

EXACTA

PRECISION

PRODUCTS LIMITED

H029

INCH

PUNCHES - DIES

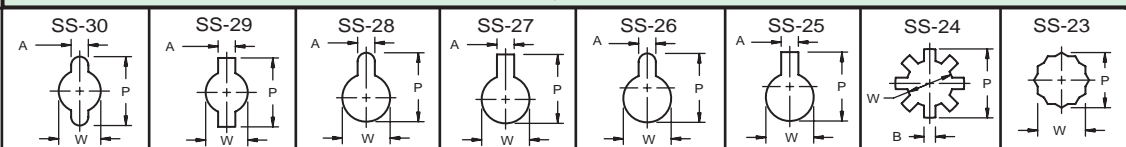
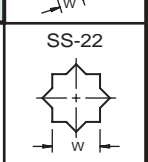
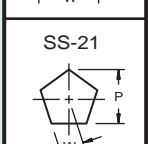
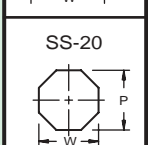
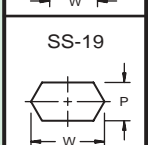
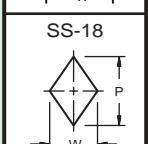
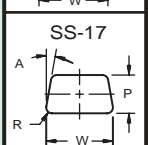
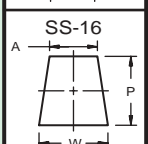
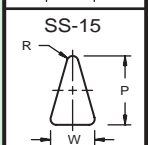
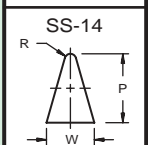
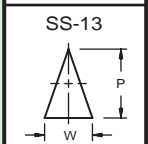
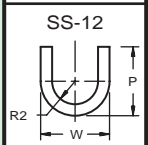
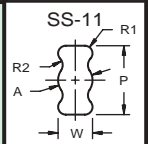
ACCESSORIES

90°

180°

0°

270°



15	STOCK PUSHERS	
14	LIFTER PINS	
13	IN DIE TAPPING UNITS	
12	SELF LUBE WEAR PRODUCTS	
11	SPOOLS	
10	URETHANE	
9	CAM SLIDE UNITS	
8	SPRING CAGES	
7	DIE SETS	
6	DOWELS	
5	SCREWS	
4	NITROGEN SPRINGS	
3	DIE SPRINGS	
2	DIES	
1	PUNCHES	
DET.	DESCRIPTION	QTY.
BILL OF MATERIAL		
EXACTA PRECISION PROD. LTD.		
STANDARDS		
COMMENTS		
DATE	INVOICE	
SCALE	DWG. NO.	

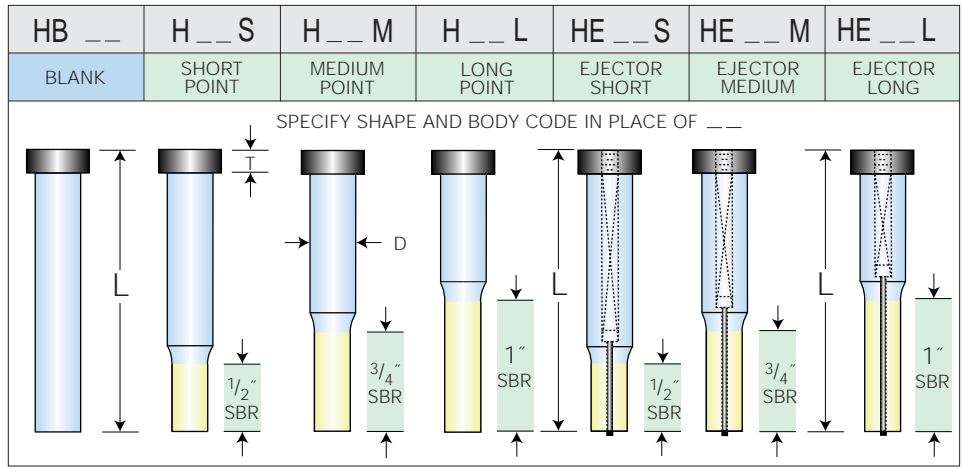


PUNCHES

HEAD TYPE

PRESS FIT

INCH



HEAD CODE	SHAPE CODE	BODY	BODY & STEEL CODE		SBR CODE	LENGTHS IN 1/4" INCREMENTS		MIN. P/W	MIN. P/W EJECT	USES EJECT. KIT	STANDARD KEYING PLAN VIEW SHOWN
			M2	A2		STANDARD	EXTENDED				
H HEADED	C ROUND 	1/8	12	12A	S 1/2" SBR *(STANDARD) .062 - .092	1 1/2 - 2 1/2	2 3/4 - 4	.062			SINGLE FLAT F1 90° 180° - 0° 270°
		3/16	18	18A		1 1/2 - 2 1/2	2 3/4 - 4	.062	.062	EK23	
		1/4	25	25A		1 1/2 - 2 3/4	3 - 6	.062	.093	EK29	
HE HEADED EJECTOR	O OBLONG 	5/16	31	31A	M 3/4" SBR *(STANDARD) .093	1 1/2 - 3 1/2	3 3/4 - 6	.093	.125	EK41	DOUBLE FLAT F2 - 0°
		3/8	37	37A		1 3/4 - 4	4 1/4 - 6	.125	.187	EK58	
		7/16	43	43A		2 - 4	4 1/4 - 6	.187	.187	EK58	
HT HEADED T = 3/16	R RECTANGLE (SQUARE) 	5/8	62	62A	L 1" SBR	2 - 4	4 1/4 - 6	.250	.250	EK58	DOWEL SLOTS DS12 = 1/8 φ DS18 = 3/16 φ DS25 = 1/4 φ 0°
		3/4	75	75A		2 1/4 - 4	4 1/4 - 6	.312	.312	EK89	
		7/8	87	87A		2 1/2 - 4	4 1/4 - 6	.375	.375	EK89	
		1	100	100A		2 1/2 - 4	4 1/4 - 6	.375	.375	EK89	
HTE HEADED T = 3/16 EJECTOR	RR RADIUS RECTANGLE 	1 1/4	125	125A	L 1" SBR	2 1/2 - 4	4 1/4 - 6	.375	.375	EK12	90° 45° 180° - 0° 270° Custom Location On Request
		1 1/2	150	150A		2 1/2 - 4	4 1/4 - 6	.375	.375	EK12	

M2 STEEL IS SHIPPED UNLESS OTHERWISE SPECIFIED
 *STANDARD SBR IS SHIPPED UNLESS OTHERWISE SPECIFIED
 P OR G DIMENSION CANNOT EXCEED BODY DIAMETER
 EJECTOR PIN LOCKHOLE SUPPLIED ON REQUEST

HOW TO ORDER: EXAMPLE

Qty.	Head Code	Shape	Body & Steel	SBR Code	Length	P x W	Rad	Keying
24	H	C	31	M	2"	.125		
6	HE	O	37	M	2 1/4"	.199 x .261		F1

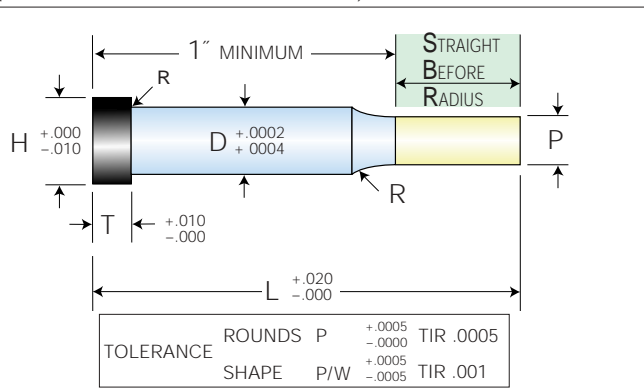
‡ OLD STANDARD

D	H	T
1/8	3/16	1/8
3/16	5/16	1/8
1/4	3/8	1/8
5/16	7/16	1/8
3/8	1/2	3/16
7/16	9/16	3/16
1/2	5/8	3/16
5/8	3/4	1/4
3/4	7/8	1/4
7/8	1	1/4
‡ 1	‡ 1 1/4	‡ 3/8
1	1 1/8	1/4
1 1/4	1 3/8	1/4
1 1/2	1 5/8	1/4
1 3/4	1 7/8	1/4
2	2 1/8	1/4
2 1/4	2 3/8	1/4
2 1/2	2 5/8	1/4

AVAILABLE SURFACE TREATMENTS

- IONITRIDING
- TITANIUM NITRIDE (TiN)
- TITANIUM CARBONITRIDE (TiCN)
- CHROMIUM NITRIDE (CrN)

(TECHNICAL INFORMATION SEE PAGE 18)

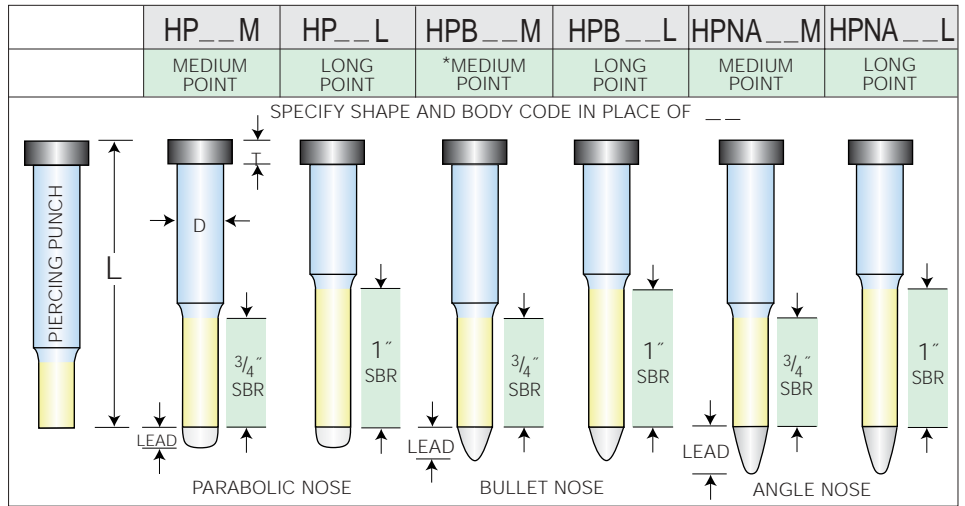


COMPONENT	PIN	SPRING	SET SCREW
Kit #	D	D	D
EK23	.023	.075	4-40
EK29	.029	.090	5-40
EK41	.041	.125	8-32
EK58	.058	.150	10-32
EK89	.089	.187	1/4-28
EK12	.120	.270	5/16-24



PILOT HEAD TYPE PRESS FIT INCH

NOTE: † PILOT NOSE LEAD LENGTH IS AUTOMATICALLY ADDED TO THE "L" DIMENSION ORDERED



PILOT CODE	PILOT NOSE STYLES	BODY	BODY & STEEL CODE		SBR CODE	LENGTHS IN 1/4" INCREMENTS		MIN. P DIM.	
			M2	A2		STANDARD	EXTENDED		
			HPP HEAD PILOT PARABOLIC NOSE			1/8	12		12A
HTPP HEAD T = 3/16 PILOT PARABOLIC NOSE		3/16	18	18A	1 1/2 - 2 1/2	2 3/4 - 4	.062		
HPB HEADED PILOT BULLET NOSE		1/4	25	25A	1 1/2 - 2 3/4	3 - 5 1/2	.062		
		5/16	31	31A	1 1/2 - 3 1/2	3 3/4 - 5 1/2	.093		
		3/8	37	37A	1 3/4 - 4	4 1/4 - 5 1/2	.125		
		7/16	43	43A	2 - 4	4 1/4 - 5 1/2	.187		
		1/2	50	50A	2 - 4	4 1/4 - 5 1/2	.187		
		5/8	62	62A	2 - 4	4 1/4 - 5 1/2	.312		
HTPB HEAD T = 3/16 PILOT BULLET NOSE		3/4	75	75A	L 1" SBR	2 1/4 - 4	4 1/4 - 5 1/2	.437	
		7/8	87	87A		2 1/2 - 4	4 1/4 - 5 1/2	.500	
		1	100	100A		2 1/2 - 4	4 1/4 - 5 1/2	.500	
		‡1	‡80	‡8		2 1/2 - 4	4 1/4 - 5 1/2	.500	
HPNA HEADED PILOT NEW ANGLE NOSE		1 1/4	125	125A		2 1/2 - 4	4 1/4 - 5 1/2	.625	
		1 1/2	150	150A		2 1/2 - 4	4 1/4 - 5 1/2	.750	
		† MAXIMUM LEAD LENGTH		LONGER SBR AVAILABLE		† LEAD LENGTH IS AUTOMATICALLY ADDED TO THE "L" DIMENSION ORDERED.			
		"P" RANGE		† OLD STANDARD					
		.125 - .250							
		.251 - .313							
HTPNA HEAD T = 3/16 PILOT NEW ANGLE NOSE		.314 - .375							
		.376 - .438							
		.439 - .500							
		.501 - .625							
		.626 - .750							
		.751 - .875							
.876 - 1.000									
1.001 - 1.250									

HOW TO ORDER: EXAMPLE

Qty.	Pilot Style	Shape	Body & Steel	SBR Code	Length	P
2	HPB	C	62	M	3"	.500

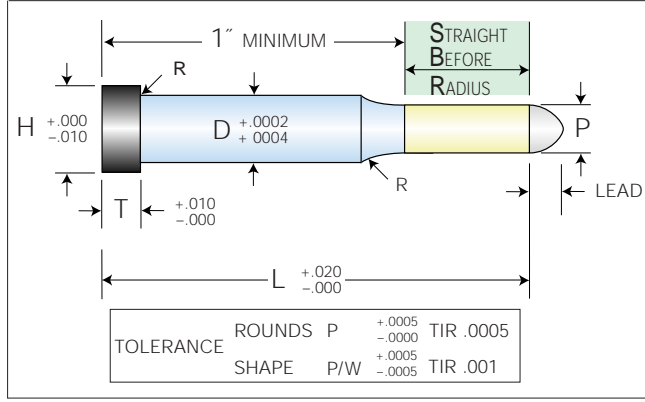
M2 STEEL IS SHIPPED UNLESS OTHERWISE SPECIFIED.
*M-SBR IS SHIPPED UNLESS OTHERWISE SPECIFIED.

D	H	T
1/8	3/16	1/8
3/16	5/16	1/8
1/4	3/8	1/8
5/16	7/16	1/8
3/8	1/2	3/16
7/16	9/16	3/16
1/2	5/8	3/16
5/8	3/4	1/4
3/4	7/8	1/4
7/8	1	1/4
‡1	‡1 1/4	‡3/8
1	1 1/8	1/4
1 1/4	1 3/8	1/4
1 1/2	1 5/8	1/4
1 3/4	1 7/8	1/4
2	2 1/8	1/4
2 1/4	2 3/8	1/4
2 1/2	2 5/8	1/4

SHAPE CODE
ROUND = C
OBLONG = O
RECTANGULAR = R
RADIUS RECTANGULAR = RR

AVAILABLE SURFACE TREATMENTS
IONITRIDING
TITANIUM NITRIDE (TiN)
TITANIUM CARBONITRIDE (TiCN)
CHROMIUM NITRIDE (CrN)

(TECHNICAL INFORMATION SEE PAGE 18)

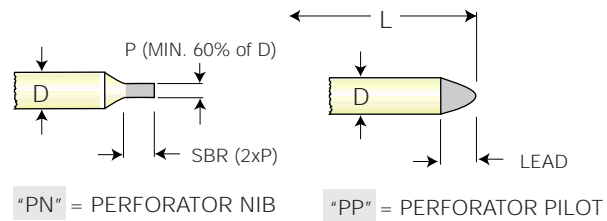
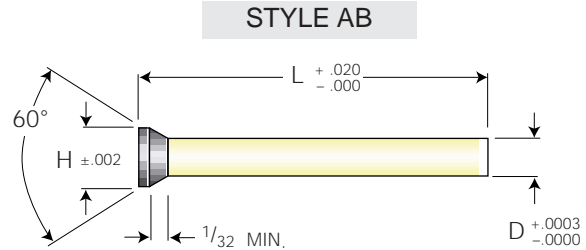
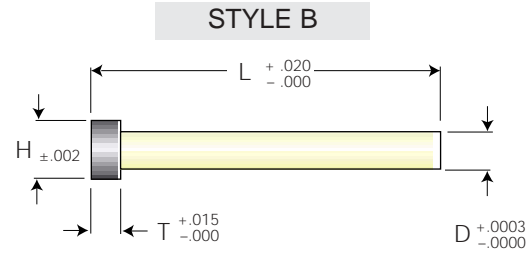




PERFORATOR PUNCHES

“P” SERIES STOCK DELIVERY

H.S.S.									
CAT. No.	SIZE RANGE D .001 Increments No.	T	H	MAXIMUM STANDARD STOCK LENGTHS					
				2	2 1/4	2 1/2	2 3/4	3	3 1/2
P-1	.030 - .040	3/32	.070						
P-2	.041 - .055	3/32	.085						
P-3	.056 - .070	3/32	.100						
P-4	.071 - .085	3/32	.115						
P-5	.086 - .100	3/32	.130						
P-6	.101 - .115	3/32	.145						
P-7	.116 - .130	3/32	.160						
P-8	.131 - .145	3/32	.175						
P-9	.146 - .160	3/32	.190						
P-10	.161 - .175	3/32	.205						
P-11	.176 - .189	1/8	.220						
P-12	.190 - .205	1/8	.235						
P-13	.206 - .220	1/8	.250						
P-14	.221 - .235	1/8	.265						
P-15	.236 - .250	1/8	.280						
P-16	.251 - .265	1/8	.295						
P-17	.266 - .280	1/8	.310						
P-18	.281 - .295	1/8	.325						
P-19	.296 - .310	1/8	.340						
P-20	.311 - .312	1/8	.355						



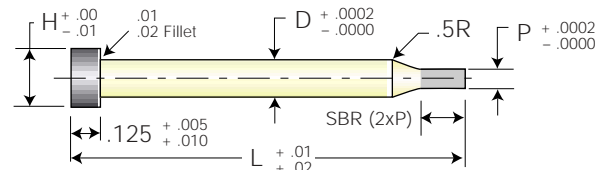
PLEASE NOTE: PERFORATOR PILOT LEAD IS INCLUDED IN OVERALL LENGTH ORDERED, AND NOT ADDED TO LENGTH ORDERED, LIKE STANDARD HEAD TYPE AND BALL LOCK PILOTS.

THE PERFORATORS CAN BE SHORTENED, NIB POINTED OR PILOT NOSED AT AN ADDITIONAL CHARGE.

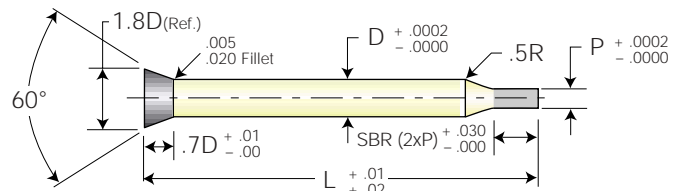
REGULAR PUNCHES

BODY CODE	SHANK D	HEAD DIE H	POINT LENGTH SBR	RANGE P	OVERALL LENGTH L				
					1 1/2	1 3/4	2	2 1/4	2 1/2
06	.0625	.125		.0310-.0624					
09	.0938	.160		.0626-.0937					
12	.1250	.190		.0939-.1249					
15	.1562	.220	2 x P	.1251-.1561	150	175	200	225	250
18	.1875	.250		.1563-.1874					
21	.2188	.282		.1876-.2187					
25	.2500	.313		.2189-.2499					

“PC” SERIES



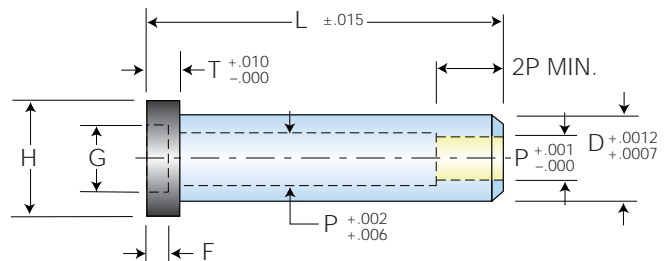
“PV” SERIES



QUILL BUSHINGS

Q SERIES

CAT. No.	P	D	H	T	G	F	LENGTHS					
							3/4	1	1 1/4	1 1/2	1 3/4	2
Q18	.040 - .060	3/16	1/4	3/32	1/8	3/32						
Q25	.060 - .126	1/4	3/8	1/8	3/16	3/32						
Q31	.080 - .160	5/16	7/16	1/8	7/32	3/32						
Q37	.161 - .218	3/8	1/2	1/8	1/4	1/8						
Q43	.200 - .250	7/16	9/16	1/8	9/32	1/8						
Q50	.218 - .312	1/2	5/8	3/16	3/8	1/8						



QUILL BUSHINGS ARE NOT HARDENED

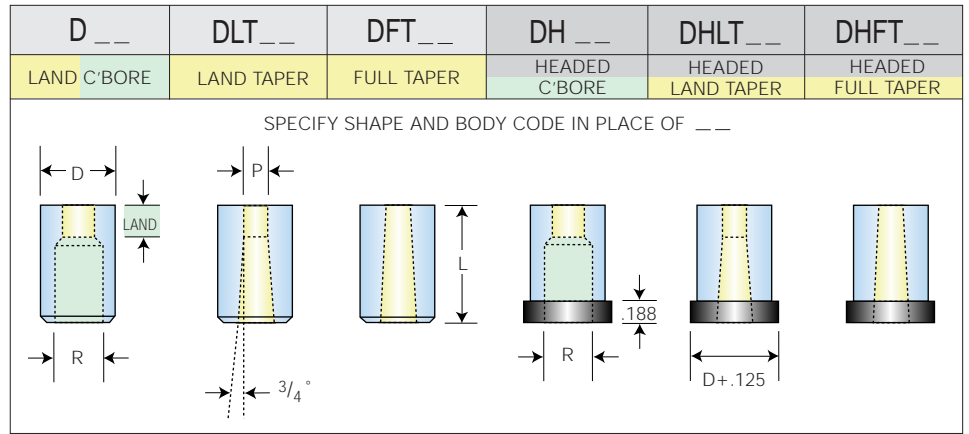


DIES

HEADLESS/HEADED

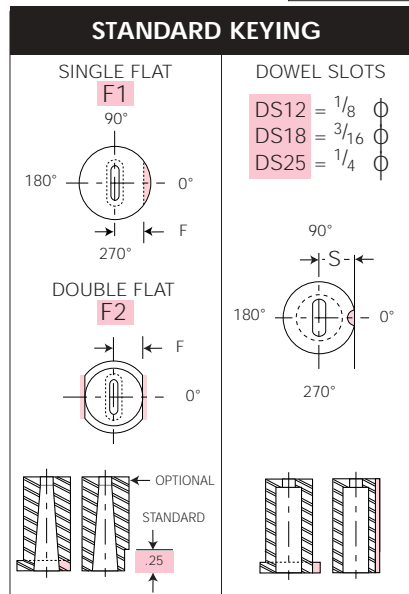
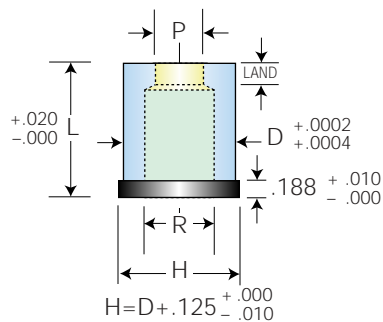
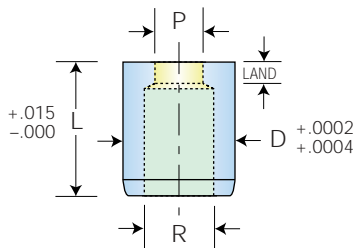
PRESS FIT

INCH



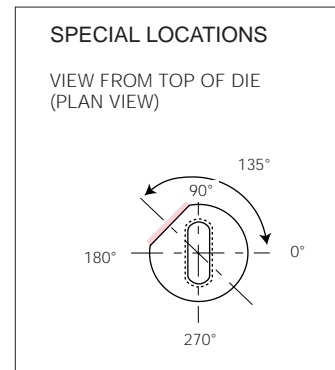
DIE CODE	SHAPE CODE	BODY	BODY & STEEL CODE		MIN. LAND	LENGTHS IN 1/8" INCREMENTS		C'BORE STYLE				TAPERED STYLE	
			M2	A2		STANDARD	EXTENDED	MIN. P ROUND	MIN. P/W	MAX. P/G SHAPE	R MAX. C'BORE	MIN. P/W	MAX. P/G
D DIE (C'BORE)	C ROUND 	1/4	25	25A	5/32	3/4 - 1 1/4	1 3/8 - 1 1/2	.064	.062	.135	.156	.062	.170
		5/16	31	31A	5/32	3/4 - 1 1/4	1 3/8 - 1 1/2	.064	.062	.175	.195	.062	.212
		3/8	37	37A	3/16	3/4 - 1 1/2	1 3/4 - 2	.064	.062	.205	.228	.062	.255
DLT DIE LAND TAPER	O OBLONG 	7/16	43	43A	3/16	3/4 - 1 1/2	1 3/4 - 2	.064	.062	.245	.265	.062	.297
		1/2	50	50A	3/16	3/4 - 1 1/2	1 3/4 - 2	.064	.062	.285	.312	.062	.344
		5/8	62	62A	3/16	3/4 - 1 1/2	1 3/4 - 2	.125	.075	.365	.391	.075	.425
DFT DIE FULL TAPER	R RECTANGLE (SQUARE) 	3/4	75	75A	3/16	3/4 - 1 1/2	1 3/4 - 2	.136	.075	.435	.468	.075	.510
		7/8	87	87A	1/4	3/4 - 1 1/2	1 3/4 - 2	.275	.075	.545	.578	.075	.595
		1	100	100A	1/4	3/4 - 1 1/2	1 3/4 - 2	.350	.075	.675	.828	.075	.680
DH DIE HEADED (C'BORE)	RR RADIUS RECTANGLE 	1 1/4	125	125A	5/16	3/4 - 1 1/2	1 3/4 - 2	.500	.075	.800	.843	.075	.825
		1 1/2	150	150A	3/8	3/4 - 1 1/2	1 3/4 - 2	.600	.075	1.050	1.094	.075	1.075
		1 3/4	175	175A	3/8	3/4 - 1 1/2	1 3/4 - 2	.750	.075	1.400	1.430	.075	1.400
DHLT DIE HEAD LAND TAPER	W WIRE BLANK 	2	200	200A	3/8	3/4 - 1 1/2	1 3/4 - 2	.875	.075	1.600	1.630	.075	1.600
		2 1/4	225	225A	3/8	3/4 - 1 1/2	1 3/4 - 2	1.000	.075	1.800	1.830	.075	1.800
		2 1/2	250	250A	3/8	3/4 - 1 1/2	1 3/4 - 2	1.125	.075	2.000	2.030	.075	2.000
DHFT DIE HEADED FULL TAPER		2 3/4	275	275A	3/8	3/4 - 1 1/2	1 3/4 - 2	1.250	.075	2.200	2.230	.075	2.200
		3	300	300A	3/8	3/4 - 1 1/2	1 3/4 - 2	1.375	.075	2.300	2.350	.075	2.400

TOLERANCE	ROUNDS P	+ .0005	TIR .0005
	SHAPE P/W	+ .0005	TIR .001



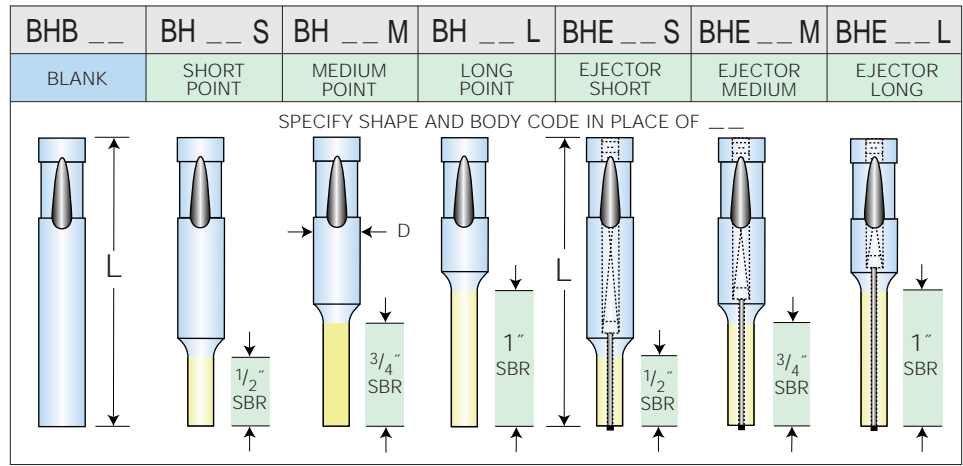
HOW TO ORDER: EXAMPLE

Qty.	Die Style	Shape	Body & Steel	Length	P x W	R	Rad	Keying
2	D	C	62	1 1/4"	.300			
6	DH	O	100	1 1/4"	.256 x .650			DS12





PUNCHES BALL-LOCK HEAVY DUTY INCH

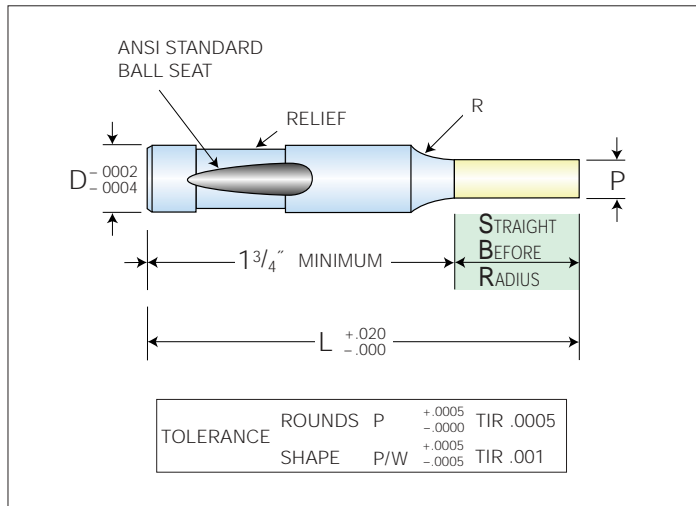


BALL-LOCK CODE	SHAPE CODE	BODY	BODY & STEEL CODE		SBR CODE	LENGTHS IN 1/4" INCREMENTS		MIN. P/W	MIN. P/W EJECT.	USES EJECT. KIT	STANDARD KEYING PLAN VIEW SHOWN
			M2	A2		STANDARD	EXTENDED				
BH BALL-LOCK HEAVY DUTY	C ROUND 	3/8	37	37A	S 1/2" SBR *(STANDARD) (.062 - .092)	2 1/2 - 5	5 1/4 - 6	.125	.125	EK41	<p>Standard Ball Seat Location</p>
		1/2	50	50A		2 1/2 - 5	5 1/4 - 6	.187	.187	EK58	
BHE BALL-LOCK HEAVY DUTY EJECTOR	O OBLONG 	5/8	62	62A	M 3/4" SBR *(STANDARD) (.093)	2 1/2 - 5	5 1/4 - 6	.250	.250	EK58	
		3/4	75	75A		2 1/2 - 5	5 1/4 - 6	.312	.312	EK89	
	R RECTANGLE (SQUARE) 	7/8	87	87A		2 3/4 - 5	5 1/4 - 6	.375	.375	EK89	
		1	100	100A		3 - 5	5 1/4 - 6	.437	.437	EK89	
		1 1/4	125	125A	L 1" SBR	3 - 5	5 1/4 - 6	.500	.500	EK12	Custom Location On Request
	RR RADIUS RECTANGLE 										
	B BLANK 										

M2 STEEL IS SHIPPED UNLESS OTHERWISE SPECIFIED
***STANDARD SBR IS SHIPPED UNLESS OTHERWISE SPECIFIED**
 P OR G DIMENSION CANNOT EXCEED BODY DIAMETER
 EJECTOR PIN LOCKHOLE AVAILABLE ON REQUEST N/C

HOW TO ORDER: EXAMPLE						
Qty.	Head Code	Shape	Body & Steel	SBR Code	Length	P x W
2	BH	C	50	M	3"	.375
6	BHE	O	62	M	3"	.250 x .560

AVAILABLE SURFACE TREATMENTS
 IONITRIDING
 TITANIUM NITRIDE (TiN)
 TITANIUM CARBONITRIDE (TiCN)
 CHROMIUM NITRIDE (CrN)
 (TECHNICAL INFORMATION SEE PAGE 18)

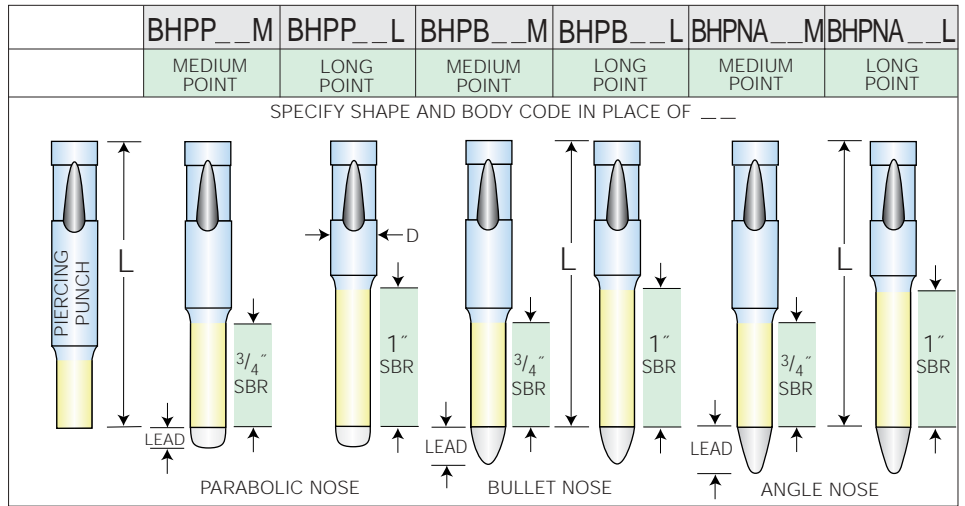


COMPONENT	PIN	SPRING	SET SCREW
Kit #	D	D	D
EK23	.023	.075	4-40
EK29	.029	.090	5-40
EK41	.041	.125	8-32
EK58	.058	.150	10-32
EK89	.089	.187	1/4-28
EK12	.120	.270	5/16-24



PILOT BALL-LOCK HEAVY DUTY INCH

NOTE: † PILOT NOSE LEAD LENGTH IS AUTOMATICALLY ADDED TO THE "L" DIMENSION ORDERED



PILOT CODE	PILOT NOSE STYLES	BODY	BODY & STEEL CODE		SBR CODE	LENGTHS IN 1/4" INCREMENTS		MIN. P DIM.																					
			M2	A2		STANDARD	EXTENDED																						
BHPP BALL LOCK HEAVY DUTY PILOT PARABOLIC NOSE	<table border="1"> <thead> <tr> <th>"P" RANGE</th> <th>† LEAD LENGTH</th> </tr> </thead> <tbody> <tr> <td>.125 - 1.250</td> <td>.250</td> </tr> </tbody> </table>	"P" RANGE	† LEAD LENGTH	.125 - 1.250	.250	3/8	37	37A	*M 3/4" SBR STANDARD	2 1/2 - 5	5 1/4 - 5 1/2	.125																	
		"P" RANGE	† LEAD LENGTH																										
		.125 - 1.250	.250																										
		1/2	50	50A	2 1/2 - 5	5 1/4 - 5 1/2	.187																						
		5/8	62	62A	2 1/2 - 5	5 1/4 - 5 1/2	.312																						
		3/4	75	75A	2 1/2 - 5	5 1/4 - 5 1/2	.437																						
7/8	87	87A	L 1" SBR	2 3/4 - 5	5 1/4 - 5 1/2	.625																							
1	100	100A		3 - 5	5 1/4 - 5 1/2	.750																							
BHPB BALL LOCK HEAVY DUTY PILOT BULLET NOSE	<table border="1"> <thead> <tr> <th>"P" RANGE</th> <th>† MAXIMUM LEAD LENGTH</th> </tr> </thead> <tbody> <tr> <td>.125 - .249</td> <td>.125/.187</td> </tr> <tr> <td>.250 - .624</td> <td>.500</td> </tr> <tr> <td>.625 - 1.250</td> <td>.750</td> </tr> </tbody> </table>	"P" RANGE	† MAXIMUM LEAD LENGTH	.125 - .249	.125/.187	.250 - .624	.500	.625 - 1.250	.750	1 1/4	125	125A	3 - 5	5 1/4 - 5 1/2	.999														
		"P" RANGE	† MAXIMUM LEAD LENGTH																										
		.125 - .249	.125/.187																										
.250 - .624	.500																												
.625 - 1.250	.750																												
BHPNA BALL LOCK HEAVY DUTY PILOT NEW ANGLE NOSE	<table border="1"> <thead> <tr> <th>"P" RANGE</th> <th>† MAXIMUM LEAD LENGTH</th> </tr> </thead> <tbody> <tr> <td>.125 - .250</td> <td>.25</td> </tr> <tr> <td>.251 - .313</td> <td>.31</td> </tr> <tr> <td>.314 - .375</td> <td>.37</td> </tr> <tr> <td>.376 - .438</td> <td>.43</td> </tr> <tr> <td>.439 - .500</td> <td>.50</td> </tr> <tr> <td>.501 - .625</td> <td>.62</td> </tr> <tr> <td>.626 - .750</td> <td>.75</td> </tr> <tr> <td>.751 - .875</td> <td>.87</td> </tr> <tr> <td>.876 - 1.000</td> <td>1.00</td> </tr> <tr> <td>1.001 - 1.250</td> <td>1.25</td> </tr> </tbody> </table>	"P" RANGE	† MAXIMUM LEAD LENGTH	.125 - .250	.25	.251 - .313	.31	.314 - .375	.37	.376 - .438	.43	.439 - .500	.50	.501 - .625	.62	.626 - .750	.75	.751 - .875	.87	.876 - 1.000	1.00	1.001 - 1.250	1.25						
		"P" RANGE	† MAXIMUM LEAD LENGTH																										
		.125 - .250	.25																										
		.251 - .313	.31																										
		.314 - .375	.37																										
		.376 - .438	.43																										
		.439 - .500	.50																										
		.501 - .625	.62																										
.626 - .750	.75																												
.751 - .875	.87																												
.876 - 1.000	1.00																												
1.001 - 1.250	1.25																												

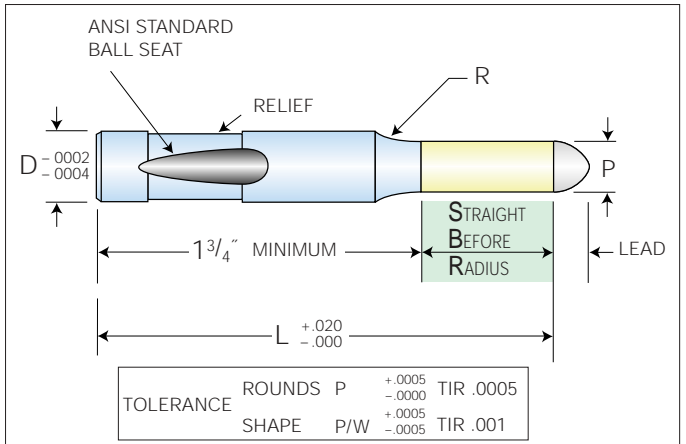
LONGER SBR AVAILABLE † LEAD LENGTH IS AUTOMATICALLY ADDED TO THE "L" DIMENSION ORDERED.

HOW TO ORDER: EXAMPLE						
Qty.	Pilot Style	Shape	Body & Steel	SBR Code	Length	P
2	BHPB	C	62	M	3"	.500

M2 STEEL IS SHIPPED UNLESS OTHERWISE SPECIFIED.
*M-SBR IS SHIPPED UNLESS OTHERWISE SPECIFIED.

SHAPE CODE
 ROUND = C
 OBLONG = O
 RECTANGULAR = R
 RADIUS RECTANGULAR = RR

AVAILABLE SURFACE TREATMENTS
 IONITRIDING
 TITANIUM NITRIDE (TiN)
 TITANIUM CARBONITRIDE (TiCN)
 CHROMIUM NITRIDE (CrN)
 (TECHNICAL INFORMATION SEE PAGE 18)



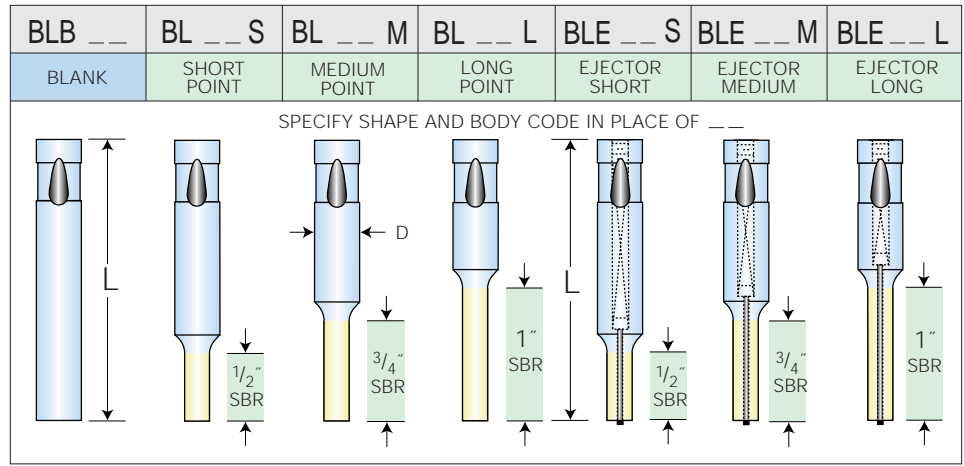


PUNCHES

BALL-LOCK

LIGHT DUTY

INCH



BALL-LOCK CODE	SHAPE CODE	BODY	BODY & STEEL CODE		SBR CODE	LENGTHS IN 1/4" INCREMENTS		MIN. P/W	MIN. P/W EJECT.	USES EJECT. KIT	STANDARD KEYING PLAN VIEW SHOWN
			M2	A2		STANDARD	EXTENDED				
BL BALL-LOCK LIGHT DUTY	C ROUND 	1/4	25	25A	S 1/2" SBR *(STANDARD) (.062 - .092)	2 - 3 1/2	3 3/4 - 6	.062	.093	EK23	<p>Standard Ball Seat Location</p> <p>90°</p> <p>180°</p> <p>0°</p> <p>270°</p> <p>Custom Location On Request</p>
		3/8	37	37A		2 - 4	4 1/4 - 6	.125	.125	EK41	
	O OBLONG 	1/2	50	50A	M 3/4" SBR *(STANDARD) (.093 >)	2 - 4	4 1/4 - 6	.187	.187	EK58	
		5/8	62	62A		2 - 4	4 1/4 - 6	.250	.250	EK58	
BLE BALL-LOCK LIGHT DUTY EJECTOR	R RECTANGLE (SQUARE) 	3/4	75	75A		2 1/4 - 4	4 1/4 - 6	.312	.312	EK89	
		7/8	87	87A		2 1/2 - 4	4 1/4 - 6	.375	.375	EK89	
		1	100	100A	2 1/2 - 4	4 1/4 - 6	.437	.437	EK89		
	RR RADIUS RECTANGLE 										
	B BLANK 										

M2 STEEL IS SHIPPED UNLESS OTHERWISE SPECIFIED
***STANDARD SBR IS SHIPPED UNLESS OTHERWISE SPECIFIED**
 P OR G DIMENSION CANNOT EXCEED BODY DIAMETER
 EJECTOR PIN LOCKHOLE AVAILABLE ON REQUEST

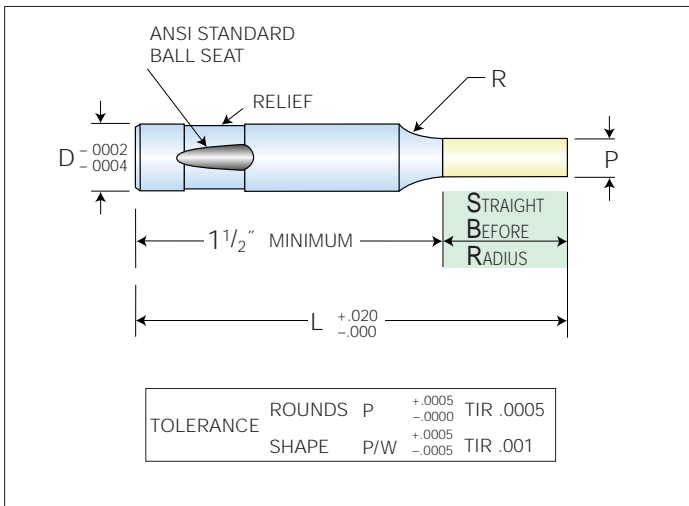
HOW TO ORDER: EXAMPLE

Qty.	Head Code	Shape	Body & Steel	SBR Code	Length	P x W
4	BL	C	37A	M	2 1/4"	.250
6	BLE	R	50	M	2 1/4"	.187 x .375

AVAILABLE SURFACE TREATMENTS

- IONITRIDING
- TITANIUM NITRIDE (TiN)
- TITANIUM CARBONITRIDE (TiCN)
- CHROMIUM NITRIDE (CrN)

(TECHNICAL INFORMATION SEE PAGE 18)

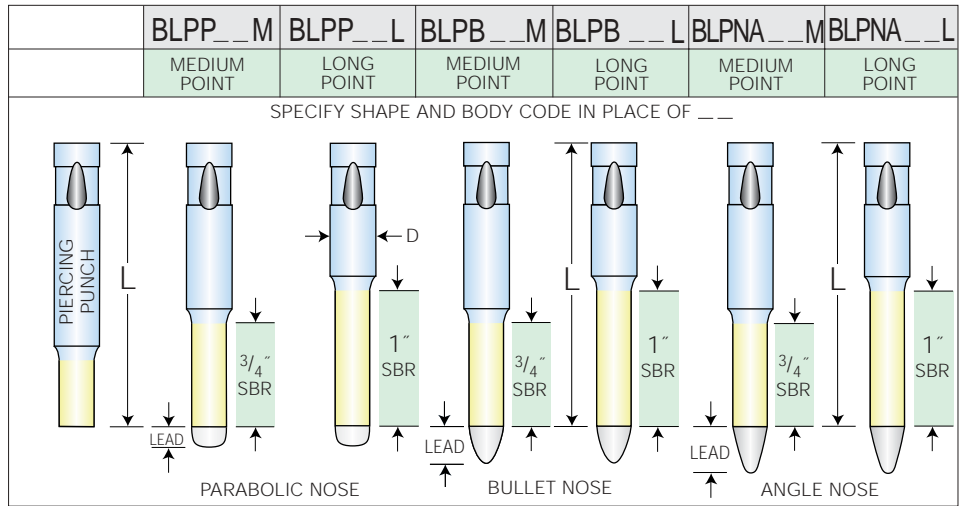


COMPONENT	PIN	SPRING	SET SCREW
Kit #	D	D	D
EK23	.023	.075	4-40
EK29	.029	.090	5-40
EK41	.041	.125	8-32
EK58	.058	.150	10-32
EK89	.089	.187	1/4-28
EK12	.120	.270	5/16-24



PILOT BALL-LOCK LIGHT DUTY INCH

NOTE: † PILOT NOSE LEAD LENGTH IS AUTOMATICALLY ADDED TO THE "L" DIMENSION ORDERED



PILOT CODE	PILOT NOSE STYLES	BODY	BODY & STEEL CODE		SBR CODE	LENGTHS IN 1/4" INCREMENTS		MIN. P DIM.																				
			M2	A2		STANDARD	EXTENDED																					
BLPP BALL LOCK LIGHT DUTY PILOT PARABOLIC NOSE	<table border="1"> <thead> <tr> <th>"P" RANGE</th> <th>† LEAD LENGTH</th> </tr> </thead> <tbody> <tr> <td>.125 - 1.250</td> <td>.250</td> </tr> </tbody> </table>	"P" RANGE	† LEAD LENGTH	.125 - 1.250	.250	1/4	25	25A	*M 3/4" SBR STANDARD L 1" SBR	2 - 2 3/4	3 - 5 1/2	.093																
		"P" RANGE	† LEAD LENGTH																									
		.125 - 1.250	.250																									
		3/8	37	37A	2 - 3 1/2	3 3/4 - 5 1/2	.125																					
		1/2	50	50A	2 - 4	4 1/4 - 5 1/2	.187																					
		5/8	62	62A	2 - 4	4 1/4 - 5 1/2	.312																					
3/4	75	75A	2 1/4 - 4	4 1/4 - 5 1/2	.437																							
7/8	87	87A	2 1/2 - 4	4 1/4 - 5 1/2	.625																							
BLPB BALL LOCK LIGHT DUTY PILOT BULLET NOSE	<table border="1"> <thead> <tr> <th>"P" RANGE</th> <th>† MAXIMUM LEAD LENGTH</th> </tr> </thead> <tbody> <tr> <td>.125 - .249</td> <td>.125/.187</td> </tr> <tr> <td>.250 - .624</td> <td>.500</td> </tr> <tr> <td>.625 - 1.250</td> <td>.750</td> </tr> </tbody> </table>	"P" RANGE	† MAXIMUM LEAD LENGTH	.125 - .249	.125/.187	.250 - .624	.500	.625 - 1.250	.750	1	100	100A	2 1/2 - 4	4 1/4 - 5 1/2	.750													
		"P" RANGE	† MAXIMUM LEAD LENGTH																									
		.125 - .249	.125/.187																									
.250 - .624	.500																											
.625 - 1.250	.750																											
				LONGER SBR AVAILABLE	† LEAD LENGTH IS AUTOMATICALLY ADDED TO THE "L" DIMENSION ORDERED.																							
BLPNA BALL LOCK LIGHT DUTY PILOT NEW ANGLE NOSE	<table border="1"> <thead> <tr> <th>"P" RANGE</th> <th>† MAXIMUM LEAD LENGTH</th> </tr> </thead> <tbody> <tr> <td>.125 - .250</td> <td>.25</td> </tr> <tr> <td>.251 - .313</td> <td>.31</td> </tr> <tr> <td>.314 - .375</td> <td>.37</td> </tr> <tr> <td>.376 - .438</td> <td>.43</td> </tr> <tr> <td>.439 - .500</td> <td>.50</td> </tr> <tr> <td>.501 - .625</td> <td>.62</td> </tr> <tr> <td>.626 - .750</td> <td>.75</td> </tr> <tr> <td>.751 - .875</td> <td>.87</td> </tr> <tr> <td>.876 - 1.000</td> <td>1.00</td> </tr> </tbody> </table>	"P" RANGE	† MAXIMUM LEAD LENGTH	.125 - .250	.25	.251 - .313	.31	.314 - .375	.37	.376 - .438	.43	.439 - .500	.50	.501 - .625	.62	.626 - .750	.75	.751 - .875	.87	.876 - 1.000	1.00							
		"P" RANGE	† MAXIMUM LEAD LENGTH																									
		.125 - .250	.25																									
		.251 - .313	.31																									
		.314 - .375	.37																									
		.376 - .438	.43																									
		.439 - .500	.50																									
		.501 - .625	.62																									
.626 - .750	.75																											
.751 - .875	.87																											
.876 - 1.000	1.00																											

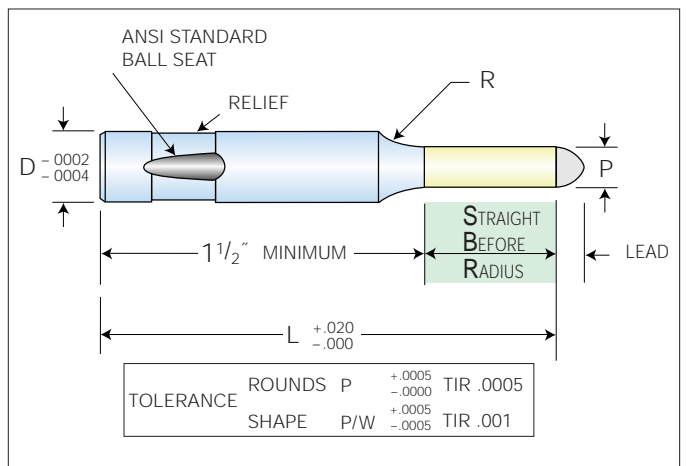
HOW TO ORDER: EXAMPLE

Qty.	Pilot Style	Shape	Body & Steel	SBR Code	Length	P
2	BLPB	C	62	M	3"	.500

M2 STEEL IS SHIPPED UNLESS OTHERWISE SPECIFIED.
 *M-SBR IS SHIPPED UNLESS OTHERWISE SPECIFIED.

SHAPE CODE
 ROUND = C
 OBLONG = O
 RECTANGULAR = R
 RADIUS RECTANGULAR = RR

AVAILABLE SURFACE TREATMENTS
 IONITRIDING
 TITANIUM NITRIDE (TiN)
 TITANIUM CARBONITRIDE (TiCN)
 CHROMIUM NITRIDE (CrN)
 (TECHNICAL INFORMATION SEE PAGE 18)



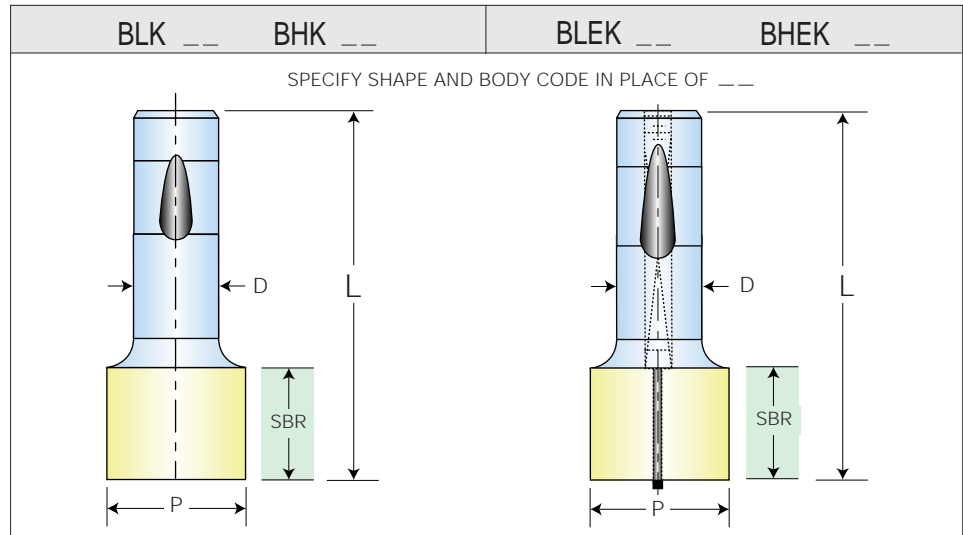


KNOB PUNCHES

BALL-LOCK

LIGHT DUTY
HEAVY DUTY

INCH



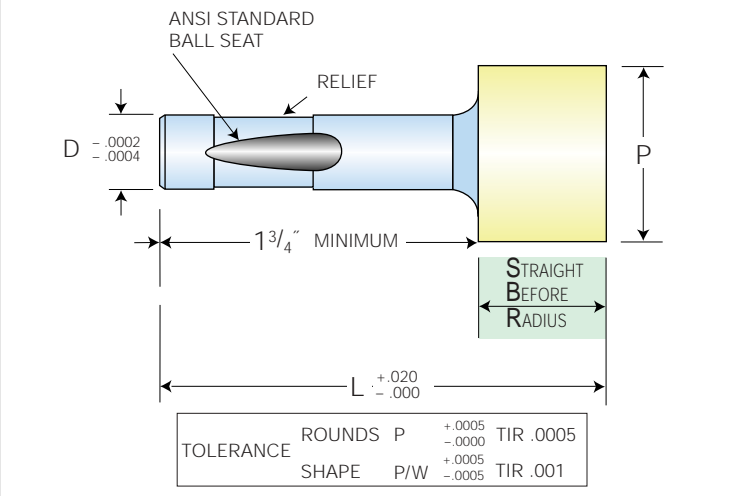
BALL-LOCK CODE	SHAPE CODE	BODY	BODY & STEEL CODE		SBR CODE	STANDARD LENGTHS	MAX. P/G	MIN. W	USES EJECT. KIT	STANDARD KEYING PLAN VIEW SHOWN
			M2	A2						
BLK BALL-LOCK LIGHT DUTY KNOB	C ROUND 	1/2	50	50A	1" SBR	3 - 3 1/2 - 4	1.250	.188	EK58	
		5/8	62	62A		3 - 3 1/2 - 4	1.500	.250	EK58	
BLEK BALL-LOCK LIGHT DUTY EJECTOR KNOB	O OBLONG 	3/4	75	75A		3 - 3 1/2 - 4	1.500	.312	EK89	
		7/8	87	87A		3 - 3 1/2 - 4	1.750	.375	EK89	
BHK BALL-LOCK HEAVY DUTY KNOB	R RECTANGLE (SQUARE) 	1	100	100A		3 - 3 1/2 - 4	1.750	.437	EK89	
		1 1/4	125	125A		3 - 3 1/2 - 4	2.750	.500	EK12	
BHEK BALL-LOCK HEAVY DUTY EJECTOR KNOB	RR RADIUS RECTANGLE 									
	B BLANK 									

M2 STEEL IS SHIPPED UNLESS OTHERWISE SPECIFIED
SPECIAL LENGTHS SUPPLIED ON REQUEST
SPECIAL SBR SUPPLIED ON REQUEST

HOW TO ORDER: EXAMPLE

Qty.	Head Code	Shape	Body & Steel	SBR Code	Length	P x W
4	BHK	C	100	L	3"	1.375
6	BHEK	R	100	L	3"	1.375 x .560

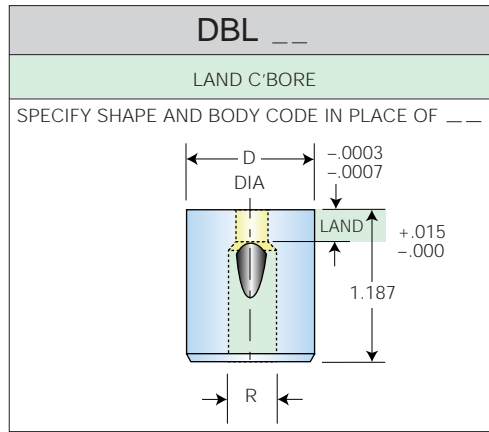
AVAILABLE SURFACE TREATMENTS
 IONITRIDING
 TITANIUM NITRIDE (TiN)
 TITANIUM CARBONITRIDE (TiCN)
 CHROMIUM NITRIDE (CrN)
 (TECHNICAL INFORMATION SEE PAGE 18)



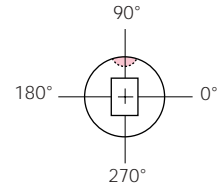
COMPONENT	PIN	SPRING	SET SCREW
Kit #	D	D	D
EK58	.058	.150	10 - 32
EK89	.089	.187	1/4 - 28
EK12	.120	.270	5/16 - 24



DIES BALL LOCK INCH



ORIENTATION



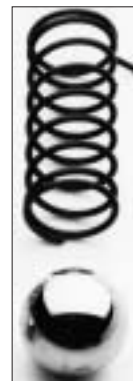
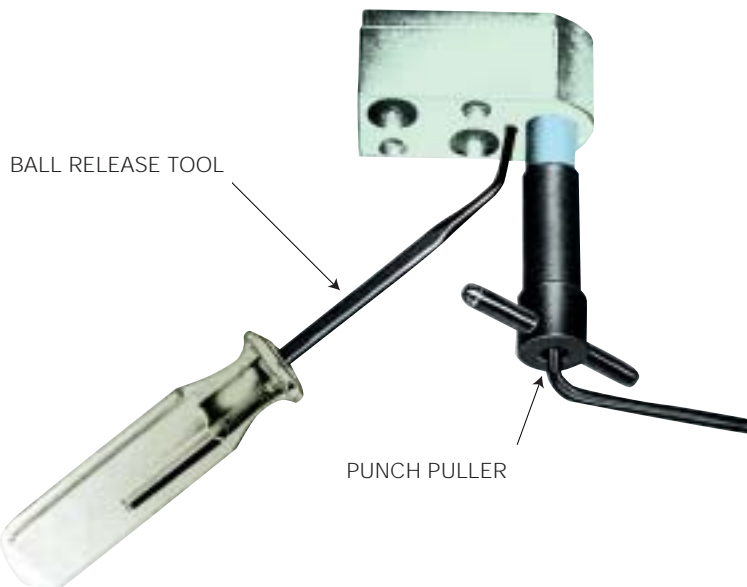
The Standard Ball Seat location is at 90°. Alternate locations of 0°, or 180° or 270° can be specified.

Custom Ball Seat locations can be specified at any degree counterclockwise from 0°.

DIE CODE	SHAPE CODE	BODY	BODY & STEEL CODE		MIN. LAND	C'BORE STYLE			R MAX. C' BORE
			M2	A2		MIN. P ROUND	MIN. W SHAPE	MAX. P/G SHAPE	
DBL DIE BALL LOCK LIGHT DUTY	C ROUND	1/2	50	50A	3/16	.064	.064	.195	.250
		5/8	62	62A	3/16	.125	.095	.285	.312
	O OBLONG	3/4	75	75A	3/16	.196	.125	.345	.422
		7/8	87	87A	1/4	.285	.125	.435	.547
	R RECTANGLE (SQUARE)	1	100	100A	1/4	.350	.160	.545	.687
		RR RADIUS RECTANGLE	1 1/4	125	125A	5/16	.440	.189	.655
	W WIRE BLANK	1 1/2	150	150A	3/8	.546	.220	.780	1.093
1 3/4		175	175A	3/8	.660	.250	1.035	1.281	

TOLERANCE	ROUNDS P	+ .0005	TIR .0005
		- .0000	
SHAPE P/W		+ .0005	TIR .001
		- .0005	

BALL-LOCK ACCESSORIES



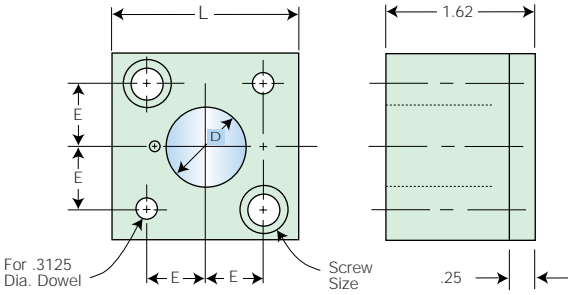
BALL DIA.	DESCRIPTION	FITS RETAINER STYLE
1/4	RETAINER SPRING	1/4 & 3/8 LIGHT DUTY
1/4	RETAINER BALL	
5/16	RETAINER SPRING	1/2 & 5/8 LIGHT DUTY
5/16	RETAINER BALL	
3/8	RETAINER SPRING	3/4 TO 1 3/4 LIGHT DUTY 3/8 HEAVY
3/8	RETAINER SPRING	
1/2	RETAINER SPRING	1/2 TO 1 1/4 HEAVY DUTY
1/2	RETAINER BALL	
3/4	RETAINER SPRING	EXTRA HEAVY DUTY
3/4	RETAINER BALL	



BALL LOCK RETAINERS SQUARE & END STYLE

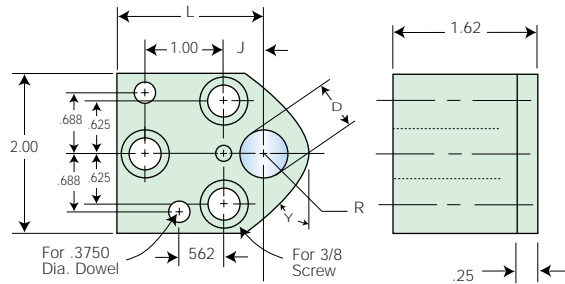
Retainer Sets Include:
Backing Plate, Ball, Spring,
Screws & Dowels

RETAINER HEAVY DUTY SQUARE TYPE



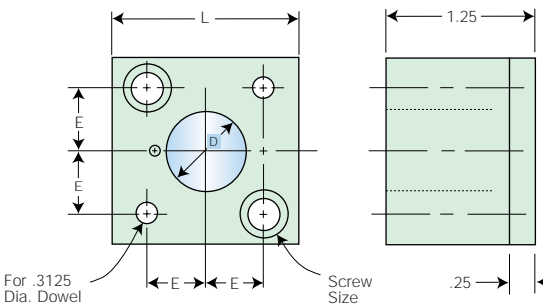
CAT. No.	OLD No.	D	L	E	SCREW SIZE
RHS50	R33	.5000	1.88	.562	3/8 - 16
RHS62	R34	.6250	2.00	.625	3/8 - 16
RHS75	R35	.7500	2.12	.688	3/8 - 16
RHS87	R36	.8750	2.38	.750	1/2 - 13
RHS100	R37	1.0000	2.38	.750	1/2 - 13
RHS125	R38	1.2500	2.62	.812	1/2 - 13

RETAINER HEAVY DUTY END TYPE



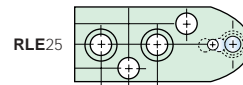
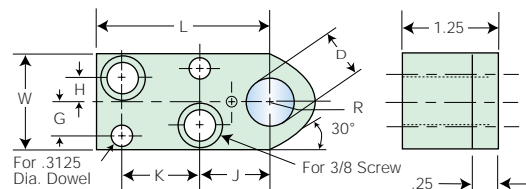
CAT. No.	OLD No.	D	L	J	R	Y
RHE50	R53	.5000	1.75	.375	.50	40°
RHE62	R54	.6250	1.81	.438	.56	45°
RHE75	R55	.7500	1.88	.500	.69	60°
RHE87	R56	.8750	1.94	.562	.75	60°
RHE100	R57	1.0000	2.00	.625	.81	60°
RHE125	R58	1.2500	2.12	.750	1.00	-

RETAINER LIGHT DUTY SQUARE TYPE



CAT. No.	OLD No.	D	L	E	SCREW SIZE
RLS25	R21	.2500	1.25	.312	1/4 - 20
RLS37	R22	.3750	1.38	.375	5/16 - 18
RLS50	R23	.5000	1.50	.438	5/16 - 18
RLS62	R24	.6250	1.62	.500	5/16 - 16
RLS75	R25	.7500	1.88	.562	3/8 - 16
RLS87	R26	.8750	2.00	.625	3/8 - 16
RLS100	R27	1.0000	2.25	.750	3/8 - 16
RLS125	R28	1.2500	2.25	.750	3/8 - 16
RLS150	R29	1.5000	2.75	1.00	3/8 - 16
RLS175	R30	1.7500	2.75	1.00	3/8 - 16

RETAINER LIGHT DUTY END TYPE



CAT. No.	OLD No.	D	G	H	J	K	L	R	W
RLE25	R41	.2500	.281	C/L	.500		2.0	.31	1.00
RLE37	R42	.3750	.375	.281	.906	.969	2.25	.38	1.25
RLE50	R43	.5000	.375	.281	.906	.969	2.25	.50	1.25
RLE62	R44	.6250	.375	.281	.906	.969	2.25	.56	1.25
RLE75	R45	.7500	.438	.344	1.125	1.000	2.50	.69	1.38
RLE87	R46	.8750	.438	.344	1.125	1.000	2.50	.75	1.50
RLE100	R47	1.0000	.438	.344	1.125	1.000	2.50	.81	1.62
RLE125	R48	1.2500	.562	.562	.875	1.125	2.37	1.00	1.87



BALL LOCK PUNCH RETAINERS TRIANGLE STYLE - INCH

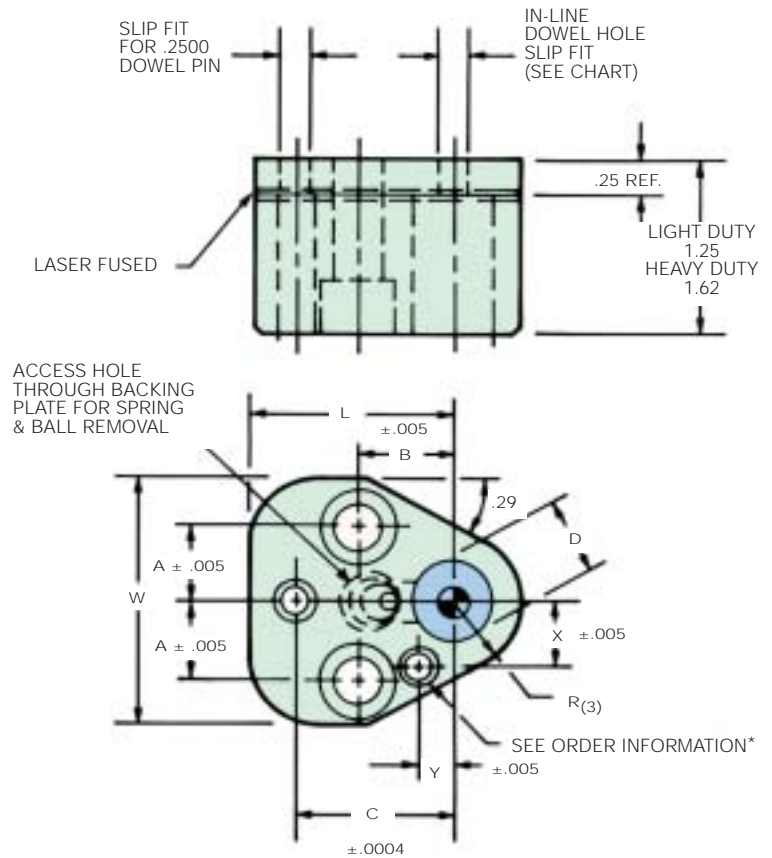
Order Information

Retainer Includes:

- 1 Ball & Spring
- 2 Screws
- 2 Round Air Vented Dowel Pins
Note: All 1/4 dowels are tapped for easy removal
- 1 Ball Release Set Screw
- 1 Jam Screw for Access Hole

Specify: Quantity and Catalogue Number
 Example: 6 pcs., RHT50
 6 pcs., RHT50 Grind Third Dowel

*The third dowel hole is ground slip fit for a .2500 dowel pin, see example.



CATALOGUE NUMBER	REFERENCE NUMBER	"D"	"A"	"B"	"L"	"R"	"C"	"W"	"X"	"Y"	IN-LINE DOWEL	SCREW SIZE
RETAINER LIGHT DUTY TRIANGLE												
RLT25	71 - PR	.2500	.438	.750	1.38	.38	1.060	1.61	.354	.295	.1250	5/16 - 18 x 1.50
RLT37	72 - PR	.3750	.438	.750	1.38	.38	1.060	1.61	.354	.295	.1875	5/16 - 18 x 1.50
RLT50	73 - PR	.5000	.562	.750	1.50	.50	1.180	1.86	.472	.256	.2500	3/8 - 16 x 1.50
RLT62	74 - PR	.6250	.625	.750	1.56	.56	1.250	1.98	.532	.236	.2500	3/8 - 16 x 1.50
RLT75	75 - PR	.7500	.688	.750	1.69	.69	1.320	2.24	.650	.197	.2500	3/8 - 16 x 1.50
RLT87	‡ 76 - PR	.8750	.688	.750	1.75	.75	1.400	2.47	.728	.197	.2500	3/8 - 16 x 1.50
RLT100	77 - PR	1.0000	.781	.938	1.88	.88	1.600	2.61	.866	.276	.2500	1/2 - 13 x 1.75
RETAINER HEAVY DUTY TRIANGLE												
RHT37	82 - PR	.3750	.438	.750	1.38	.38	1.060	1.61	.354	.295	.1875	5/16 - 18 x 1.75
RHT50	83 - PR	.5000	.562	.750	1.50	.50	1.180	1.86	.472	.256	.2500	3/8 - 16 x 1.75
RHT62	84 - PR	.6250	.625	.750	1.56	.56	1.250	1.98	.532	.236	.2500	3/8 - 16 x 1.75
RHT75	85 - PR	.7500	.688	.750	1.69	.69	1.320	2.24	.650	.197	.2500	3/8 - 16 x 1.75
RHT87	‡ 86 - PR	.8750	.688	.750	1.75	.75	1.400	2.47	.728	.197	.2500	3/8 - 16 x 1.75
RHT100	87 - PR	1.0000	.781	.938	1.88	.88	1.600	2.61	.866	.276	.2500	1/2 - 13 x 1.75
RHT125	88 - PR	1.2500	.781	.938	1.88	.88	1.600	2.61	.866	.276	.2500	1/2 - 13 x 1.75

‡Furnished with backing plug instead of backing plate.



URETHANE Sheets, Rods, Bars, Tubes

Cataloged standard sizes in 90 Shore Durometer are available from stock for most all needs. Urethane has extreme load-bearing capacity and is abrasion resistance. Urethane has excellent resilience and memory qualities and returns to its original shape with minimal deterioration. It is unaffected by oil, grease and most chemicals and solvents.

URETHANE offers more than 3 times the wear life characteristics of natural rubber. Will not mar, scratch, dent or gouge most painted, galvanized or soft metal surfaces. Ideal for pressure pads, forming blocks, stripping pads, draw dies, embossing dies, bulging punches, strippers, springs or shedders.

URETHANE is also available in the full range of hardnesses for that SPECIAL JOB.

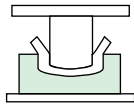
Solid Bars

Bars may be used in press brake tooling, as pressure pads or as a replacement for long rows of steel springs.

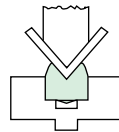
Solid Rods

Rods of URETHANE are incomparable in bulging operations, roll forming and as individual springs.

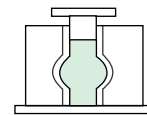
URETHANE* forms any angle, adapts to practically any shape and is easy to install for a wide range of metalworking and stamping operations.



URETHANE* helps to eliminate wrinkles caused by drawing in the air.



URETHANE* produces better definition and sharper bends.



Mar-free tubular and even convolute forms can be bulged with long-lasting URETHANE*

Stocked Hardness - 90 DUROMETER Stocked Length 12" Plus

Other Hardness & Sizes Available on Request

URETHANE SHEETS

STD. 12" SQUARE



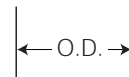
THICKNESS	CAT. NUMBER
1/8	US12
1/4	US25
3/8	US37
1/2	US50
5/8	US62
3/4	US75
1	US100
1 1/4	US125
1 1/2	US150
2	US200

URETHANE TUBES

STD. LENGTH -12"

Light Duty

CAT. NUMBER	I.D.	O.D.
UTL18	3/16	11/16
UTL25	1/4	3/4
UTL31	5/16	13/16
UTL37	3/8	7/8
UTL50	1/2	1
UTL62	5/8	1 1/8
UTL75	3/4	1 3/8
UTL87	7/8	1 5/8
UTL100	1	1 3/4



Heavy Duty

CAT. NUMBER	I.D.	O.D.
UTH50	1/2	1 1/8
UTH62	5/8	1 1/4
UTH75	3/4	1 1/2
UTH87	7/8	1 3/4
UTH100	1	2

Extra-Heavy Duty

CAT. NUMBER	I.D.	O.D.
UTEH50	1/2	1 1/4
UTEH62	5/8	1 1/2
UTEH75	3/4	1 3/4
UTEH87	7/8	2
UTEH100	1	2 1/4
UTEH125	1 1/4	2 1/2
UTEH150	1 1/2	2 3/4

URETHANE BARS

STD. LENGTH 12"



SIZE	CAT. NUMBER
1x1	UB1x1
1x2	UB1x2
1x3	UB1x3
1x4	UB1x4
2x2	UB2x2
2x3	UB2x3
2x4	UB2x4
3x3	UB3x3
3x4	UB3x4
4	UB4x4

URETHANE RODS

STD. LENGTH 12"



DIA.	CAT. NUMBER
1/8	UR12
1/4	UR25
3/8	UR37
1/2	UR50
5/8	UR62
3/4	UR75
7/8	UR87
1	UR100
1 1/8	UR112
1 1/4	UR125
1 1/2	UR150
2	UR200
2 1/2	UR250
3	UR300
4	UR400
6	UR600

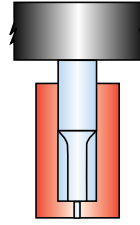
DUROMETERED SHORE HARDNESS	COLOUR CODE	MAXIMUM DEFLECTION
60A	YELLOW	40%
80A	BLUE	30%
STD 90A	GREEN	25%
95A	RED	20%
75D	BLACK	5%



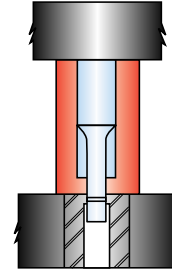
URETHANE Closed End Strippers

A hard, tough urethane with extreme loadbearing capacity and abrasion resistance, also offers the desired resilience for extensive deformation with minimum deterioration.

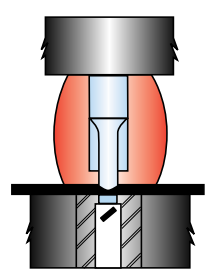
Urethane Strippers assure positive stripping and at the same time dampen punch vibration by gripping around the punch point. The closed end feature holds thin stock flat during the stripping cycle, eliminating the potential for rejected parts.



Push On

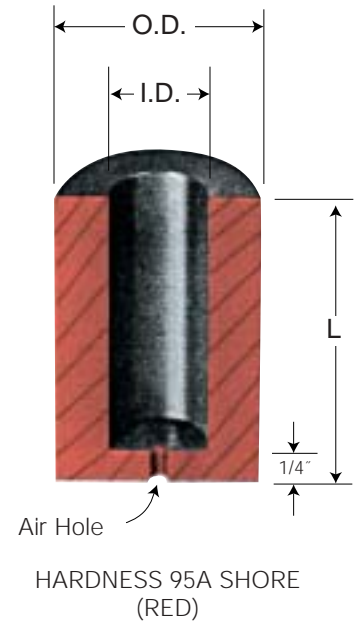


Punch shape in end of stripper



Punch Material

CAT. NO.	FITS PUNCH SHANK (A)	OUTSIDE DIA.	LENGTH L	APPROXIMATE STRIPPING PRESSURE AVAILABLE AT DEFLECTION INDICATED		
				1/8	1/4	3/8
UCS25	1/4	3/4	1 1/4	280	460	620
			1 1/2	260	455	610
			1 3/4	255	445	580
			2	245	430	540
UCS31	5/16	13/16	1 1/4	320	515	640
			1 1/2	310	495	600
			1 3/4	280	475	580
			2	275	455	550
UCS37	3/8	7/8	1 1/4	420	640	950
			1 1/2	400	620	825
			1 3/4	390	600	775
			2	380	520	660
UCS50	1/2	1	1 1/4	510	780	1010
			1 1/2	490	710	990
			1 3/4	475	670	870
			2	330	500	660
			2 1/4	300	435	615
UCS62	5/8	1 1/8	1 1/4	555	900	1220
			1 1/2	470	820	1100
			1 3/4	460	800	990
			2	450	730	975
UCS75	3/4	1 3/8	2 1/4	440	700	950
			1 1/2	450	720	1050
			1 3/4	360	645	970
			2	340	610	885
			2 1/4	320	575	810
			2 1/2	275	525	735
UCS87	7/8	1 5/8	2 3/4	240	475	670
			3	210	410	600
			1 1/2	1100	1635	2260
			1 3/4	940	1400	2040
			2	850	1250	1900
			2 1/4	765	1155	1715
UCS10	1	1 3/4	2 1/2	650	970	1420
			2 3/4	635	940	1375
			3	600	900	1200
			1 1/2	1800	2800	3100
			1 3/4	1200	2600	3000
			2	1000	2200	2740
			2 1/4	900	1860	2600
			2 1/2	850	1600	2300
			2 3/4	800	1400	2100
			3	780	1250	1900



HOW TO ORDER: EXAMPLE		
Qty.	CAT. No.	Length
6	UCS50	1 3/4



FORMING PUNCHES FOR HEADED STYLE BALL LOCK LIGHT STYLE - BALL LOCK HEAVY STYLE

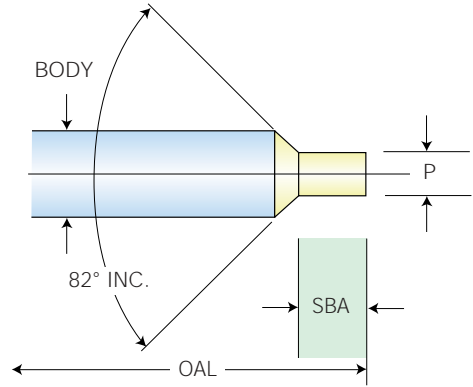
WHEN ORDERING FORMING PUNCHES STATE THE HEAD CODE, SHAPE CODE, BODY DIA. & STEEL CODE. SEE PAGES 2, 6 OR 8.

COUNTERSINK PUNCHES - CK SERIES

Available in both Headed and Ball lock styles (specify).

HOW TO ORDER: EXAMPLE

Qty.	STYLE Code	Shape	Body & Steel	SBA Code	Length	P	Keying
4	BHCK	C	50	.187	3	.125	-

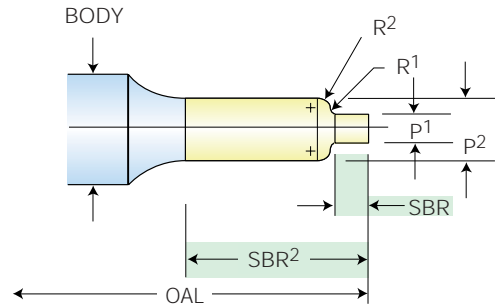


EXTRUSION PUNCHES - X SERIES

Available in both Headed and Ball lock styles (specify).

HOW TO ORDER: EXAMPLE

Qty.	STYLE Code	Shape	Body & Steel	SBR Code	Length	P ¹	P ²	SBR ¹	SBR ²	R ¹	R ²
4	BLX	C	62	75	3	.100	.250	.125	.75	.062	.062

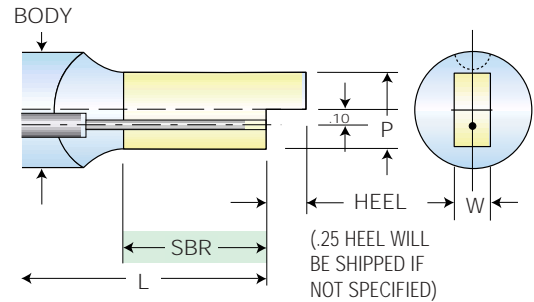


OFFSET EJECTOR WITH HEEL

Available in both Headed and Ball lock styles (specify).

HOW TO ORDER: EXAMPLE

Qty.	STYLE Code	Shape	Body Dia.	SBR Code	Length	P x W	Keying	Heel
2	BH	OEHR	62	M	3	.250 x .375	STD	.250

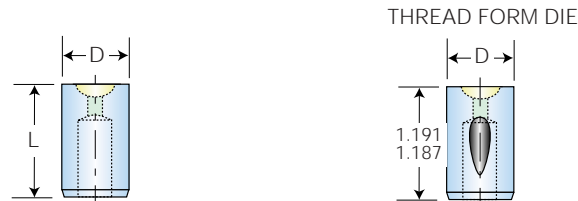
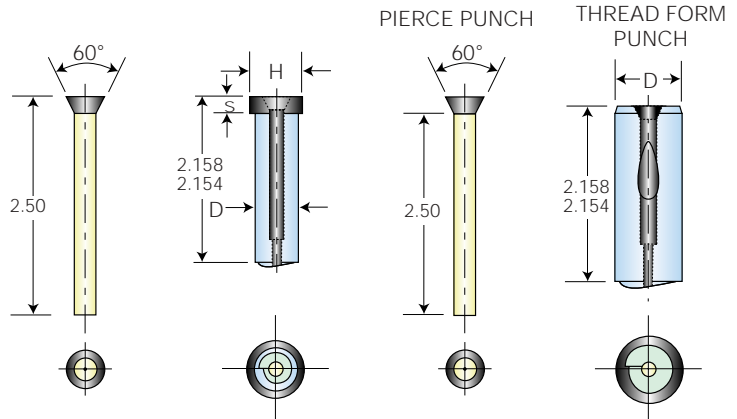


THREAD FORMING TOOLS



THREAD SIZE	BODY DIA. D
6-18	.375
8-15	.500
10-12	.500
12-11	.625
14-10	.625
20-9	.750

THREAD SIZE	BODY DIA. D
6-20	.375
8-18	.500
10-16	.500
12-14	.625
1/4-14	.625
5/16-12	.750

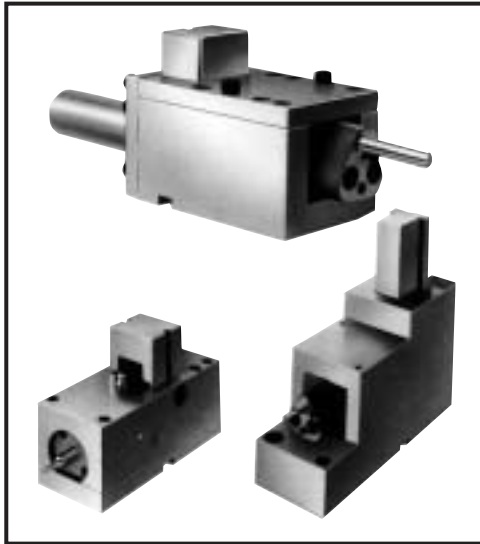


HOW TO ORDER: EXAMPLE

Qty.	STYLE Code	Shape	Material Thickness
2	BH	TF1012	24



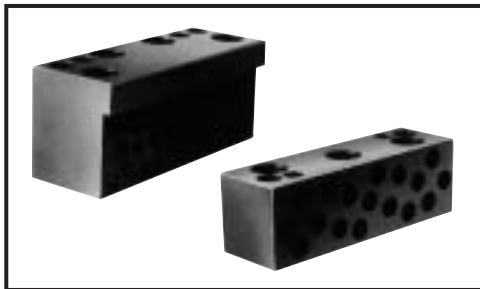
OTHER PRODUCTS AND COMPONENTS



- CAM SLIDE UNITS**
- Pierce, trim, form
 - Versatile for most tooling
- MINI-CAM SLIDE UNITS**
- Compact
 - Uses standard punches
 - Internal spring



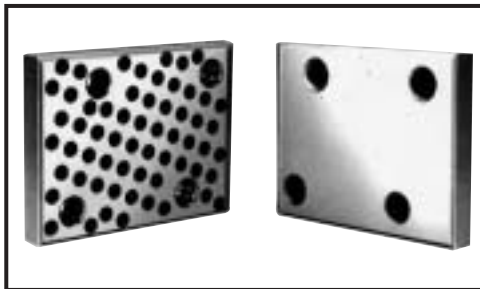
SPRING CAGES AND GUARDS



- KEEPER AND GUIDE BLOCKS**
- Made of chromium steels
 - Precision ground, self-lubricating, hardened wear surfaces

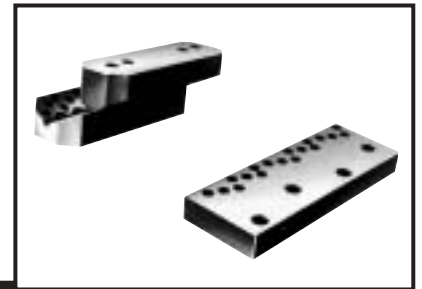


- DIE BUSHINGS AND PINS**
- Industry standard
 - Graphite-plugged
 - Solid aluminum bronze
 - Replaces oil-grooved bushings



- SELF-LUBE WEAR PLATES**
- Metric or English available
 - Bronze, steel & cast iron
 - Industry standard

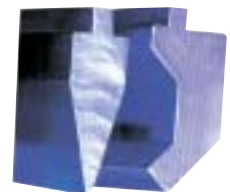
- V-BLOCKS AND KEEPER PLATES**
- Industry standard
 - Precision ground
 - Interchangeable



- DIE SUPPLIES**
- DIE SPRINGS
 - DIE MAKERS SUPPLIES
 - SELF LUBE PRODUCTS
 - CAM UNITS
 - NITROGEN GAS SPRINGS
 - IN DIE TAPPING UNITS



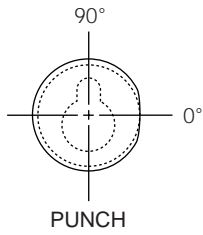
SHEAR BLADES ALL MACHINES



- PRESS BRAKE TOOLS**
- STANDARD BRAKE DIES FOR ALL MACHINES
 - SPECIAL BRAKE DIES
 - RECUTTING AND STRAIGHTENING OF BRAKE TOOLS
 - EUROPEAN (AMADA) STYLE AND NORTH AMERICAN
 - PRECISION GROUND THROUGH HARDENED BRAKE DIES

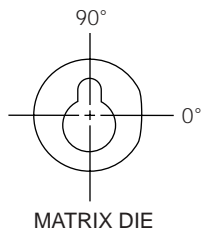


TECHNICAL INFORMATION



PUNCH

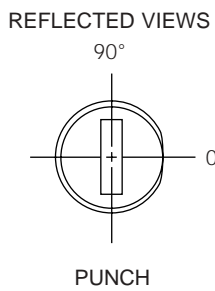
PLAN VIEW from the head end, of a punch shows the point shape with dotted lines.



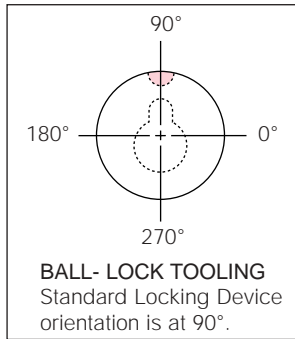
MATRIX DIE

PLAN VIEW of a die shows the shape with solid lines.

HEAD TYPE TOOLING
Standard Locking Device orientation is at 0°.



PUNCH



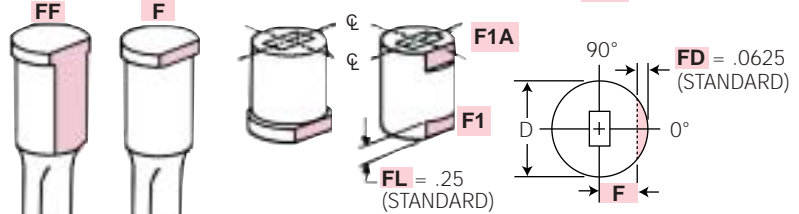
BALL- LOCK TOOLING
Standard Locking Device orientation is at 90°.

Reflected View - Punches
The Reflected View is the view as seen in a mirror when held below a punch or guide in its operating position.

NOTE: Must identify as REFLECTED VIEW on punch drawing.

Flats

ON HEADED PRODUCTS **F** = .5D
ON HEADLESS PRODUCTS **F** = .5D - .0625 (**FD**)

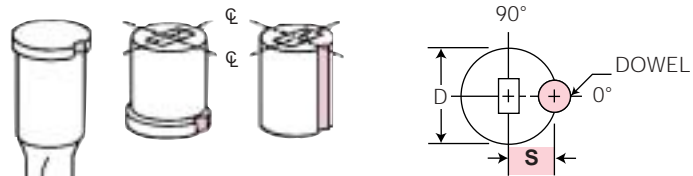


SPECIAL FLATS SPECIFY **F1** or **F1A** - **FL** - **FD** or **F**
- LOCATION DEGREES COUNTER CLOCKWISE

F1 = SINGLE FLAT
F2 = DOUBLE FLAT
FF = FULL LENGTH FLAT - SPECIFY **F** FLAT **D** DEPTH OR **F** DIMENSION

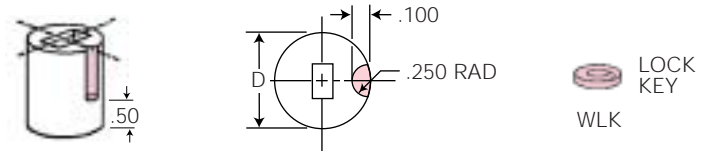
Dowel Slots

HEADED PRODUCTS **S** = .5D + 1/2 DOWEL
HEADLESS PRODUCTS **S** = .5D



DS12 (1/8) DOWEL SLOTS (STANDARD)
DS18 (3/16) DOWEL SLOTS SPECIFY **S** DIMENSION
DS25 (1/4) DOWEL SLOTS SPECIFY **S** DIMENSION

Windsor Lock



SURFACE ENHANCEMENTS

Exacta are leaders in the area of advanced treatments for punches and dies. We were the first company to offer plasma ionitride in North America, the first to advocate cryogenic treatment, and now offer a full range of modern physical vapor deposition (P.V.D.) treatments. We are one of the very few companies who perform all of these treatments **in-house**. Our heat treatment division, Exactatherm, is recognized to be a leader in the field of vacuum heat treatment and advanced surface treatments.

IONITRIDE: Ionitriding is a vacuum diffusion process which increases the hardness of the surface of Punches and lowers the coefficient of friction, making it a cost efficient method of increasing wear life of Punches and at the same time lowering the stripping pressure in stamping and extrusion operations. The process temperature is between 900/950 deg F. and the hardness on the surface is not as a result of an external layer but of hardness built up **under** the surface by a metallurgical reaction between Nitrogen and the tool steel, because of this the hardened layer cannot flake off. Surface hardness of Rc70/72 when applied to M2 HSS.

TITANIUM NITRIDE: The original P.V.D. coating with its typical gold coloration. The Ti N layer is usually 2-3 microns thick and is very hard (Equivalent to Rc80/82), and gives excellent wear and galling resistance in light to medium stamping operations. The core hardness of M2 is unaffected by this process but the core hardness of air hardening steels (A2 & D2) typically will drop 2 to 3 points to (Rc57/59).

TITANIUM CARBO-NITRIDE: Ti CN can exist over a range of compositions and the coloration can vary from bronze, through pink to grey. This coating is usually 2-5 microns thick, with an equivalent hardness of Rc 86/90 and is extremely abrasion resistant. An excellent choice when stamping abrasive high tensile strength materials. The temperature of application is the same as for Ti N (600 deg F/850 deg F) and as such does not effect the core hardness of M2, but will drop A2 and D2 by 2 to 3 points (Rc57/59).

CHROMIUM NITRIDE: Metallic silver in colour, with an equivalent of Rc76/80, CrN can be deposited thicker than TiN or TiCN and still have excellent adhesion. Usually the first choice for extrusion and piercing of heavier gauge materials, its galling resistance is excellent.

CRYOGENIC TREATMENT: This treatment can be applied to all tool steels including M2, A2 and D2, but is also successful on O-1, S-7 and 521000. This is not a surface treatment, but a process that affects the **whole tool**. By taking the tool down to **-320 deg F** the microstructure of the steel is modified and homogenized. This results in a tougher steel (less chipping), increase in wear resistance, and will hold long term dimensional tolerances better than any other treatment. The external appearance is unchanged. A must for close tolerance, heavily loaded tooling such as fine - blanking. Can be used in conjunction **with** any of the other surface treatments.



INCH - DECIMAL AND METRIC CONVERSION CHARTS

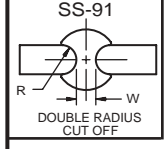
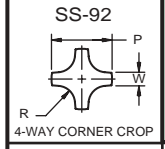
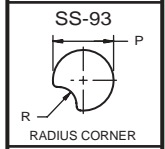
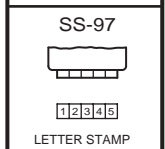
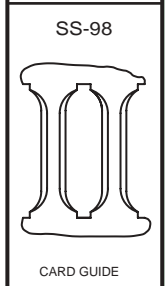
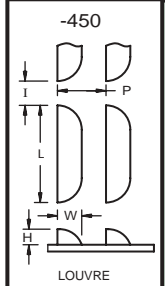
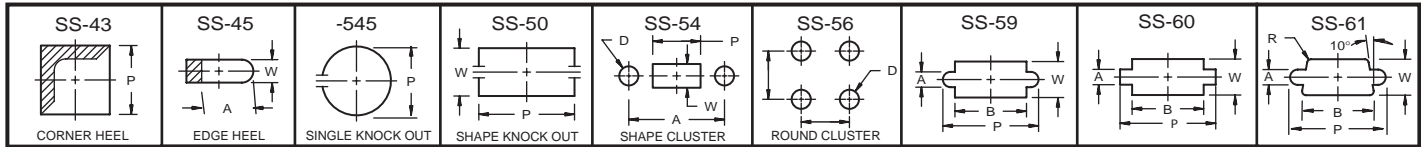
MILLIMETERS TO DECIMALS

mm	decimal	mm	decimal	mm	decimal	mm	decimal
0.01	.00039	0.51	.02008	1	.03937	51	2.00787
0.02	.00079	0.52	.02047	2	.07874	52	2.04724
0.03	.00118	0.53	.02087	3	.11811	53	2.08661
0.04	.00157	0.54	.02126	4	.15748	54	2.12598
0.05	.00197	0.55	.02165	5	.19685	55	2.16535
0.06	.00236	0.56	.02205	6	.23622	56	2.20472
0.07	.00276	0.57	.02244	7	.27559	57	2.24409
0.08	.00315	0.58	.02283	8	.31496	58	2.28346
0.09	.00354	0.59	.02323	9	.35433	59	2.32283
0.10	.00394	0.60	.02362	10	.39370	60	2.36220
0.11	.00433	0.61	.02402	11	.43307	61	2.40157
0.12	.00472	0.62	.02441	12	.47244	62	2.44094
0.13	.00512	0.63	.02480	13	.51181	63	2.48031
0.14	.00551	0.64	.02520	14	.55118	64	2.51969
0.15	.00591	0.65	.02559	15	.59055	65	2.55906
0.16	.00630	0.66	.02598	16	.62992	66	2.59843
0.17	.00669	0.67	.02638	17	.66929	67	2.63780
0.18	.00709	0.68	.02677	18	.70866	68	2.67717
0.19	.00748	0.69	.02717	19	.74803	69	2.71654
0.20	.00787	0.70	.02756	20	.78740	70	2.75591
0.21	.00827	0.71	.02795	21	.82677	71	2.79528
0.22	.00866	0.72	.02835	22	.86614	72	2.83465
0.23	.00906	0.73	.02874	23	.90551	73	2.87402
0.24	.00945	0.74	.02913	24	.94488	74	2.91339
0.25	.00984	0.75	.02953	25	.98425	75	2.95276
0.26	.01024	0.76	.02992	26	1.02362	76	2.99213
0.27	.01063	0.77	.03032	27	1.06299	77	3.03150
0.28	.01102	0.78	.03071	28	1.10236	78	3.07087
0.29	.01142	0.79	.03110	29	1.14173	79	3.11024
0.30	.01181	0.80	.03150	30	1.18110	80	3.14961
0.31	.01220	0.81	.03189	31	1.22047	81	3.18898
0.32	.01260	0.82	.03228	32	1.25984	82	3.22835
0.33	.01299	0.83	.03268	33	1.29921	83	3.26772
0.34	.01339	0.84	.03307	34	1.33858	84	3.30709
0.35	.01378	0.85	.03346	35	1.37795	85	3.34646
0.36	.01417	0.86	.03386	36	1.41732	86	3.38583
0.37	.01457	0.87	.03425	37	1.45669	87	3.42520
0.38	.01496	0.88	.03465	38	1.49606	88	3.46457
0.39	.01535	0.89	.03504	39	1.53543	89	3.50394
0.40	.01575	0.90	.03543	40	1.57480	90	3.54331
0.41	.01614	0.91	.03583	41	1.61417	91	3.58268
0.42	.01654	0.92	.03622	42	1.65354	92	3.62205
0.43	.01693	0.93	.03661	43	1.69291	93	3.66142
0.44	.01732	0.94	.03701	44	1.73228	94	3.70079
0.45	.01772	0.95	.03740	45	1.77165	95	3.74016
0.46	.01811	0.96	.03780	46	1.81102	96	3.77953
0.47	.01850	0.97	.03819	47	1.85039	97	3.81890
0.48	.01890	0.98	.03858	48	1.88976	98	3.85827
0.49	.01929	0.99	.03898	49	1.92913	99	3.89764
0.50	.01969	1.00	.03937	50	1.96850	100	3.93701

STANDARD GAGE FOR SHEET METAL

STANDARD GAGE NO.	THICKNESS IN DECIMALS
3	0.2391
4	.2242
5	.2092
6	.1943
7	.1793
8	.1644
9	.1495
10	.1345
11	.1196
12	.1046
13	.0897
14	.0747
15	.0673
16	.0598
17	.0538
18	.0478
19	.0418
20	.0359
21	.0329
22	.0299
23	.0269
24	.0239
25	.0209
26	.0179
27	.0164
28	.0149
29	.0135
30	.0120
31	.0105
32	.0097
33	.0090
34	.0082
35	.0075
36	.0067
37	.0064
38	.0060

INCHES	DECIMAL	MILLIMETER
1/64	.01562	.03968
1/32	.03125	0.7937
3/64	.04687	1.1906
1/16	.0625	1.5875
5/64	.07812	1.9843
3/32	.09375	2.3812
7/64	.10937	2.7780
1/8	.1250	3.1749
9/64	.14062	3.5718
5/32	.15625	3.9686
11/64	.17187	4.3655
3/16	.1875	4.7624
13/64	.20312	5.1592
7/32	.21875	5.5561
15/64	.23437	5.9530
1/4	.2500	6.3498
17/64	.26562	6.7467
9/32	.28125	7.1436
19/64	.29687	7.5404
5/16	.3125	7.9373
21/64	.32812	8.3342
11/32	.34375	8.7310
23/64	.35937	9.1279
3/8	.3750	9.5248
25/64	.39062	9.9216
13/32	.40625	10.3185
27/64	.42187	10.7154
7/16	.4375	11.1122
29/64	.45312	11.5091
15/32	.46875	11.9060
31/64	.48437	12.3029
1/2	.5000	12.6997
33/64	.51562	13.0966
17/32	.53125	13.4934
35/64	.54687	13.8903
9/16	.5625	14.2872
37/64	.57812	14.6841
19/32	.59375	15.0809
39/64	.60937	15.4778
5/8	.6250	15.8747
41/64	.64062	16.2715
21/32	.65625	16.6684
43/64	.67187	17.0653
11/16	.6875	17.4621
45/64	.70312	17.8590
23/32	.71875	18.2559
47/64	.73437	18.6527
3/4	.7500	19.0496
49/64	.76562	19.4465
25/32	.78125	19.8433
51/64	.79687	20.2402
13/16	.8125	20.6371
53/64	.82812	21.0339
27/32	.84375	21.4308
55/64	.85937	21.8277
7/8	.8750	22.2245
57/64	.89062	22.6214
29/32	.90625	23.0183
59/64	.92187	23.4151
15/16	.9375	23.8120
61/64	.95312	24.2089
31/32	.96875	24.6057
63/64	.98437	25.0026
1	1.0000	25.3995



The figures shown are approximate tons required for punching mild sheet steel having a shear strength of 55,000 pounds per square inch.

MFG GAGE	30	27	24	22	20	18	16	14	12	11	10
THICKNESS	.0120	.0164	.0239	.0299	.0359	.0478	.0598	.0747	.1046	.1196	.1345
LINEAR INCHES	PRESSURE IN TONS										
1	1	1	1	1	1	2	2	3	3	4	4
2	1	1	2	2	2	3	4	5	6	7	8
3	1	2	2	3	3	4	5	7	9	10	12
4	2	2	3	4	4	6	7	9	12	14	15
5	2	3	4	5	5	7	9	11	15	17	19
6	2	3	4	5	6	8	10	13	18	20	23
7	3	4	5	6	7	10	12	15	21	24	26
8	3	4	6	7	8	11	14	17	24	27	30
9	3	5	6	8	9	12	15	19	26	30	34
10	4	5	7	9	10	14	17	21	29	33	37
12	4	6	8	10	12	16	20	25	35	40	45
14	5	7	10	12	14	19	24	29	41	47	52
16	6	8	11	14	16	22	27	33	47	53	60
18	6	9	12	15	18	24	30	37	52	60	67
20	7	10	14	17	20	27	33	41	58	66	74
25	9	12	17	21	25	33	42	52	72	83	93
30	10	14	20	25	30	40	50	62	87	99	111
35	12	16	23	29	35	46	58	72	101	116	130
40	14	19	27	33	40	53	66	83	116	132	148
45	15	21	30	37	45	60	74	93	130	148	167
50	17	23	33	42	50	66	83	103	144	165	185
60	20	28	40	50	60	79	99	124	173	198	223
70	24	32	46	58	70	93	116	144	202	231	259
80	27	37	53	66	79	106	132	165	231	264	296
90	30	41	60	74	89	119	148	185	259	297	333
100	33	46	66	83	99	132	165	206	288	329	370

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