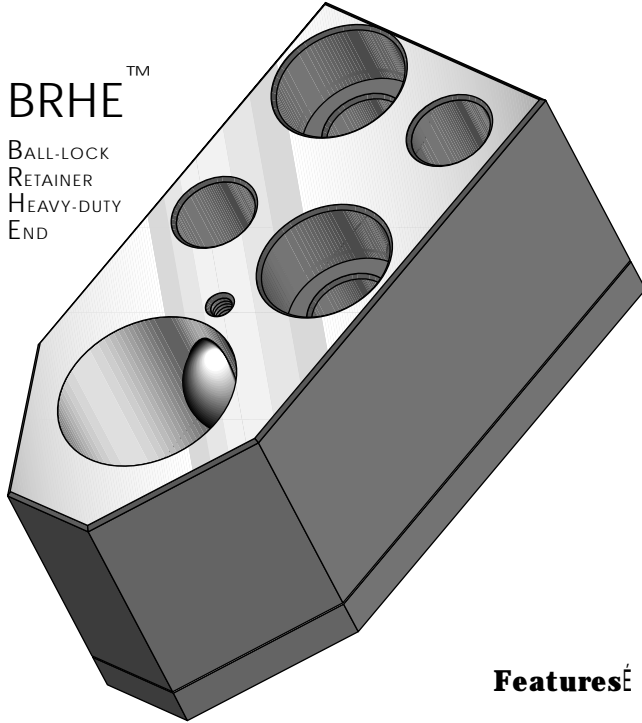
Ordering Example:
(24) BRLR 25

Retainer set includes:
 2 Socket head cap screws
 1 Vented and tapped dowel
 1 Ball release set screw.

TYPE	"D"	"W"	"L"	"S"	"R ₁ "	"R ₂ "	"C"	"E"	"B"	"P"	"F"
BRLR	10	40.61	38.5	29	9.5	9.5	19.05	11.12	8.0	6.0	M8
BRLR	13	47.93	41.7	29	12.7	9.5	19.05	14.27	8.0	6.0	M8
BRLR	16	51.59	43.3	29	14.3	9.5	19.05	15.87	8.0	6.0	M8
BRLR	20	57.93	47.5	30	17.5	11.0	19.05	17.47	8.0	6.0	M10
BRLR	25	70.85	59.2	37	22.2	15.0	23.82	19.84	8.0	6.0	M12
BRLR	32	70.85	59.2	37	22.2	15.0	23.82	19.84	8.0	6.0	M12



BRHE[™]
BALL-LOCK
RETAINER
HEAVY-DUTY
END



Features

- Full backing plate
- Completely interchangeable dowels
- Location held to -0.01

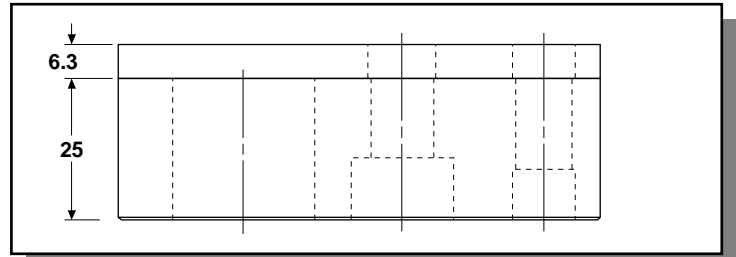
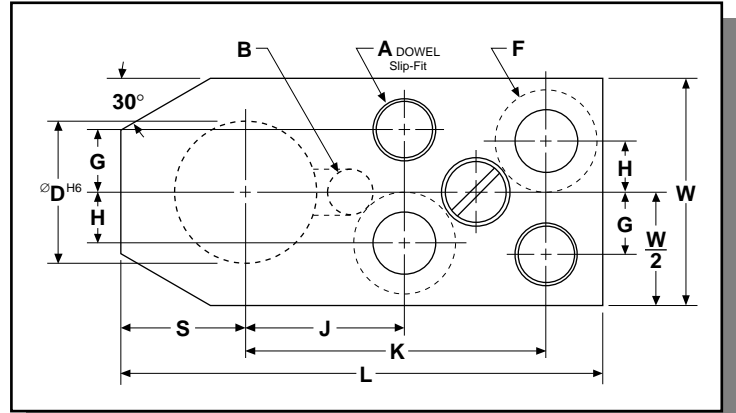
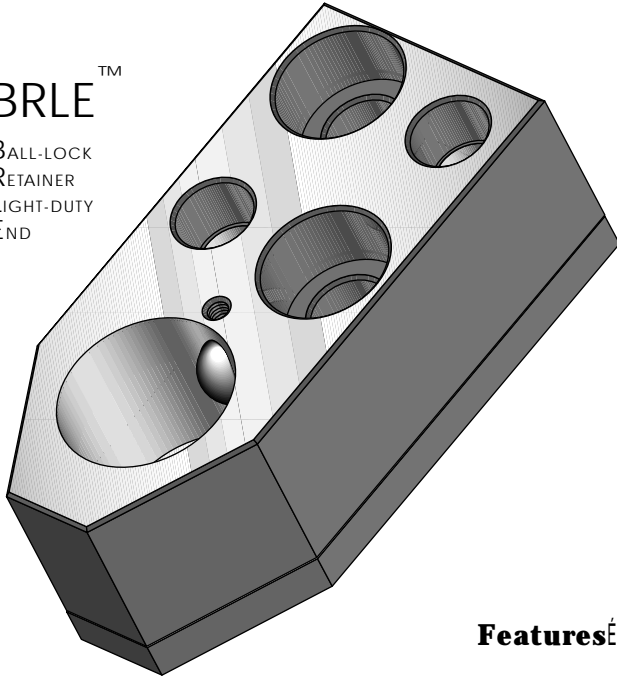
Ordering Example:
(10) BRHE 25

Retainer set includes:
2 Socket head cap screws.
2 Vented and tapped dowels.



TYPE	"D"	"W"	"L"	"S"	"J"	"K"	"G"	"H"	"A"	"B"	"F"
BRHE	10	32	75	15	25	50	9	7	8.0	10.0	M8
BRHE	13	32	75	15	25	50	9	7	8.0	12.0	M8
BRHE	16	32	75	15	25	50	9	7	8.0	12.0	M8
BRHE	20	42	85	22	28	53	11	9	10.0	12.0	M10
BRHE	25	42	85	22	28	53	11	9	10.0	12.0	M10
BRHE	32	50	100	25	35	65	16	14	10.0	12.0	M12
BRHE	40	60	110	30	40	68	18	16	10.0	12.0	M12

BRLE™
BALL-LOCK
RETAINER
LIGHT-DUTY
END



Features:

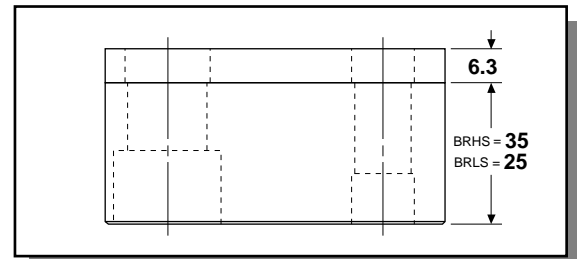
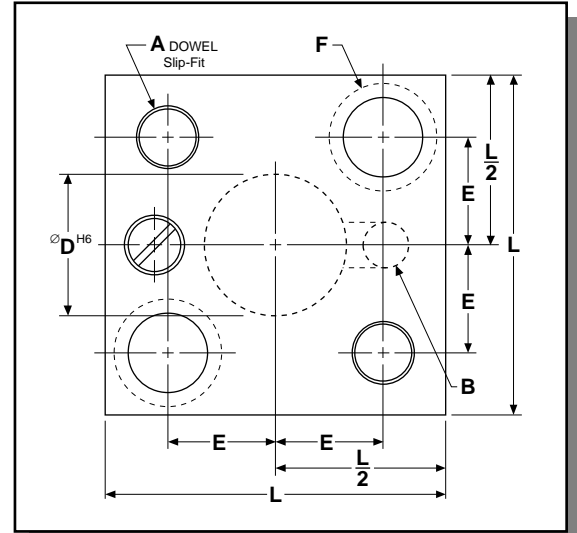
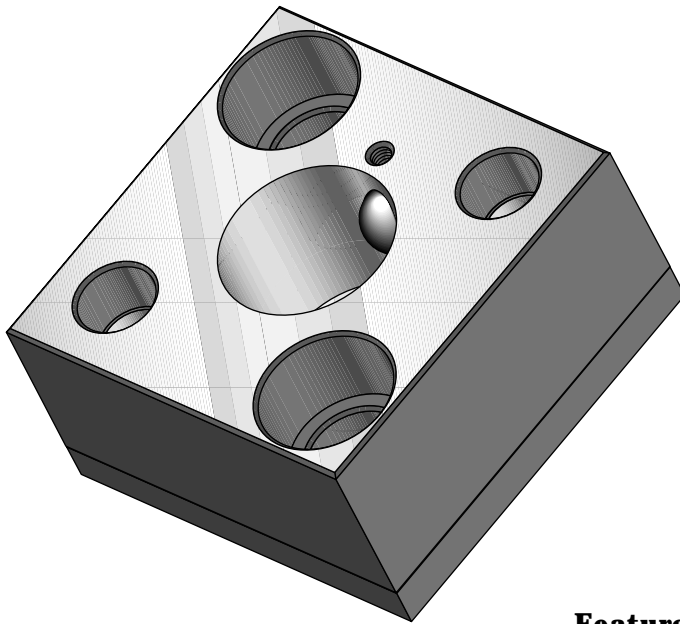
- Full backing plate
- Completely interchangeable dowels
- Location held to -0.01

Ordering Example:
(4) BRLE 25

Retainer set includes:
2 Socket head cap screws.
2 Vented and tapped dowels.



TYPE	"D"	"W"	"L"	"S"	"J"	"K"	"G"	"H"	"A"	"B"	"F"
BRLE	6	32	75	15	25	50	9	7	8.0	6.0	M8
BRLE	10	32	75	15	25	50	9	7	8.0	8.0	M8
BRLE	13	32	75	15	25	50	9	7	8.0	8.0	M8
BRLE	16	32	75	15	25	50	9	7	8.0	8.0	M8
BRLE	20	42	85	22	28	53	11	9	10.0	8.0	M10
BRLE	25	42	85	22	28	53	11	9	10.0	8.0	M10



Features:

- Full backing plate
- Completely interchangeable dowels
- Location held to -0.01

TYPE	"D"	"L"	"E"	"A"	"B"	"F"
BRHS	10	45	13.0	8.0	10.0	M8
BRHS	13	45	13.0	8.0	12.0	M8
BRHS	16	45	13.0	8.0	12.0	M8
BRHS	20	56	16.0	10.0	12.0	M10
BRHS	25	63	20.0	10.0	12.0	M12
BRHS	32	70	23.5	10.0	12.0	M12
BRHS	40	70	23.5	10.0	12.0	M12

Ordering Example:
(9) BRHS 25

Retainer set includes:
2 Socket head cap screws.
2 Vented & tapped dowels.

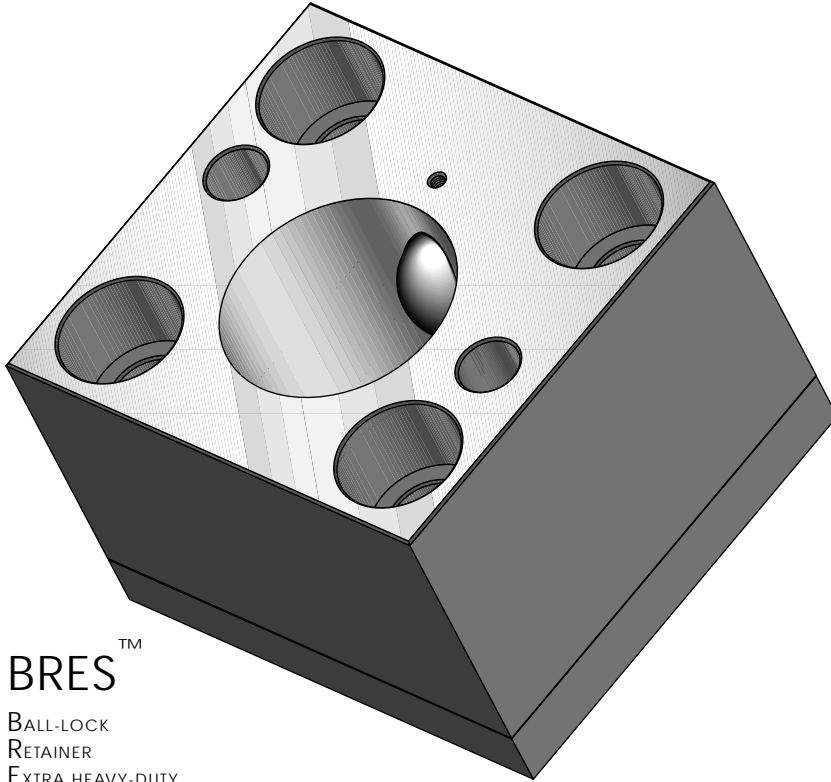


TYPE	"D"	"L"	"E"	"A"	"B"	"F"
BRLS	6	45	13.0	8.0	6.0	M8
BRLS	10	45	13.0	8.0	8.0	M8
BRLS	13	45	13.0	8.0	8.0	M8
BRLS	16	45	13.0	8.0	8.0	M8
BRLS	20	56	16.0	10.0	8.0	M10
BRLS	25	63	20.0	10.0	8.0	M12

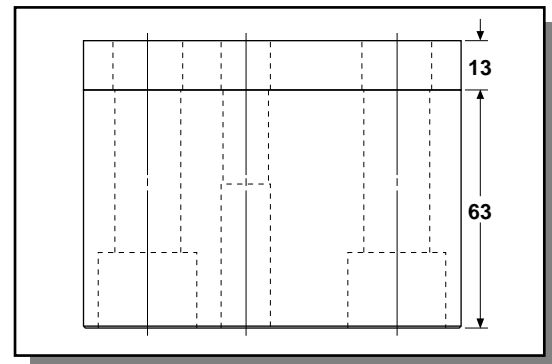
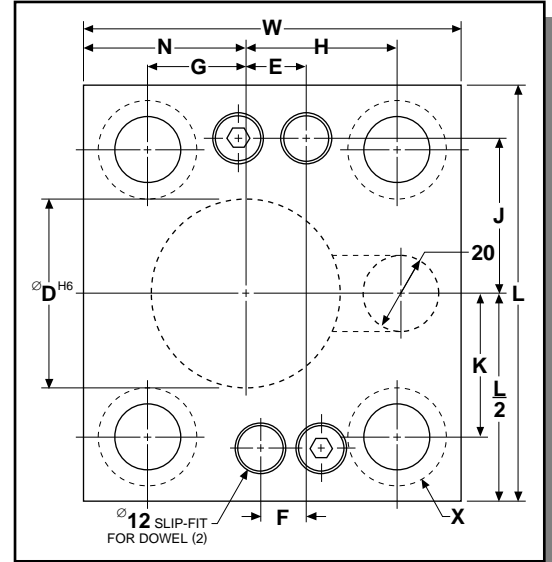
Ordering Example:
(6) BRLS 25

Retainer set includes:
2 Socket head cap screws.
2 Vented & tapped dowels.





BRES™
BALL-LOCK
RETAINER
EXTRA HEAVY-DUTY
SQUARE



Lane Extra Heavy-Duty Retainers are built for severe stripping applications.

An Extra Heavy-Duty Ball-Lock (20mm ball) provides a positive lock for heavy gage (above 6mm) stock thickness.

Dowels are located ± 0.01 to provide interchangeability.

Ordering
Example:
(3) BRES 50

Retainer set includes:
2 Socket head cap screws.
2 Dowels.



TYPE	"D"	"W"	"L"	"N"	"E"	"F"	"G"	"H"	"J"	"K"	"X"
BRES	25	75	80	30	8	3	17	32	29	27	M12
BRES	32	80	90	34	11	9	21	33	34	32	M12
BRES	40	85	95	35	14	16	22	37	36	34	M12
BRES	45	95	100	41	11	11	26	39	37	35	M16
BRES	50	100	110	44	16	16	29	41	42	40	M16
BRES	56	110	115	48	21	28	31	45	43	41	M16
BRES	63	115	120	50	24	35	33	48	46	44	M16

Tool Steel Rc 53-56

Stripping Force: 4,008 kg.

By utilizing the Ball-Lock Concept, **Lane Stamp Holders** are designed for quick change and interchangeability.

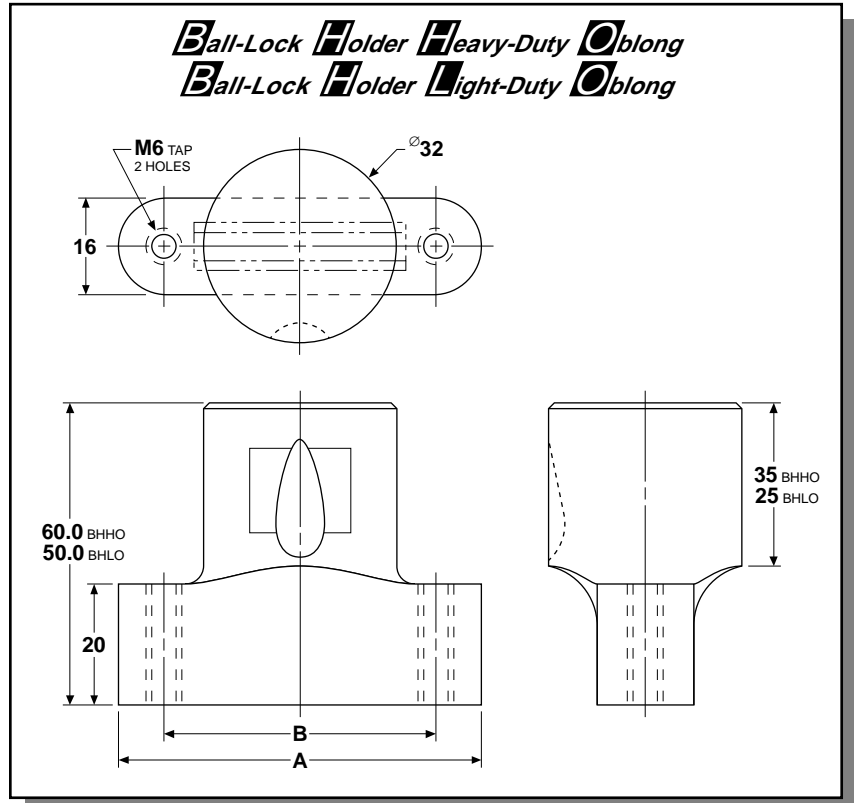
3mm Characters are available in Numbers, Letters, Dots, Dashes and Blanks.

Stamp Holders are available in Character Sets of 3, 5, 7, 9 and 12.

Ordering Example:
(2) BHHO 32-3

A2, Rc 59-61 double tempered

Heavy-Duty Type "D"	Light-Duty Type "D"	No. of Char.	"A"	"B"
BHHO 32	BHLO 32	3	40	25
BHHO 32	BHLO 32	5	50	35
BHHO 32	BHLO 32	7	55	40
BHHO 32	BHLO 32	9	65	50
BHHO 32	—	12	75	60

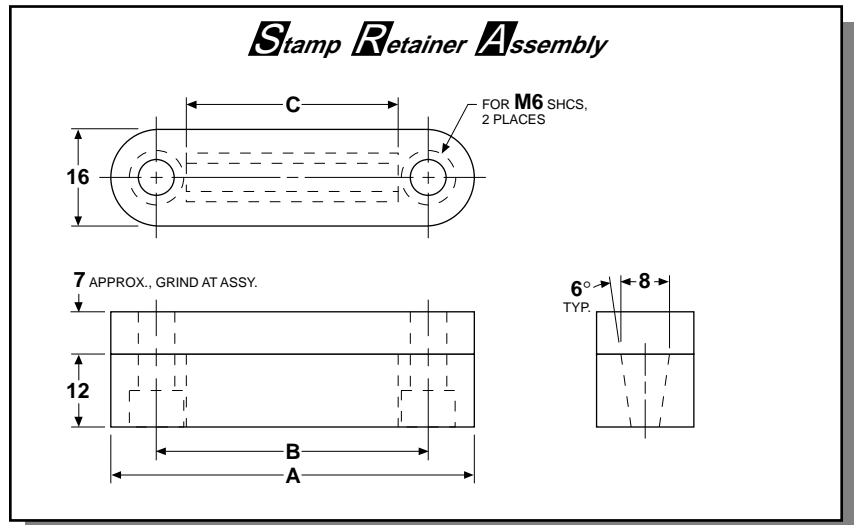


Ordering Example:
(2) SRA 3

Backing Plate: 01 Rc 58-60
Retainer: C1018 Soft

Set includes: holder, backing plate and (2) M6 x 35 socket head cap screws

Type	No. of Char.	"A"	"B"	"C"
SRA	3	40	25	12
SRA	5	50	35	20
SRA	7	55	40	28
SRA	9	65	50	36
SRA	12	75	60	48



Ordering Examples:
(2) WMS 3-L*
(2) WMS 3-P
(2) WMS 3-4

01 Rc 58-60

* (Quantity) Wedge Male Stamp
Char.Height - Character

