Quality
Punches,
Pilots,
Die Buttons,
& Retainers

Ball Lock

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TEL. 81 8354 8910
www.acatmexicana.com

Improved performance, less downtime, longer tool life

DAYTON®

Global leader in
providing fabrication
and stamping solutions

a MISUMI Group Company

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Ball Lock Quality Products

Product Applications

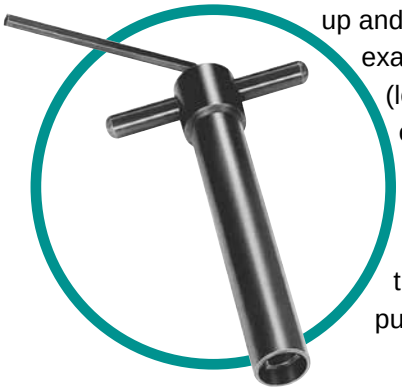
Dayton Ball Lock Punches, Retainers, Die Buttons, and ***Accessories*** are mainstays in industries with high-demand applications, including automotive and major appliance manufacturing. Because there is no need to pull a die from the press, removal and replacement of worn punches can reduce downtime and improve profitability.

Dayton Ball Lock Punches add longer tool life and improve finished part quality. For example, *Dayton Jektole® Punches* (slug ejection punches) provide increased punch to die button clearance; can triple the number of cycles between punch regrinds; and extend tool life.

Dayton Ball Lock Die Buttons include *Ball Lock, Press Fit,* and *EDM Die Button Blanks.*

Dayton Ball Lock Retainers provide many features, functions, and benefits. For example, *Dayton True Position® Retainers* (the recognized industry standard) eliminate hand fitting; reduce mounting time, and are ideally suited for both round and complex-shaped products. Other Dayton Retainers include *Multi-Position™, End and Square, Single Punch,* and our unique line of *EZ Fit™ Retainers*—a simpler, better way to reconfigure and/or replace existing retainers.

Dayton Ball Lock Accessories (e.g., backing plugs, ball release tools, and urethane strippers) complete the full line of Dayton Ball Lock products, and can help speed up and improve production. For example, *Dayton Punch Pullers* (left photo) are simple and easy to use. Just slide the punch puller over the punch shank, rotate the built-in wrench until it is tight, re-lease the ball, and pull down.

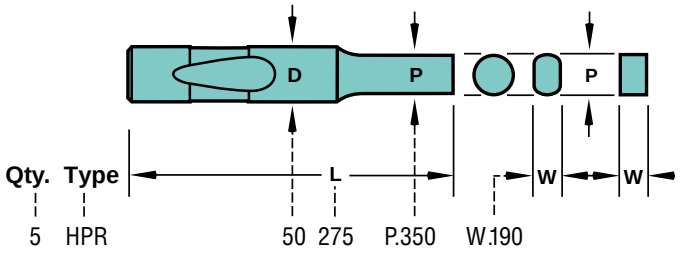


Ordering Information

Each page contains detailed instructions on how to order specific Dayton Ball Lock products. Individual product drawings completely define the product—including shape, dimensions, tolerances, and concentricity. When ordering, you are asked to specify quantity, product type, shank and length codes, and point or hole size (for example).

In the example below, the type specified is “HPR.” “H” stands for heavy duty, “P” stands for punch, and “R” stands for rectangle. 50 is the shank diameter, which is coded by the first two digits of the decimal equivalent (.500"). 275 is the overall length, which is coded by inches and quarter-inches (2.75"). Finally, P.350 and W.190 represent the point or hole size dimension.

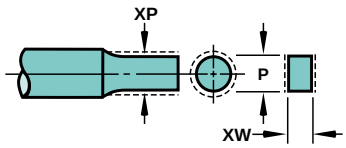
HOW TO ORDER



Standard Alterations

Punches, die buttons, and retainers are available in sizes other than those listed in the catalog.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an “X” is placed in front of the P or W dimension, e.g., “XP” and/or “XW.” If the point length is longer or shorter than standard, designate “XB” for the point length. See the foldout tabs in the individual product sections for these and other special order designations.



Contents

Punches

Punches (cont'd)

Die Buttons

Retainers

Retainers (cont'd)

Miscellaneous/Other

Product Designation

Each page contains detailed instructions on how to order specific Dayton Ball Lock products. In addition, use the following chart to define the product as a part number.

Example:

HPR — **Line Product Shape**: **H** is for Heavy Duty; **P** is for Punch (Regular); **R** is for Rectangle

50 — **Shank Dia. D** (shank diameter) Coded by the first 2 digits of dec. equiv. (.500).

275 — **Overall Length L** Coded by whole number and first two digits of dec. equiv. (2.750).

Product	Series	Length	Point or Hole Size
HPR	50	275	P.350, W.190
Type	**Catalog Number**		**Dimensions, As Specified**

Diameter (D) is shown on the order as a two- or three-digit code. To convert the shank diameter to the appropriate code, use the following chart.

Code	D	Code	D	Code	D
12	.1250	50	.5000	150	1.5000
18	.1875	62	.6250	175	1.7500
25	.2500	75	.7500	200	2.0000
31	.3125	87	.8750	225	2.2500
37	.3750	100	1.0000	250	2.5000
43	.4375	125	1.2500	275	2.7500

Classified Shapes

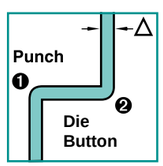
Classified shapes (83 common shapes, no detailing required) are available on all punches, die buttons, and guide bushings, as indicated in this catalog. See pp. 32, 33 for more information and special instructions. Also, see individual product pages and p. 40 for additional information on orientation and views.

Clearance

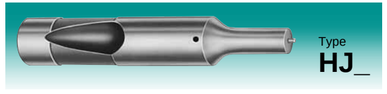
Normal grinding methods produce:

❶.007 max. fillet on the punch — matching corner shape on the die button.

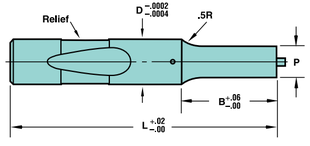
❷.007 max. fillet on the die button — matching corner shape on the punch.



Jektole® Punches
Heavy Duty



Type **HJ_**



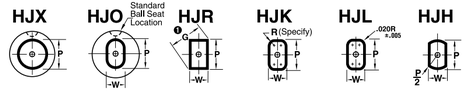
Material
Steel: A2, M2, PS4, RC 60-63
Round P +.0005 −.0000 — ◎ .0005 P to D
Shape P, W ± .0005 — ◎ .001 P to D

Shank		Point	Round		Shape		L											L					
D	Code	Lgth. B	Min. XP	Range P	Min. XW	Min. W	Max. P/G	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	Code	5.00	5.25	5.50	5.75	6.00	Jektole® Group**
.375	37	.625	.062	.062 - .374	.062	.062 - .374		250	275									37						J2, J3, J4*
.500	50	.812	.158	.187 - .499	.158	.187 - .499				300	325	350	375	400	425	450	475	50	500	525	550	575	600	J6
.625	62	.937	.158	.312 - .624	.158	.250 - .624												62						J6
.750	75	1.062	.235	.437 - .749	.235	.312 - .749												75						J9
.875	87	1.187	.300	.625 - .874	.235	.375 - .874												87						J9
1.000	100	1.250	.350	.750 - .999	.235	.437 - .999												100						J9
1.250	125	1.437	.450	1.000-1.249	.281	.500-1.249												125						J12
.375	37		.062	.125 - .374	.062	.125 - .374		B250	B275									37						J2, J3, J4*
.500	50		.158	.187 - .499	.158	.187 - .499				B300	B325	B350	B375	B400	B425	B450	B475	50	B500	B525	B550	B575	B600	J6
.625	62		.158	.312 - .624	.158	.250 - .624												62						J6
.750	75	**.75**	.235	.437 - .749	.235	.312 - .749												75						J9
.875	87		.300	.625 - .874	.235	.375 - .874												87						J9
1.000	100		.350	.750 - .999	.235	.437 - .999												100						J9
1.250	125		.450	1.000-1.249	.281	.500-1.249												125						J12
.375	37		.081	.125 - .374	.081	.125 - .374		C250	C275									37						J2, J3, J4*
.500	50		.158	.187 - .499	.158	.187 - .499				C300	C325	C350	C375	C400	C425	C450	C475	50	C500	C525	C550	C575	C600	J6
.625	62		.158	.312 - .624	.158	.250 - .624												62						J6
.750	75	**1.00**	.235	.437 - .749	.235	.312 - .749												75						J9
.875	87		.300	.625 - .874	.235	.375 - .874												87						J9
1.000	100		.350	.750 - .999	.235	.437 - .999												100						J9
1.250	125		.450	1.000-1.249	.281	.500-1.249												125						J12
.500	50		.158	.187 - .499	.158	.187 - .499			D275									50						J6
.625	62		.158	.312 - .624	.158	.250 - .624				D300	D325	D350	D375	D400	D425	D450	D475	62						J6
.750	75	**1.25**	.235	.437 - .749	.235	.312 - .749												75	D500	D525	D550	D575	D600	J9
.875	87		.300	.625 - .874	.235	.375 - .874												87						J9
1.000	100		.350	.750 - .999	.235	.437 - .999												100						J9
1.250	125		.450	1.000-1.249	.281	.500-1.249												125						J12

*J2 (P = .062 - .0639), J3 (P = .064 - .0939), J4 (P>.094)
**See p. 39 for additional information.

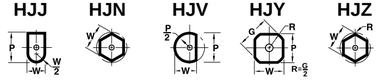
Jektole® Punches
Heavy Duty

HJX HJO (Standard Ball Seat Location) HJR HJK HJL HJH



❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.

HJJ HJN HJV HJY HJZ



Features/Benefits

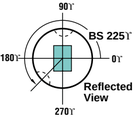
Jektole® punches permit doubling punch to die button clearance; produce up to three times the number of hits between sharpenings; and reduce burr heights.

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	25	HJX	37	C300	P.175	A2
	12	HJO	75	450	P.692, W.312	M2

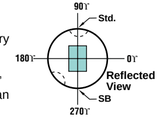
Standard Ball Seat Locations
Standard Ball Seat Location is at 90°. Alternate locations of 0°, 180°, or 270° can be specified at no additional cost.

Custom Ball Seat Locations
Custom Ball Seat Locations can be specified as "BS" and degrees counter-clockwise from 0°. For additional information, see "Locking Devices" on p. 40.



Double Ball Seat
A second ball seat may be specified. Normally located 180° from the primary ball seat, these are used to minimize sharpening of notching punches by rotating the punch 180°. Specify "SB" and degree desired. A second ball can also be located 90° from the primary ball seat.

Not recommended for diameters under .750.



FDS FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

Standard Alterations

Jektole® punches are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an "X" is placed in front of the P or W dimension, e.g., "XP" and/or "XW." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

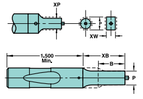
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Jektole® Punches—Heavy Duty



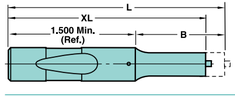
XP, XW P and W Dimensions Smaller than Standard

XB Point Length Other than Standard

For XBB, add three days to delivery.

Point Length	XB .5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	XBB 1.6251-2.0000
Code Type	Min. P (Rounds)									
37 HJX	.062	.062	.080	.080	.115	.115	.115	.115	.115	
50 HJX		.158	.158	.158	.158	.158	.158	.158	.158	.187
62 HJX		.158	.158	.158	.158	.158	.158	.158	.158	.187
75 HJX		.235	.235	.235	.235	.235	.235	.235	.235	.281
87 HJX		.300	.300	.300	.300	.300	.300	.300	.300	.350
100 HJX		.350	.350	.350	.350	.350	.350	.350	.350	.350
125 HJX		.450	.450	.450	.450	.450	.450	.450	.450	.450
	Min. W (Shapes)									
37 HJ_	.062	.062	.080	.080	.115	.115	.115	.115	.115	
50 HJ_		.158	.158	.158	.158	.158	.158	.158	.158	.187
62 HJ_		.158	.158	.158	.158	.158	.158	.158	.158	.187
75 HJ_		.235	.235	.235	.235	.235	.235	.235	.235	.281
87 HJ_		.235	.235	.235	.235	.235	.235	.235	.235	.281
100 HJ_		.235	.235	.235	.235	.235	.235	.235	.235	.281
125 HJ_			.281	.281	.281	.281	.281	.281	.281	.281

XL **Overall Length Shortened**
Stock removal from point end which shortens B length. To maintain "B", specify "XLB".



XLB **Overall Length Shortened**
B length maintained

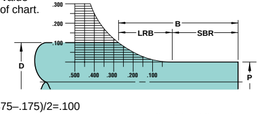
XJ **Smaller Jektole® Components**
See p. 39

XK **No sidehole**
For air injection. No cost.

LL **Precision Overall Length**
Same as XL except overall length is held to ±.001.

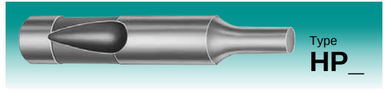
SBR **Straight Before Radius**

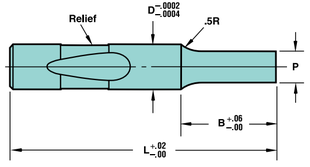
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.



Example:
D=.375
P=.175
(D-P)/2=(.375-.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

Regular Punches
Heavy Duty



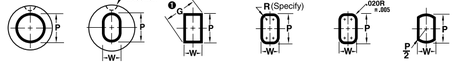


Material
Steel: A2, M2, PS4, RC 60-63
Round P +.0005 −.0000 | ◎ .0005 P to D
Shape P, W ±.0005 | ◎ .001 P to D

Shank		Point	Round		Shape		L											Code	L						
D	Code	Lgth. B	Min. XP	Range P	Min. XW	Min. Max. W P/G	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25		5.50	5.75	6.00	6.25	6.50	6.75	7.00
.375	37	.625	.050	.062 - .374	.050	.062 - .374													37							
.500	50	.812	.093	.187 - .499	.093	.187 - .499	250	275											50							
.625	62	.937	.125	.312 - .624	.125	.250 - .624													62							
.750	75	1.062	.235	.437 - .749	.235	.312 - .749			300	325	350	375	400	425	450	475	500	525	75	550	575	600	625	650	675	700
.875	87	1.187	.300	.625 - .874	.235	.375 - .874													87							
1.000	100	1.250	.350	.750 - .999	.235	.437 - .999													100							
1.250	125	1.437	.450	1.000-1.249	.235	.500-1.249													125							
.375	37		.050	.125 - .374	.050	.125 - .374													37							
.500	50		.093	.187 - .499	.093	.187 - .499	B250	B275											50							
.625	62		.125	.312 - .624	.125	.250 - .624													62							
.750	75	**.75**	.235	.437 - .749	.235	.312 - .749			B300	B325	B350	B375	B400	B425	B450	B475	B500	B525	75	B550	B575	B600	B625	B650	B675	B700
.875	87		.300	.625 - .874	.235	.375 - .874													87							
1.000	100		.350	.750 - .999	.235	.437 - .999													100							
1.250	125		.450	1.000-1.249	.235	.500-1.249													125							
.375	37		.081	.125 - .374	.081	.125 - .374													37							
.500	50		.093	.187 - .499	.093	.187 - .499	C250	C275											50							
.625	62		.125	.312 - .624	.125	.250 - .624													62							
.750	75	**1.00**	.235	.437 - .749	.235	.312 - .749			C300	C325	C350	C375	C400	C425	C450	C475	C500	C525	75	C550	C575	C600	C625	C650	C675	C700
.875	87		.300	.625 - .874	.235	.375 - .874													87							
1.000	100		.350	.750 - .999	.235	.437 - .999													100							
1.250	125		.450	1.000-1.249	.235	.500-1.249													125							
.500	50		.125	.187 - .499	.125	.187 - .499													50							
.625	62		.158	.312 - .624	.158	.250 - .624		D275											62							
.750	75	**1.25**	.235	.437 - .749	.235	.312 - .749			D300	D325	D350	D375	D400	D425	D450	D475	D500	D525	75	D550	D575	D600	D625	D650	D675	D700
.875	87		.300	.625 - .874	.235	.375 - .874													87							
1.000	100		.350	.750 - .999	.235	.437 - .999													100							
1.250	125		.450	1.000-1.249	.235	.500-1.249													125							

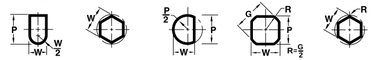
Regular Punches
Heavy Duty

HPX HPO (Standard Ball Seat Location) HPR HPK HPL HPH



❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.

HPJ HPN HPV HPY HPZ



Features/Benefits

Regular punches provide three times better alignment than other major brands; offer longer tool life; and can significantly improve finished part quality.

HOW TO ORDER

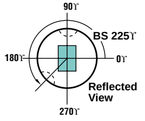
Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	16	HPX	62	B375	P.370	M2
	7	HPR	50	300	P.327, W.254	A2

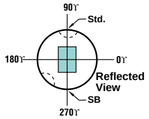
Standard Ball Seat Locations
Standard Ball Seat Location is at 90°. Alternate locations of 0°, 180°, or 270° can be specified at no additional cost.

Custom Ball Seat Locations
Custom Ball Seat Locations can be specified as "BS" and degrees counter-clockwise from 0°. For additional information, see "Locking Devices" on p. 40.

Double Ball Seat
A second ball seat may be specified. Normally located 180° from the primary ball seat, these are used to minimize sharpening of notching punches by rotating the punch 180°. Specify "SB" and degree desired. A second ball can also be located 90° from the primary ball seat.

Not recommended for diameters under .500.





FDS® FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

Standard Alterations

Regular Ball Lock punches are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an "X" is placed in front of the P or W dimension, e.g., "XP" and/or "XW." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

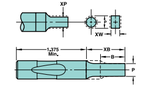
Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

7

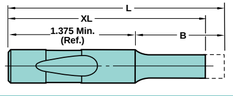
Standard Alterations
Regular Punches—Heavy Duty



XP, XW P and W Dimensions Smaller than Standard
XB Point Length Other than Standard
For XBB and X3B, add three days to delivery.

Point Length	XB .5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	XBB 1.6251-2.0000	X3B 2.0001-2.5000	2.5001-3.0000
Code Type	Min. P (Rounds)											
37 HPX	.050	.050	.080	.080	.106	.115	.115	.115	.115	.187	.250	.312
50 HPX	—	.093	.093	.093	.125	.125	.125	.125	.125	.187	.250	.312
62 HPX	—	.125	.125	.125	.158	.158	.158	.158	.158	.187	.250	.312
75 HPX	—	.235	.235	.235	.235	.235	.235	.235	.235	.281	.375	.375
87 HPX	—	.300	.300	.300	.300	.300	.300	.300	.300	.350	.375	.437
100 HPX	—	.350	.350	.350	.350	.350	.350	.350	.350	.350	.375	.437
125 HPX	—	.450	.450	.450	.450	.450	.450	.450	.450	.450	.450	.450
	Min. W (Shapes)											
37 HP_	.050	.050	.080	.080	.106	.115	.115	.115	.115	.156		
50 HP_	—	.093	.093	.093	.125	.125	.125	.125	.125	.156		
62 HP_	—	.125	.125	.125	.158	.158	.158	.158	.158	.187		
75 HP_	—	—	.235	.235	.235	.235	.235	.235	.235	.250		
87 HP_	—	—	.235	.235	.235	.235	.235	.235	.235	.250		
100 HP_	—	—	.235	.235	.235	.235	.235	.235	.235	.250		
125 HP_	—	—	.235	.235	.235	.235	.235	.235	.235	.265		

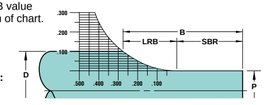
XL **Overall Length Shortened**
Stock removal from point end which shortens B length. To maintain "B", specify "XLB".



XLB **Overall Length Shortened**
B length maintained

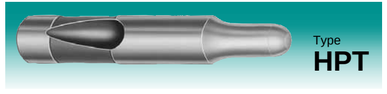
LL **Precision Overall Length**
Same as XL except overall length is held to ±.001.

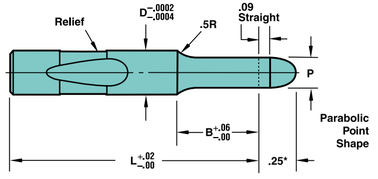
SBR **Straight Before Radius**
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.



Example:
D=.375
P=.175
(D-P)/2=(.375-.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

Regular Pilots
Heavy Duty



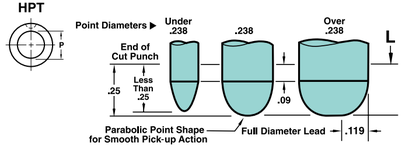


*Slightly less for diameters under .238.

Material
Steel: A2, M2, PS4, RC 60-63
Round P +.0005 −.0000 ⌀ .0005 P to D
When P=D, shank tolerance applies.

Shank		Point	Round		L													L						
D	Code	Lgth. B	Min. XP	Range P	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	Code	5.50	5.75	6.00	6.25	6.50	6.75	7.00
.375	37	.625	.061	.092 - .375	250	275	300	325	350	375	400	425	450	475	500	525	37	550	575	600	625	650	675	700
.500	50	.812	.092	.186 - .500													50							
.625	62	.937	.124	.311 - .625													62							
.750	75	1.062	.234	.436 - .750													75							
.875	87	1.187	.299	.624 - .875													87							
1.000	100	1.250	.349	.749-1.000													100							
1.250	125	1.437	.449	.999-1.250													125							
.375	37	.75	.061	.124 - .375	B250	B275	B300	B325	B350	B375	B400	B425	B450	B475	B500	B525	37	B550	B575	B600	B625	B650	B675	B700
.500	50		.092	.186 - .500													50							
.625	62		.124	.311 - .625													62							
.750	75		.234	.436 - .750													75							
.875	87		.299	.624 - .875													87							
1.000	100		.349	.749-1.000													100							
1.250	125		.449	.999-1.250													125							
.375	37	1.00	.079	.124 - .375	C250	C275	C300	C325	C350	C375	C400	C425	C450	C475	C500	C525	37	C550	C575	C600	C625	C650	C675	C700
.500	50		.092	.186 - .500													50							
.625	62		.124	.311 - .625													62							
.750	75		.234	.436 - .750													75							
.875	87		.299	.624 - .875													87							
1.000	100		.349	.749-1.000													100							
1.250	125		.449	.999-1.250													125							
.500	50	1.25	.124	.186 - .500		D275	D300	D325	D350	D375	D400	D425	D450	D475	D500	D525	50	D550	D575	D600	D625	D650	D675	D700
.625	62		.157	.311 - .625													62							
.750	75		.234	.436 - .750													75							
.875	87		.299	.624 - .875													87							
1.000	100		.349	.749-1.000													100							
1.250	125		.449	.999-1.250													125							

Regular Pilots
Heavy Duty



Features/Benefits

Regular pilots are built to exact tolerances; the parabolic point shape allows for smooth pick-up action; and pilots offer a wide range of unique punching and fabrication applications.

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P	Steel
Example:	13	HPT	37	300	P.175	A2

FDS FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

Standard Alterations

Regular Ball Lock pilots are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P dimension is outside the standard range, an "X" is placed in front of the P dimension, e.g., "XP." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

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DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

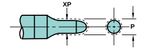
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

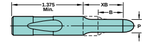
Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Regular Pilots—Heavy Duty



XP P Dimensions Smaller than Standard

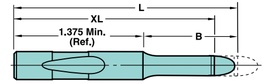


XB Point Length Other than Standard

For XBB and X3B, add three days to delivery.

Point Length	XB .5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	XBB 1.6251-2.0000	X3B 2.0001-2.5000	2.5001-3.0000
Code Type	Min. P (Rounds)											
37 HPT	.061	.061	.079	.079	.105	.114	.114	.114	.114	.186	.249	.311
50 HPT		.092	.092	.092	.124	.124	.124	.124	.124	.186	.249	.311
62 HPT		.124	.124	.124	.157	.157	.157	.157	.157	.186	.249	.311
75 HPT		.234	.234	.234	.234	.234	.234	.234	.234	.280	.311	.405
87 HPT		.299	.299	.299	.299	.299	.299	.299	.299	.349	.374	.436
100 HPT		.349	.349	.349	.349	.349	.349	.349	.349	.349	.374	.436
125 HPT		.449	.449	.449	.449	.449	.449	.449	.449	.449	.449	.449

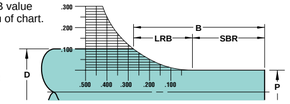
XL Overall Length Shortened
Stock removal from point end which shortens B length. To maintain "B", specify "XLB".



XLB Overall Length Shortened
B length maintained

SBR Straight Before Radius

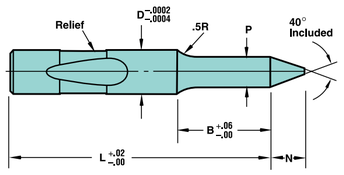
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.



Example:
D=.375
P=.175
(D-P)/2=(.375–.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

Positive Pick-Up Pilots
Heavy Duty

Type
HPA



Material
Steel: M2, PS4, RC 60-63
All heads are drawn to RC 40-55.
Round P +.0005 −.0000 | ◎ .0005 | P to D
When P=D, shank tolerance applies.

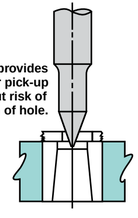
Order any length shown. If you require a length between those shown, designate "XL." Example: You require a length of 3.600. Order 375, then show XL 3.600. See "How to Order" example on the next page. XL is available down to 1.375. Note shank length limitation of .75. (B length may be shorter than shown when XL is under the shortest length shown.)
There is no additional charge for XL.

Shank		Point	Round				L																		
D	Code	Lgth. B	Min. XP	Range P	*N	Pn	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	Code	5.50	5.75	6.00	6.25	6.50	6.75	7.00
.375	37	.625	.083	.186 - .375	.37	.2342	250	275	300	325	350	375	400	425	450	475	500	525	37	550	575	600	625	650	675	700
.500	50	.812	.092	.249 - .500	.50	.3252													50							
.625	62	.937	.124	.311 - .625	.62	.4162													62							
.750	75	1.062	.234	.436 - .750	.75	.5072													75							
.875	87	1.187	.299	.624 - .875	.87	.5982													87							
1.000	100	1.250	.349	.749-1.000	1.00	.6892													100							
1.250	125	1.437	.449	.999-1.250	1.25	.8712													125							
.375	37	.75	.083	.186 - .375	.37	.2342	B250	B275	B300	B325	B350	B375	B400	B425	B450	B475	B500	B525	37	B550	B575	B600	B625	B650	B675	B700
.500	50		.092	.249 - .500	.50	.3252													50							
.625	62		.124	.311 - .625	.62	.4162													62							
.750	75		.234	.436 - .750	.75	.5072													75							
.875	87		.299	.624 - .875	.87	.5982													87							
1.000	100		.349	.749-1.000	1.00	.6892													100							
1.250	125		.449	.999-1.250	1.25	.8712													125							
.375	37	1.00	.083	.186 - .375	.37	.2342	C250	C275	C300	C325	C350	C375	C400	C425	C450	C475	C500	C525	37	C550	C575	C600	C625	C650	C675	C700
.500	50		.092	.249 - .500	.50	.3252													50							
.625	62		.124	.311 - .625	.62	.4162													62							
.750	75		.234	.436 - .750	.75	.5072													75							
.875	87		.299	.624 - .875	.87	.5982													87							
1.000	100		.349	.749-1.000	1.00	.6892													100							
1.250	125		.449	.999-1.250	1.25	.8712													125							
.500	50	1.25	.124	.249 - .500	.50	.3252		D275	D300	D325	D350	D375	D400	D425	D450	D475	D500	D525	50	D550	D575	D600	D625	D650	D675	D700
.625	62		.157	.311 - .625	.62	.4162													62							
.750	75		.234	.436 - .750	.75	.5072													75							
.875	87		.299	.624 - .875	.87	.5982													87							
1.000	100		.349	.749-1.000	1.00	.6892													100							
1.250	125		.449	.999-1.250	1.25	.8712													125							

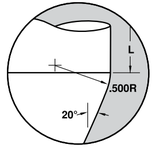
*N =[(P-.057)/.728]+.132 when "P" dimension is less than "Pn" shown in chart.

Positive Pick-Up Pilots
Heavy Duty

HPA



Geometry provides smoother pick-up without risk of distortion of hole.



Greater positioning—moves stock farther than conventional pilots.

Features/Benefits

Positive pick-up pilots provide smoother pick-up without the risk of distorting the hole; in addition, the unique design moves the stock farther than conventional pilots.

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P	Steel
Example:	3	HPA	75	275	P.624	M2

FDS® FIRM DELIVERY SCHEDULE

1 Day
PS4 +2 Days

Standard Alterations

Ball Lock positive pick-up pilots are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P dimension is outside the standard range, an "X" is placed in front of the P dimension, e.g., "XP." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

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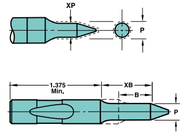
Standard Alterations
Positive Pick-Up Pilots—Heavy Duty

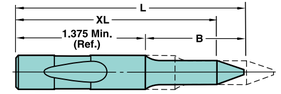


XP P Dimensions Smaller than Standard

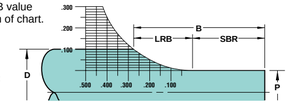
XB Point Length Other than Standard
Specify XB, XBB, or X3B and length (see chart below).
For XBB and X3B, add three days to delivery.

	XB										XBB	X3B
Point Length	.5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	1.6251-2.0000	2.0001-2.5000	2.5001-3.0000
Code Type	Min. P (Rounds)											
37 HPA	.083	.083	.083	.083	.105	.114	.114	.114	.114	.186	.249	.311
50 HPA	.092	.092	.092	.092	.124	.124	.124	.124	.124	.186	.249	.311
62 HPA	.124	.124	.124	.124	.155	.155	.155	.155	.155	.186	.249	.311
75 HPA	.234	.234	.234	.234	.234	.234	.234	.234	.234	.280	.311	.374
87 HPA	.299	.299	.299	.299	.299	.299	.299	.299	.299	.349	.374	.436
100 HPA	.349	.349	.349	.349	.349	.349	.349	.349	.349	.349	.374	.436
125 HPA	.449	.449	.449	.449	.449	.449	.449	.449	.449	.449	.449	.449

XL Overall Length Shortened
Stock removal from point end. B length is maintained.
Available at no charge within catalog range.

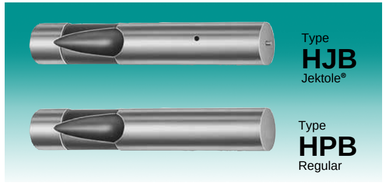


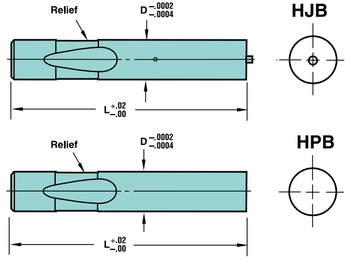
SBR Straight Before Radius
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.



Example:
D=.375
P=.175
(D-P)/2=(.375–.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

Punch Blanks Jektole®& Regular
Heavy Duty





Material
Steel: A2, M2, PS4, RC 60-63

Type	Shank D	Code	L 2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	★ Jektole® Group
HJB	.375	37																J4
	.500	50	250															J6
	.625	62		275														J6
	.750	75			300	325	350	375	400	425	450	475	500					J9
	.875	87												525	550	575	600	J9
	1.000	100																J9
	1.250	125																J12

Type	Shank D	Code	L 2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00
HPB	.375	37																			
	.500	50	250																		
	.625	62		275																	
	.750	75			300	325	350	375	400	425	450	475	500	525	550	575	600				
	.875	87																625	650	675	700
	1.000	100																			
	1.250	125																			

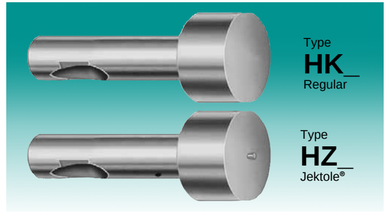
*See p. 39 for additional information.

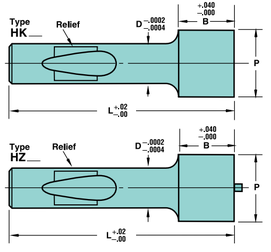
HOW TO ORDER

Specify:	Qty.	Type	D Code	L	Steel
Example:	12	HJB	50	300	M2
	5	HPB	75	400	A2

FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

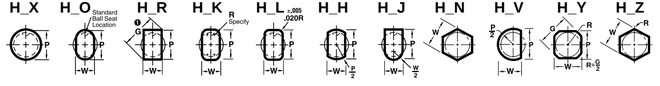
Point Larger than Shank Jektole®& Regular
Heavy Duty





Material
Steel: A2, M2, RC 60-63.
Round P +.0005 -.0000 | ◎ .0005 P to D
Shape P, W ±.0005 | ◎ .001 P to D

❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.



Type	Shank D	Code	Point Lgth. B	Round Range P	Shape Min XW	Shape Min. W	Shape Max. P/G	L 2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	★ Jektole® Group
HK_ Regular HZ_ Jektole®	.375	37	.62	.376 - .875	.062	.125 - .875											J4
	.500	50	.75	.501-1.250	.158	.188-1.250											J6
	.625	62	.88	.626-1.500	.158	.250-1.500		250									J6
	.750	75	.94	.751-1.500	.235	.312-1.500			275	300	325	350	375	400	425	450	J9
	.875	87	.94	.876-1.750	.235	.375-1.750											J9
	1.000	100	.94	1.001-1.750	.235	.437-1.750											J9
	1.250	125	1.25	1.251-2.000	.281	.500-2.000											J12

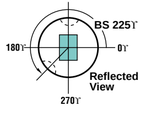
*See p. 39 for additional information.

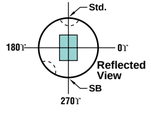
Standard Ball Seat Locations
Standard Ball Seat Location is at 90°. Alternate locations of 0°, 180°, or 270° can be specified at no additional cost.

Custom Ball Seat Locations
Custom Ball Seat Locations can be specified as "BS" and degrees counter-clockwise from 0°. For additional information, see "Locking Devices" on p. 40.

Double Ball Seat
A second ball seat may be specified. Normally located 180° from the primary ball seat, these are used to minimize sharpening of notching punches by rotating the punch 180°. Specify "SB" and degree desired. A second ball can also be located 90° from the primary ball seat.

Not recommended for diameters under .750 for HZ__ and .500 for HK__.





FIRM DELIVERY SCHEDULE
1-4 pcs., 2 Days
5-19 pcs., 3 Days

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	2	HKR	100	350	P1.350, W.500	M2

Standard Alterations

Point Larger than Shank Ball Lock punches are available in sizes other than those shown in the chart above.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an "X" is placed in front of the P or W dimension, e.g., "XP" and/or "XW." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

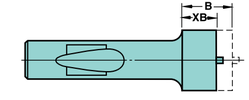
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

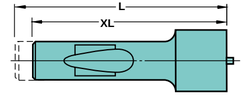
Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Point Larger than Shank—Heavy Duty



XB **Point Length Shorter than Standard**
(Shortens punch from the point end.)



XL **Overall Length Shortened**
Stock removal from ***shank end***. Minimum shank length is 1⅜". Does not alter ball seat location.

LL **Precision Overall Length**
Same as XL except overall length is held to ±.001.

Dayton Slug Control

Dayton Slug Control is a guaranteed method for reducing the risk of pulling slugs to the die surface during withdrawal of the punch. A series of grooves is designed inside the die button. There, the slugs are trapped until they fall freely through the relief. The use of Dayton Slug Control has no effect on hole size, and will not require any changes in current regrind practices.

Our guarantee: *Use Dayton Slug Control in a stamping die now pulling slugs. If, for any reason, you are not completely satisfied, we will refund the full cost of the Slug Control alteration.* (We cannot guarantee the retention of slugs when clearance exceeds 10% per side.)

Ordering

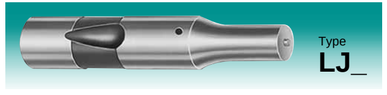
Dayton Slug Control is easy to specify and order. Simply add the information that is unique to your application to the die button catalog number. Please specify XSC for alteration and show material thickness (inches) and clearance per side (percentage).

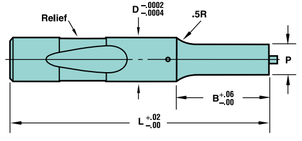
HOW TO ORDER

Catalog Number					Your Specs		
Inch KDX	62	100	P.250		XSC	MT.0625	CS 5
Type	D	L	P		Alt. Code	Mat'l Thickness (inches)	Clear Per Side (%)

For additional information, contact your Dayton distributor.

Jektole® Punches
Light Duty





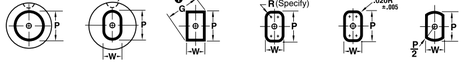
Material
Steel: A2, M2, PS4, RC 60-63
Round P +.0005 −.0000 | ◎ .0005 P to D
Shape P, W ±.0005 | ◎ .001 P to D

Shank D	Code	Point Lgth. B	Round Min. XP	Round Range P	Shape Min. XW	Shape Min. Max. W P/G	L 2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	Code	L 4.75	5.00	5.25	5.50	5.75	6.00	**Jektole® Group
.250	25	.500	.050	.062-.249	.050	.062-.249	200											25							J2, J3*
.375	37	.625	.115	.125-.374	.115	.125-.374												37							J4
.500	50	.750	.158	.187-.499	.158	.187-.499												50							J6
.625	62	.875	.158	.312-.624	.158	.250-.624		225	250	275	300	325	350	375	400	425	450	62	475	500	525	550	575	600	J6
.750	75	.937	.235	.437-.749	.235	.312-.749												75							J9
.875	87	.937	.300	.625-.874	.235	.375-.874												87							J9
1.000	100	.937	.350	.750-.999	.235	.437-.999												100							J9
.250	25	.75	.050	.093-.249	.050	.093-.249												25							J2, J3*
.375	37		.115	.125-.374	.115	.125-.374												37							J4
.500	50		.158	.187-.499	.158	.187-.499												50							J6
.625	62		.158	.312-.624	.158	.250-.624		B225	B250	B275	B300	B325	B350	B375	B400	B425	B450	62	B475	B500	B525	B550	B575	B600	J6
.750	75		.235	.437-.749	.235	.312-.749												75							J9
.875	87		.300	.625-.874	.235	.375-.874												87							J9
1.000	100		.350	.750-.999	.235	.437-.999												100							J9
.375	37	1.00	.115	.125-.374	.115	.125-.374												37							J4
.500	50		.158	.187-.499	.158	.187-.499												50							J6
.625	62		.158	.312-.624	.158	.250-.624		C225	C250	C275	C300	C325	C350	C375	C400	C425	C450	62	C475	C500	C525	C550	C575	C600	J6
.750	75		.235	.437-.749	.235	.312-.749												75							J9
.875	87		.300	.625-.874	.235	.375-.874												87							J9
1.000	100		.350	.750-.999	.235	.437-.999												100							J9
.500	50	1.25	.158	.187-.499	.158	.187-.499												50							J6
.625	62		.158	.312-.624	.158	.250-.624												62							J6
.750	75		.235	.437-.749	.235	.312-.749			D250	D275	D300	D325	D350	D375	D400	D425	D450	75	D475	D500	D525	D550	D575	D600	J9
.875	87		.300	.625-.874	.235	.375-.874												87							J9
1.000	100		.350	.750-.999	.235	.437-.999												100							J9

*J2 (P=.050-.0639) J3 (P≥.064)
**See p.39 for additional information.

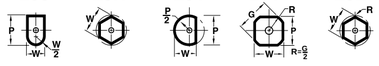
Jektole® Punches
Light Duty

LJX LJO (Standard Ball Seat Location) LJR LJK (R (Specify)) LJL (.020R ±.005) LJH



❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.

LJJ LJN LJV LJY LJZ



Features/Benefits

Jektole® punches permit doubling punch to die button clearance; produce up to three times the number of hits between sharpenings; and reduce burr heights.

HOW TO ORDER

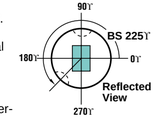
Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	21	LJX	37	325	P.175	A2
	15	LJR	50	400	P.327, W.254	M2

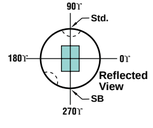
Standard Ball Seat Locations
Standard Ball Seat Location is at 90°. Alternate locations of 0°, 180°, or 270° can be specified at no additional cost.

Custom Ball Seat Locations
Custom Ball Seat Locations can be specified as "BS" and degrees counter-clockwise from 0°. For additional information, see "Locking Devices" on p. 40.

Double Ball Seat
A second ball seat may be specified. Normally located 180° from the primary ball seat, these are used to minimize sharpening of notching punches by rotating the punch 180°. Specify "SB" and degree desired. A second ball can also be located 90° from the primary ball seat.

Not recommended for diameters under .625.





FDS FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

Standard Alterations

Jektole® punches are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an "X" is placed in front of the P or W dimension, e.g., "XP" and/or "XW." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

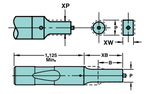
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Jektole® Punches—Light Duty



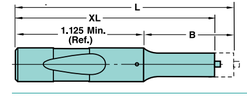
XP, XW P and W Dimensions Smaller than Standard

XB Point Length Other than Standard

For XBB, add three days to delivery.

Point Length	Code Type	XB .5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	XBB 1.6251-2.0000
		Min. P (Rounds)									
25	LJX	.050	.050	.080	.080						
37	LJX	.115	.115	.115	.115	.115	.115	.115	.115	.115	
50	LJX		.158	.158	.158	.158	.158	.158	.158	.158	.187
62	LJX		.158	.158	.158	.158	.158	.158	.158	.158	.188
75	LJX		.235	.235	.235	.235	.235	.235	.235	.235	.281
87	LJX		.300	.300	.300	.300	.300	.300	.300	.300	.312
100	LJX		.350	.350	.350	.350	.350	.350	.350	.350	.350
		Min. W (Shapes)									
25	LJ_		.050	.050	.080	.080					
37	LJ_		.115	.115	.115	.115	.115	.115	.115	.115	
50	LJ_			.158	.158	.158	.158	.158	.158	.158	.187
62	LJ_			.158	.158	.158	.158	.158	.158	.158	.188
75	LJ_			.235	.235	.235	.235	.235	.235	.235	.250
87	LJ_		.235	.235	.235	.235	.235	.235	.235	.235	.250
100	LJ_		.235	.235	.235	.235	.235	.235	.235	.235	.250

XL Overall Length Shortened
Stock removal from point end which shortens B length.



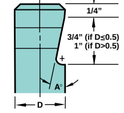
XLB Overall Length Shortened
B length maintained

LL Precision Overall Length
Same as XL except overall length is held to ±.001.

WS Whistle Stop See table for standard angles. The Whistle Stop alteration is ground through the ball seat, subject to the same limitations as other standard and custom ball seat locations.

Example: LJX50 400, P.327, M2, WS, XA 7.5°

D	A°
25,37	5°
50	7.5°
62-100	10°

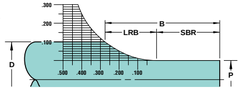


Angles of 5° and 7.5° also available on .625 and larger diameters.
(Specify **XA** and angle after **WS**.)

XJ Smaller Jektole® Components
See p.39.

XK No Side Hole
For air ejection. No cost.

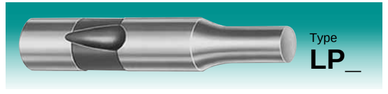
SBR Straight Before Radius
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.



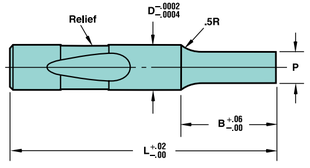
Example:
D=.375
P=.175
(D-P)/2=(.375-.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

www.daytonlamina.com Dayton Progress Corporation Dayton Progress Corporation

Regular Punches
Light Duty



Type **LP_**



Material
Steel: A2, M2, PS4, RC 60-63
Round P +.0005 −.0000 | ◎ .0005 P to D
Shape P, W ± .0005 | ◎ .001 P to D

Shank D	Code	Point Lgth. B	Round Min. XP	Round Range P	Shape Min. XW	Shape Min. W	Shape Max. P/G	L 2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	Code	L 5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00
.250	25	.500	.040	.062-.249	.040	.062-.249															25								
.375	37	.625	.050	.125-.374	.050	.125-.374		200													37								
.500	50	.750	.093	.187-.499	.093	.187-.499															50								
.625	62	.875	.125	.312-.624	.125	.250-.624			225	250	275	300	325	350	375	400	425	450	475	500	62	525	550	575	600	625	650	675	700
.750	75	.937	.235	.437-.749	.235	.312-.749															75								
.875	87	.937	.300	.625-.874	.235	.375-.874															87								
1.000	100	.937	.350	.750-.999	.235	.437-.999															100								
.250	25		.040	.093-.249	.040	.093-.249															25								
.375	37		.050	.125-.374	.050	.125-.374															37								
.500	50		.093	.187-.499	.093	.187-.499															50								
.625	62	**.75**	.125	.312-.624	.125	.250-.624			B225	B250	B275	B300	B325	B350	B375	B400	B425	B450	B475	B500	62	B525	B550	B575	B600	B625	B650	B675	B700
.750	75		.235	.437-.749	.235	.312-.749															75								
.875	87		.300	.625-.874	.235	.375-.874															87								
1.000	100		.350	.750-.999	.235	.437-.999															100								
.375	37		.080	.125-.374	.080	.125-.374															37								
.500	50		.093	.187-.499	.093	.187-.499															50								
.625	62	**1.00**	.125	.312-.624	.125	.250-.624			C225	C250	C275	C300	C325	C350	C375	C400	C425	C450	C475	C500	62	C525	C550	C575	C600	C625	C650	C675	C700
.750	75		.235	.437-.749	.235	.312-.749															75								
.875	87		.300	.625-.874	.235	.375-.874															87								
1.000	100		.350	.750-.999	.235	.437-.999															100								
.500	50		.125	.187-.499	.125	.187-.499															50								
.625	62		.158	.312-.624	.158	.250-.624															62								
.750	75	**1.25**	.235	.437-.749	.235	.312-.749				D250	D275	D300	D325	D350	D375	D400	D425	D450	D475	D500	75	D525	D550	D575	D600	D625	D650	D675	D700
.875	87		.300	.625-.874	.235	.375-.874															87								
1.000	100		.350	.750-.999	.235	.437-.999															100								

Regular Punches
Light Duty

LPX 

LPO Standard Ball Seat Location 

LPR ❶ 

LPK 

LPL 

LPH 

❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.

LPJ 

LPN 

LPV 

LPY 

LPZ 

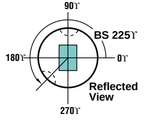
Features/Benefits

Regular punches provide three times better alignment than other major brands; offer longer tool life; and can significantly improve finished part quality.

HOW TO ORDER

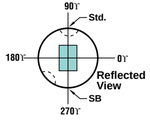
Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	25	LPX	87	B275	P.740	M2
	12	LPO	100	B350	P.937, W.475	A2

Standard Ball Seat Locations
Standard Ball Seat Location is at 90°. Alternate locations of 0°, 180°, or 270° can be specified at no additional cost.



Custom Ball Seat Locations
Custom Ball Seat Locations can be specified as "BS" and degrees counter-clockwise from 0°. For additional information, see "Locking Devices" on p. 40.

Double Ball Seat
A second ball seat may be specified. Normally located 180° from the primary ball seat, these are used to minimize sharpening of notching punches by rotating the punch 180°. Specify "SB" and degree desired. A second ball can also be located 90° from the primary ball seat.



Not recommended for diameters under .375.

FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

Standard Alterations

Regular punches are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an "X" is placed in front of the P or W dimension, e.g., "XP" and/or "XW." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

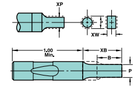
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Regular Punches—Light Duty



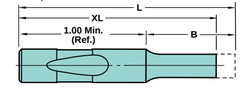
XP, XW P and W Dimensions Smaller than Standard

XB Point Length Other than Standard

For XBB and X3B, add three days to delivery.

Point Length	XB .5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	XBB 1.6251-2.0000	X3B 2.0001-2.5000	2.5001-3.0000
Code Type	**Min. P (Rounds)**											
25 LPX	.040	.040	.080	.080	.106	.115						
37 LPX	.050	.050	.080	.080	.106	.115	.115	.115	.115	.187	.250	.312
50 LPX		.093	.093	.093	.125	.125	.125	.125	.125	.187	.250	.312
62 LPX		.125	.125	.125	.156	.156	.156	.156	.156	.187	.250	.312
75 LPX		.235	.235	.235	.235	.235	.235	.235	.235	.281	.312	.375
87 LPX		.300	.300	.300	.300	.300	.300	.300	.300	.350	.375	.437
100 LPX		.350	.350	.350	.350	.350	.350	.350	.350	.350	.375	.437
	Min. W (Shapes)											
25 LP_		.040	.040	.080	.080	.106	.115					
37 LP_		.050	.050	.080	.080	.106	.115	.115	.115	.156		
50 LP_			.093	.093	.093	.125	.125	.125	.125	.187		
62 LP_			.125	.125	.125	.156	.156	.156	.156	.187		
75 LP_			.235	.235	.235	.235	.235	.235	.235	.250		
87 LP_				.235	.235	.235	.235	.235	.235	.250		
100 LP_				.235	.235	.235	.235	.235	.235	.250		

XL **Overall Length Shortened**
Stock removal from point end which shortens B length.



XLB **Overall Length Shortened**
B length maintained

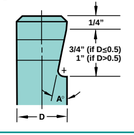
LL **Precision Overall Length**
Same as XL except overall length is held to ±.001.

WS **Whistle Stop** See table for standard angles. The Whistle Stop alteration is ground through the ball seat, subject to the same limitations as other standard and custom ball seat locations.

Example: LPX37 400, P.327, M2, WS, XA 5°

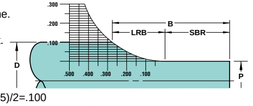
D	A°
.25,.37	5°
.50	7.5°
.62-100	10°

Angles of 5° and 7.5° also available on .625 and larger diameters. (Specify **XA** and angle after **WS**.)



SBR **Straight Before Radius**

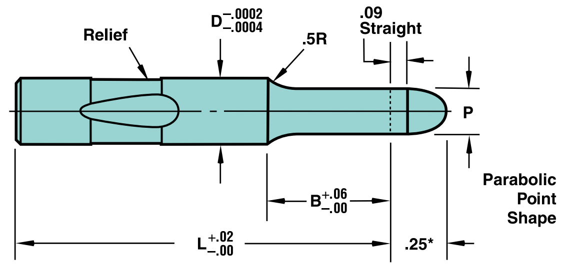
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.



Example:
D=.375
P=.175
(D-P)/2=(.375–.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

Regular Pilots
Light Duty

Type
LPT

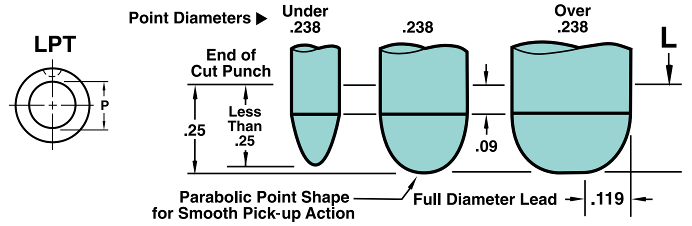


*Slightly less for diameters under .238.

Material
Steel: A2, M2, PS4, RC 60-63
Round P +.0005 −.0000 ◎ .0005 P to D
When P=D, shank tolerance applies.

Shank D	Code	Point Lgth. B	Round Min. XP	Round Range P	L 2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	Code	L 5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00
.250	25	.500	.050	.061 - .250														25								
.375	37	.625	.061	.124 - .375	200													37								
.500	50	.750	.092	.186 - .599														50								
.625	62	.875	.124	.311 - .625		225	250	275	300	325	350	375	400	425	450	475	500	62	525	550	575	600				
.750	75	.937	.234	.436 - .750														75					625	650	675	700
.875	87	.937	.299	.624 - .875														87								
1.000	100	.937	.349	.749-1.000														100								
.250	25		.050	.092 - .250														25								
.375	37		.061	.124 - .375														37								
.500	50		.092	.186 - .500														50								
.625	62	.75	.124	.311 - .625		B225	B250	B275	B300	B325	B350	B375	B400	B425	B450	B475	B500	62	B525	B550	B575	B600				
.750	75		.234	.436 - .750														75					B625	B650	B675	B700
.875	87		.299	.624 - .875														87								
1.000	100		.349	.749-1.000														100								
.375	37		.079	.124 - .375														37								
.500	50		.092	.186 - .500														50								
.625	62	1.00	.124	.311 - .625		C225	C250	C275	C300	C325	C350	C375	C400	C425	C450	C475	C500	62	C525	C550	C575	C600				
.750	75		.234	.436 - .750														75					C625	C650	C675	C700
.875	87		.299	.624 - .875														87								
1.000	100		.349	.749-1.000														100								
.500	50		.124	.186 - .500														50								
.625	62		.157	.311 - .625														62								
.750	75	1.25	.234	.436 - .750			D250	D275	D300	D325	D350	D375	D400	D425	D450	D475	D500	75	D525	D550	D575	D600	D625	D650	D675	D700
.875	87		.299	.624 - .875														87								
1.000	100		.349	.749-1.000														100								

Regular Pilots
Light Duty



Features/Benefits

Regular pilots are built to exact tolerances; the parabolic point shape allows for smooth pick-up action; and pilots offer a wide range of unique punching and fabrication applications.

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P	Steel
Example:	25	LPT	37	300	P.175	A2

FDS FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

Standard Alterations

Regular pilots are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P dimension is outside the standard range, an "X" is placed in front of the P dimension, e.g., "XP." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

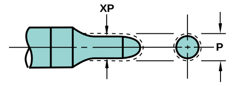
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

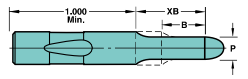
Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Regular Pilots—Light Duty



XP P Dimensions Smaller than Standard

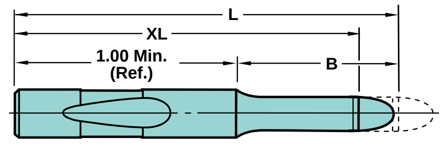


XB Point Length Other than Standard

For XBB and X3B, add three days to delivery.

	XB									XBB	X3B	
Point Length	.5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	1.6251-2.0000	2.0001-2.5000	2.5001-3.0000
Code Type	Min. P (Rounds)											
25 LPT	.050	.050	.079	.079	.105	.114						
37 LPT	.061	.061	.079	.079	.105	.114	.114	.114	.114	.186	.249	.311
50 LPT		.092	.092	.092	.124	.124	.124	.124	.124	.186	.249	.311
62 LPT		.124	.124	.124	.155	.155	.155	.155	.155	.186	.249	.311
75 LPT		.234	.234	.234	.234	.234	.234	.234	.234	.280	.311	.374
87 LPT		.299	.299	.299	.299	.299	.299	.299	.299	.349	.374	.436
100 LPT		.349	.349	.349	.349	.349	.349	.349	.349	.349	.374	.436

XL **Overall Length Shortened**
Stock removal from point end which shortens B length.

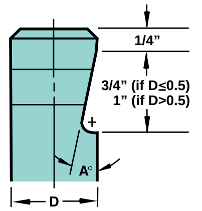


XLB **Overall Length Shortened**
B length maintained

WS **Whistle Stop** See table for standard angles. The Whistle Stop alteration is ground through the ball seat, subject to the same limitations as other standard and custom ball seat locations.

Example: LPT62 400, P.327, M2, WS, XA 10°

D	A°
25,37	5°
50	7.5°
62-100	10°

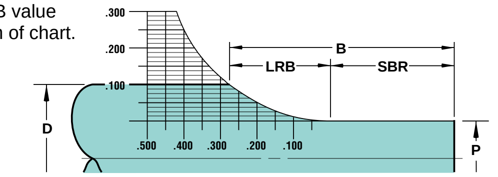


Angles of 5° and 7.5° also available on .625 and larger diameters. (Specify **XA** and angle after **WS**.)

SBR **Straight Before Radius**

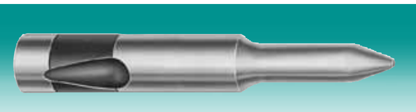
To determine Length of Radius Blend (LRB)

1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.

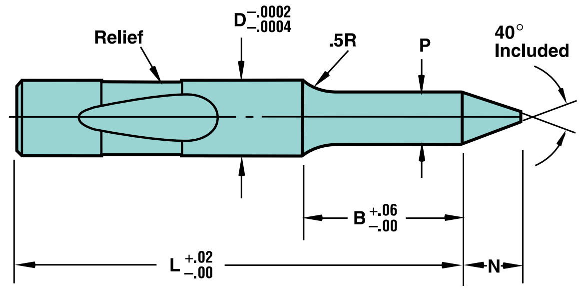


Example:
D=.375
P=.175
(D-P)/2=(.375–.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

Positive Pick-Up Pilots
Light Duty



Type
LPA



Material
Steel: M2, PS4, RC 60-63
Round P +.0005 −.0000 ◎ .0005 P to D
When P=D, shank tolerance applies.

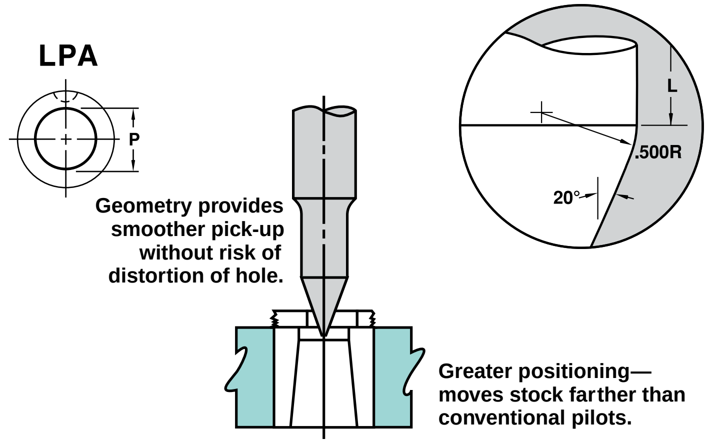
Order any length shown. If you require a length between those shown, designate "XL." Example: You require a length of 3.600. Order 375, then show XL 3.600. See "How to Order" example on the next page. XL is available down to 1.375. Note shank length limitation of .75. (B length may be shorter than shown when XL is under the shortest length shown.)
There is no additional charge for XL.

Shank D	Code	Point Lgth. B	Round Min. XP	Round Range P	*N		L 2.50	L 2.75	L 3.00	L 3.25	L 3.50	L 3.75	L 4.00	L 4.25	L 4.50	L 4.75	L 5.00	L 5.25
.375	37	.625	.083	.186 - .375	.37	.2342	250	275	300	325	350	375	400	425	450	475	500	525
.500	50	.750	.092	.249 - .500	.50	.3252												
.625	62	.875	.124	.311 - .625	.62	.4162												
.750	75	.937	.234	.436 - .750	.75	.5072												
.875	87	.937	.299	.624 - .875	.87	.5982												
1.000	100	.937	.349	.749-1.000	1.00	.6892												
.375	37	.75	.083	.186 - .375	.37	.2342	B250	B275	B300	B325	B350	B375	B400	B425	B450	B475	B500	B525
.500	50		.092	.249 - .500	.50	.3252												
.625	62		.124	.311 - .625	.62	.4162												
.750	75		.234	.436 - .750	.75	.5072												
.875	87		.299	.624 - .875	.87	.5982												
1.000	100		.349	.749-1.000	1.00	.6892												
.375	37	1.00	.083	.186 - .375	.37	.2342	C250	C275	C300	C325	C350	C375	C400	C425	C450	C475	C500	C525
.500	50		.092	.249 - .500	.50	.3252												
.625	62		.124	.311 - .625	.62	.4162												
.750	75		.234	.436 - .750	.75	.5072												
.875	87		.299	.624 - .875	.87	.5982												
1.000	100		.349	.749-1.000	1.00	.6892												
.500	50	1.25	.124	.249 - .500	.50	3252		D275	D300	D325	D350	D375	D400	D425	D450	D475	D500	D525
.625	62		.157	.311 - .625	.62	.4162												
.750	75		.234	.436 - .750	.75	.5072												
.875	87		.299	.624 - .875	.87	.5982												
1.000	100		.349	.749-1.000	1.00	.6892												

Code	L 5.50	L 5.75	L 6.00	L 6.25	L 6.50	L 6.75	L 7.00
37	550	575	600				
50				625	650	675	700
62							
75							
87							
100							
37	B550	B575	B600				
50				B625	B650	B675	B700
62							
75							
87							
100							
37	C550	C575	C600				
50				C625	C650	C675	C700
62							
75							
87							
100							
50	D550	D575	D600	D625	D650	D675	D700
62							
75							
87							
100							

*N =[(P-.057)/.728]+.132 when "P" dimension is less than "Pn" shown in chart.

Positive Pick-Up Pilots
Light Duty



Features/Benefits

Positive pick-up pilots provide smoother pick-up without the risk of distorting the hole; in addition, the unique design moves the stock farther than conventional pilots.

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P	Steel
Example:	5	LPA	50	300	P.375	M2

FDS® FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

Standard Alterations

Ball Lock positive pick-up pilots are available in sizes other than those shown in the chart to the left.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P dimension is outside the standard range, an "X" is placed in front of the P dimension, e.g., "XP." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

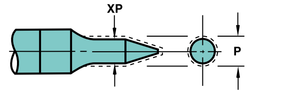
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

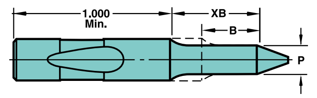
Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Positive Pick-Up Pilots—Light Duty



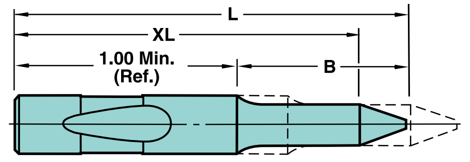
XP P Dimensions Smaller than Standard



XB Point Length Other than Standard
Specify XB, XBB, or X3B and length (see chart below).
For XBB and X3B, add three days to delivery.

	XB									XBB	X3B	
Point Length	.5001-.6250	.6251-.7500	.7501-.8750	.8751-1.0000	1.0001-1.1250	1.1251-1.2500	1.2501-1.3750	1.3751-1.5000	1.5001-1.6250	1.6251-2.0000	2.0001-2.5000	2.5001-3.0000
Code Type	Min. P (Rounds)											
37 LPA	.083	.083	.083	.083	.105	.114	.114	.114	.114	.186	.249	.311
50 LPA	.092	.092	.092	.092	.124	.124	.124	.124	.124	.186	.249	.311
62 LPA	.124	.124	.124	.124	.155	.155	.155	.155	.155	.186	.249	.311
75 LPA	.234	.234	.234	.234	.234	.234	.234	.234	.234	.280	.311	.374
87 LPA	.299	.299	.299	.299	.299	.299	.299	.299	.299	.349	.374	.436
100 LPA	.349	.349	.349	.349	.349	.349	.349	.349	.349	.349	.374	.436

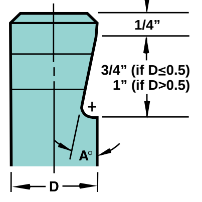
XL **Overall Length Shortened**
Stock removal from point end. B length is maintained.
Available at no charge within catalog range.



WS **Whistle Stop** See table for standard angles. The Whistle Stop alteration is ground through the ball seat, subject to the same limitations as other standard and custom ball seat locations.

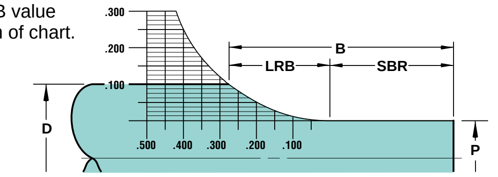
Example: LPA50 400, P.327, M2, WS, XA 7.5°

D	A°
25,37	5°
50	7.5°
62-100	10°



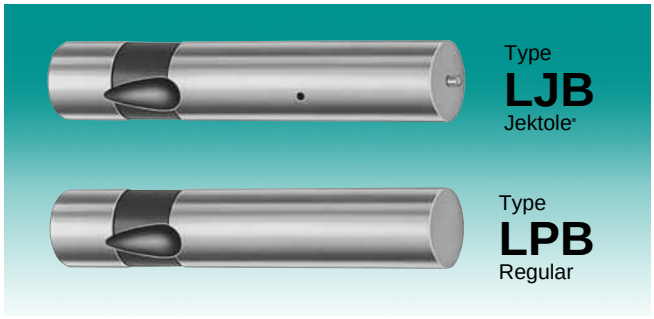
Angles of 5° and 7.5° also available on .625 and larger diameters. (Specify **XA** and angle after **WS**.)

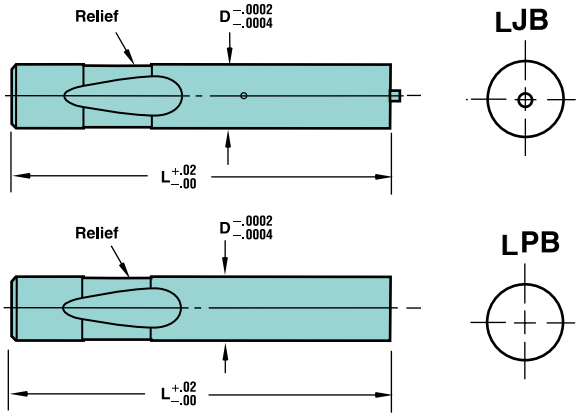
SBR **Straight Before Radius**
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2.
2. Find (D-P)/2 value on left side of chart.
3. Follow line over to intersection point on radius blend line.
4. Read LRB value on bottom of chart.



Example:
D=.375
P=.175
(D-P)/2=(.375–.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300.

Punch Blanks Jektole® & Regular
Light Duty





Material
Steel: A2, M2, PS4, RC 60-63

Type	Shank D	Code	L 2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	* Jektole® Group
LJB	.250	25	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	J3
	.375	37																		J4
	.500	50																		J6
	.625	62																		J6
	.750	75																		J9
	.875	87																		J9
	1.000	100																		J9

Type	Shank D	Code	L 2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00
LPB	.250	25	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	700
	.375	37																					
	.500	50																					
	.625	62																					
	.750	75																					
	.875	87																					
	1.000	100																					

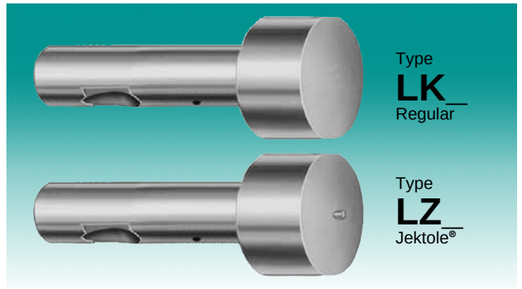
*See p. 39 for additional information.

HOW TO ORDER

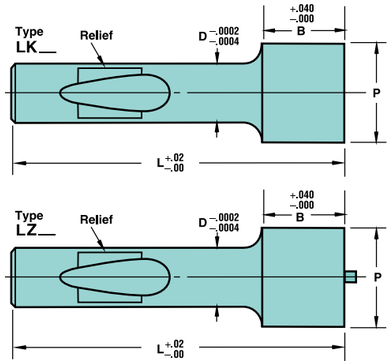
Specify:	Qty.	Type	D Code	L	Steel
Example:	12	LJB	50	300	M2

FDS® FIRM DELIVERY SCHEDULE
1 Day
PS4 +2 Days

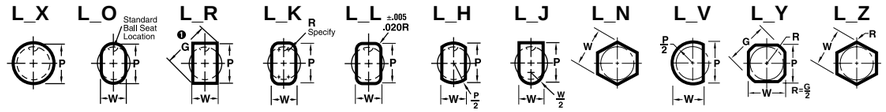
Point Larger than Shank Jektole® & Regular
Light Duty



Material
Steel: A2, M2, RC 60-63
Round P $^{+.0005}_{-.0000}$ | ◎ .0005 P to D
Shape P, W ± .0005 | ◎ .001 P to D



❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.



Type	Shank D	Code	Point Lgth. B	Round Range P	Shape Min XW	Shape Min. W	Shape Max. P/G	L 2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	* Jektole® Group
LK_ Regular LZ_ Jektole®	.375	37	.62	.376 - .875	.062	.125	.875	250	275	300	325	350	375	400	425	450	J4
	.500	50	.75	.501-1.250	.158	.188	1.250										J6
	.625	62	.88	.626-1.500	.158	.250	1.500										J6
	.750	75	.94	.751-1.500	.235	.312	1.500										J9
	.875	87	.94	.876-1.750	.235	.375	1.750										J9
	1.000	100	.94	1.001-1.750	.235	.437	1.750										J9

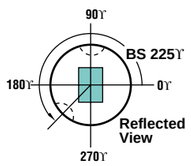
*See p. 39 for additional information.

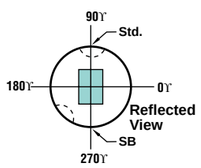
Standard Ball Seat Locations
Standard Ball Seat Location is at 90°. Alternate locations of 0°, 180°, or 270° can be specified at no additional cost.

Custom Ball Seat Locations
Custom Ball Seat Locations can be specified as "BS" and degrees counter-clockwise from 0°. For additional information, see "Locking Devices" on p. 40.

Double Ball Seat
A second ball seat may be specified. Normally located 180° from the primary ball seat, these are used to minimize sharpening of notching punches by rotating the punch 180°. Specify "SB" and degree desired. A second ball can also be located 90° from the primary ball seat.

Not recommended for diameters under .625 for LZ__ and .500 for LK__.





FDS® FIRM DELIVERY SCHEDULE
1-4 pcs., 2 Days
5-19 pcs., 3 Days

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	2	LKX	100	400	P1.300	M2

Standard Alterations

Point Larger than Shank Ball Lock punches are available in sizes other than those shown in the chart above.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an "X" is placed in front of the P or W dimension, e.g., "XP" and/or "XW." If the point length is other than standard, designate "XB" as the point length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Surface Coatings

Some catalog products can be coated to increase hardness, reduce galling, and improve wear and/or corrosion resistance.

DayTride® (XN)—a low-cost surface application that treats all exposed surfaces. Ideal for punches and die buttons. Provides high dimensional stability. Approx. hardness: RC73.

DayTiN® (XNT)—applied via PVD (physical vapor deposition). Provides extreme hardness (hard as carbide) and excellent lubricity when used with a lubricant. Not recommended for stainless steel, copper, or nickel. Approx. hardness: *Vickers 2300.

DayTAN™ (XAN)—ultra-hard, high-aluminum PVD coating. Absorbs shear stress and provides high temperature resistance. Ideal for HSLA, dual phase, and TRIP steels. Approx. hardness: *Vickers 3400.

TiCN (XCN)—very hard PVD, thin film. Provides ultra hardness (harder than carbide) and superior abrasive wear resistance. Approx. hardness: *Vickers 3000.

XNM—PVD, solid film. Produces lower coefficient of friction than other coatings. Provides excellent lubricity. Approx. hardness: *Vickers 2000.

XNP—the ultimate coating for extrusion and forming applications. Also works well in shaving operations. Tolerance is ± .0002. Approx. hardness: *Vickers 3100.

DayKool™ (XCR)—cryogenic steel conditioning process, used primarily with hard, thick materials. Improves strength, toughness, and dimensional stability.

CrN (CRN)—excellent adhesion, high toughness, and good corrosion resistance. Primary applications are metal forming (copper, brass, bronze), metal die casting, and plastic injection molding. Approx. hardness: *Vickers 1800-2100.

ZertonPlus™ (XNA)—excellent wear resistance, thermal shock stability and hot hardness. Approx. hardness *Vickers 3200.

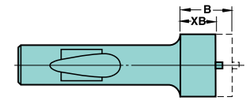
XNAProgress (XNAP)—ultra-hard PVD coating that absorbs shear stress; provides excellent high-temperature resistance. Ideal for stamping where tools are exposed to extreme stress profiles. A good alternative to TD coating without the dimensional changes associated with that process. Approx hardness: *Vickers 3200.

Diamond Like Carbon Coating (XCD)—combines high hardness with an extremely low coefficient of friction. Good protection against abrasive & adhesive wear. Approx. hardness *Vickers 5000.

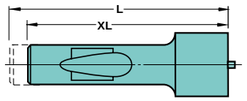
Code / Delivery		Material
XN —DayTride®	+ 3 days	M2 & PS4
XNT —DayTiN®	+ 3 days	M2 & PS4
XAN —DayTAN™	+ 4 days	M2 & PS4
XCN —TiCN	+ 3 days	M2 & PS4
XNM	+12 days	M2 & PS4
XNP	+ 8 days	M2 & PS4
XCR —DayKool™	+ 1 day	M2 & PS4
CRN	+ 7 days	M2 & PS4
XNA —ZertonPlus™	+ 7 days	M2 & PS4
XNAP—XNAProgress	+12 days	M2 & PS4
XCD	+ 8 days	M2 & PS4

* Vickers used when RC exceeds 80.
® DayTride and DayTiN are registered trademarks of Dayton Progress.
™ DayTAN, DayKool, and ZertonPlus are trademarks of Dayton Progress.

Standard Alterations
Point Larger than Shank—Light Duty



XB **Point Length Shorter than Standard**
(Shortens punch from the point end.)



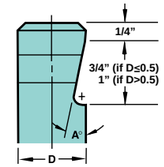
XL **Overall Length Shortened**
Stock removal from ***shank end***. Minimum shank length is 1 3/16". Does not alter ball seat location.

LL **Precision Overall Length**
Same as XL except overall length is held to ±.001.

WS **Whistle Stop** See table for standard angles. The Whistle Stop alteration is ground through the ball seat, subject to the same limitations as other standard and custom ball seat locations.

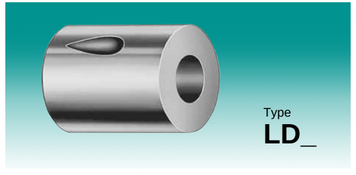
Example: LZX75 400, P1.250, M2, WS, XA 10°
LKR75 400, P1.250, W.350, M2, WS, XA 10°

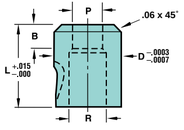
D	A°
37	5°
50	7.5°
62-100	10°



Angles of 5° and 7.5° also available on .625 and larger diameters. (Specify **XA** and angle after **WS**.)

Die Buttons
Ball Lock

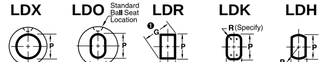




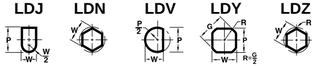
Material
Steel: A2, M2, RC 60-63
Round P +.0005 -.0000 | ◎ .0005 | P to D
Shape P, W +.001 -.000 | ◎ .001 | P to D

Body				Round	Shape		L
D	Code	Min. B	Max. R	Range P	Min. W	Max. P/G	1.187
.5000	50	.156	.228	.064 - .195	.048 - .195		118
.6250	62	.187	.312	.126 - .285	.064 - .285		118
.7500	75	.187	.375	.196 - .345	.095 - .345		118
.8750	87	.187	.468	.286 - .435	.125 - .435		118
1.0000	100	.250	.578	.346 - .545	.125 - .545		118
1.2500	125	.250	.687	.436 - .655	.187 - .655		118
1.5000	150	.250	.812	.546 - .780	.187 - .780		118
1.7500	175	.312	1.062	.656-1.035	.187-1.035		118

LDX LDO (Standard Ball Seat Location) LDR LDK LDH



LDJ LDN LDV LDY LDZ



❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.

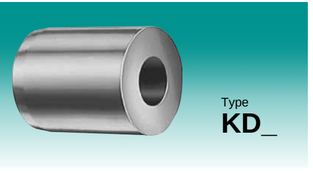
HOW TO ORDER

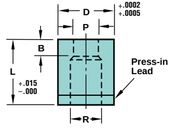
Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	10	LDX	125	118	P.625	A2

Note: The standard ball seat location is at 90°. Alternate locations of 0°, 180°, or 270° can be specified at no additional cost. For additional information, see "Locking Devices" on p. 40.

FIRM DELIVERY SCHEDULE
Up to 1.5000 Dia. 2 Days
1.7500 and larger Dia. 4 Days

Die Buttons
Press Fit



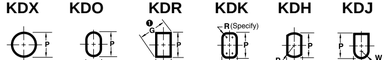


Material
Steel: A2, M2, RC 60-63
Round P +.0005 -.0000 | ◎ .0005 | P to D
Shape P, W +.001 -.000 | ◎ .001 | P to D
D ≥ 1.75 +.0002 -.0006

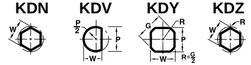
HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P (or P&W)	Steel
Example:	5	KDR	50	100	P.250, W.093	A2

KDX KDO KDR KDK KDH KDJ



KDN KDV KDY KDZ



❶ Check your P&W dimensions to be certain the diagonal G does not exceed the maximum shown.

Body				Round	Shape		L							
D	Code	Min. B	Max. R	Range P	Min. W	Max. P/G	.750	.875	.937	1.000	1.125	1.250	1.375	1.500
.2500	25	.156	.156	.064 - .135	.048 - .135									
.3125	31	.156	.191	.064 - .171	.048 - .171									
.3750	37	.156	.228	.064 - .195	.048 - .195									
.4375	43	.156	.281	.064 - .250	.048 - .250									
.5000	50	.156	.312	.064 - .285	.064 - .285									
.6250	62	.187	.390	.136 - .365	.095 - .365									
.7500	75	.187	.468	.136 - .435	.118 - .435									
.8750	87	.187	.578	.276 - .545	.125 - .545		75	87	93	100	112	125	137	150
1.0000	100	.250	.703	.356 - .675	.125 - .675									
1.2500	125	.250	.828	.500 - .800	.187 - .800									
1.5000	150	.250	1.093	.616-1.050	.187-1.050									
1.7500	175	.312	1.430	.750-1.400	.187-1.400									
2.0000	200	.312	1.630	.875-1.600	.187-1.600									
2.2500	225	.312	1.830	1.000-1.800	.187-1.800									
2.5000	250	.312	2.030	1.125-2.000	.187-2.000									
2.7500	275	.312	2.230	1.250-2.200	.187-2.200									

FIRM DELIVERY SCHEDULE
Up to 1.5000 Dia. 2 Days
1.7500 and larger Dia. 4 Days

Standard Alterations

Ball Lock press fit die buttons are available in sizes other than those shown in the chart above.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P and W dimensions are outside the standard range, an "X" is placed in front of the P or W dimension, e.g., "XP" and/or "XW." If the point length is other than standard, designate "XB" as the land length. Also see "Standard Alterations" on the front of the pullout tab in this section for other special order designators.

Dayton Slug Control

Dayton Slug Control is a guaranteed method for reducing the risk of pulling slugs to the die surface during withdrawal of the punch. A series of grooves is designed inside the die button. There, the slugs are trapped until they fall freely through the relief. The use of Dayton Slug Control has no effect on hole size, and will not require any changes in current regrind practices.

Our guarantee: *Use Dayton Slug Control in a stamping die now pulling slugs. If, for any reason, you are not completely satisfied, we will refund the full cost of the Slug Control alteration.* (We cannot guarantee the retention of slugs when clearance exceeds 10% per side.)

Ordering
Dayton Slug Control is easy to specify and order. Simply add the information that is unique to your application to the die button catalog number. Please specify XSC for alteration and show material thickness (inches) and clearance per side (percentage).

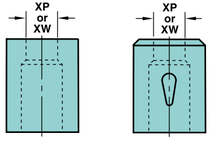
HOW TO ORDER

	Catalog Number				Your Specs		
Inch	KDX	62	100	P.250	XSC	MT.0625	CS 5
	Type	D	L	P	Alt. Code	Mat'l Thickness (inches)	Clear Per Side (%)

For additional information, contact your Dayton distributor.

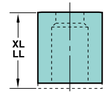
Standard Alterations
Die Buttons

XP, XW P and W Dimensions Larger or Smaller than Standard



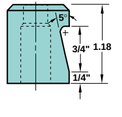
Body Code	Press Fit Min. P	Press Fit Min. W	Press Fit Max. P/G	Press Fit R	Ball Lock Min. P	Ball Lock Min. W	Ball Lock Max. P/G	Ball Lock R
25	.064	.048	.167	.191				
37	.064	.048	.250	.281				
50	.064	.064	.344	.375	.064	.048	.250	.281
62	.136	.095	.453	.500	.126	.064	.344	.375
75	.136	.118	.562	.594	.150	.095	.453	.500
87	.276	.125	.656	.703	.175	.125	.562	.594
100	.356	.125	.750	.781	.200	.125	.656	.703
125	.500	.187	.935	.969	.250	.187	.750	.781
150	.616	.187	1.200	1.230	.300	.187	.935	.969
175	.750	.187	1.400	1.430	.350	.187	1.200	1.230
200	.875	.187	1.600	1.630				
225	1.000	.187	1.800	1.830				
250	1.125	.187	2.000	2.030				
275	1.250	.187	2.200	2.230				

XL **Overall Length Shortened**
Stock removal does not alter land length on KD__.
Minimum overall length = .25
Not available on Ball Lock Die Buttons.

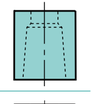


LL **Precision Overall Length**
Same as XL except overall length is held to ±.001.
Not available on Ball Lock Die Buttons.

WS **Whistle Stop (5° standard angle)**
The Whistle Stop alteration is ground through the ball seat, subject to the same limitations as other standard and custom ball seat locations. The XP alteration is not available with the WS alteration.
Example: LDX75, 118, P.328, M2, WS.



XSC **Slug Control eliminates slug pulling**
(When ordering Dayton Slug Control, please specify XSC in place of the standard die button code, as well as your specifications. See the "How to Order" example on the front of this tab.)

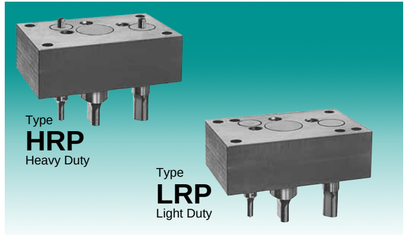


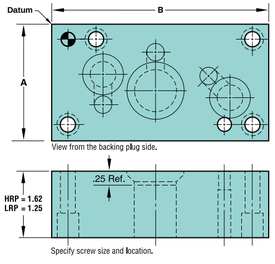
XBL **Straight Through Land**
The land length (B) equals the overall length. Can be used for bushings, guides and a variety of other applications.
*Round die buttons only

XN **+3 days**
DayTride® A unique wear-resistant surface treatment for M2 & PS only.

See p.38 for Die Button Blanks.

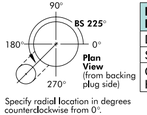
Multi-Position™ Retainers
Heavy Duty/Light Duty





Type	W	L													
		2.50	2.75	3.00	3.25	3.50	3.75	4.00	5.00	6.00	7.00	8.00	9.00	10.00	12.00
HRP LRP	2.00	2025	2027	2030	2032	2035	2037	2040	2050	2060	2070	2080	2090	2010	2012
	2.75		2727	2730	2732	2735	2737	2740	2750	2760	2770	2780	2790	2710	2712
	3.00		3027	3030	3032	3035	3037	3040	3050	3060	3070	3080	3090	3010	3012
	4.00							4040	4050	4060	4070	4080	4090	4010	4012
	6.00									6060	6070	6080	6090	6010	6012
	8.00											8080	8090	8010	8012

Ball Hole Locations



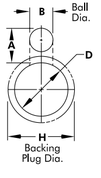
Specify radial location in degrees counterclockwise from 0°.

Hole Reference Re Datum Point	
Dowel Holes	±.0003
Screw Holes	±.0050
Component Holes	±.0003

Punch Shape	Ball Hole Class	Radial Tolerance
Round	B	±5°
Shape	BB	±0°5'

The Ball Hole Class B is standard, unless otherwise specified.

Space Requirements



TYPE	D	A	B	H
HRP	.375	.57	.375	.625
	.500	.69	.500	.750
	.625	.69	.500	.875
	.750	.69	.500	1.000
	.875	.69	.500	1.125
	1.000	.69	.500	1.250
	1.250	.69	.500	1.500
LRP	.250	.44	.250	.500
	.375	.44	.250	.625
	.500	.50	.312	.750
	.625	.50	.312	.875
	.750	.57	.375	1.000
	.875	.57	.375	1.125
	1.000	.57	.375	1.250

HOW TO ORDER

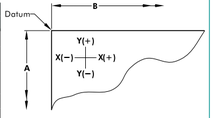
Example:

Retainer	Catalog No.	Special Size
☑ HRP ☐ LRP	3070	A _____ B _____

Multi-Position™ Retainers

Hole No.	Component Type	Component Size	Location X Axis	Location Y Axis	Ball Hole Location	Ball Hole Class	Backing Plug Type
1	Dowel	5/16 S.F.*	.375	– .375	—	—	—
2	S.H.C.S	5/16	1.000	– .375	—	—	—
3	HJR	62	2.090	–1.375	90°	BB	C
4	Clear	1.281	4.250	–1.062	—	—	—
5	Jackscr.	STD.	0.687	– .937	—	—	—

*Slip Fit



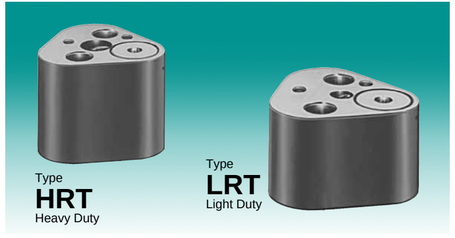
See the back of the pullout tab for additional information on Backing Plugs.

Multi-Position™ Retainers require special order forms, which are available on request. Specify all dimensions from the datum: Use the drawing above for reference.

FIRM DELIVERY SCHEDULE
1-6 holes, 5 Days
7+ holes, 8 Days

Multi-Position™ is a trademark of Dayton Progress Corporation.

True Position® Retainers
Heavy Duty/Light Duty



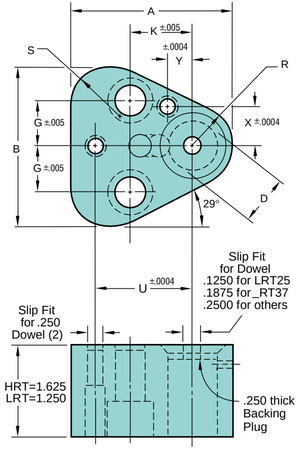
TRUE POSITION®

The industry standard interchangeable retainer

HOW TO ORDER

Specify:	Qty.	Type	D
Example:	23	HRT	37
	13	LRT	62

True Position® Retainer sets include:
- 1 Ball
- 1 Spring
- 2 Screws
- 2 Dowels
- 1 Ball Release Set Screw



Catalog Number

Heavy Duty	Light Duty	D	A	B	G	K	R	S	U	X	Y	Screw Size
—	LRT	.2500	1.75	1.72	.438	.750	.38	.47	1.060	.354	.295	5/16-18
		.3750	1.75	1.72	.438	.750	.38	.47	1.060	.354	.295	5/16-18
		.5000	2.00	1.97	.562	.750	.50	.60	1.180	.472	.256	3/8-16
		.6250	2.12	2.09	.625	.750	.56	.66	1.250	.532	.236	3/8-16
		.7500	2.38	2.34	.688	.750	.69	.79	1.320	.650	.197	3/8-16
		.8750	2.50	2.47	.688	.750	.75	.85	1.400	.728	.197	3/8-16
HRT		1.0000	2.75	2.72	.781	.938	.88	.97	1.600	.866	.276	1/2-13
	—	1.2500	2.75	2.72	.781	.938	.88	.97	1.600	.866	.276	1/2-13

FIRM DELIVERY SCHEDULE
1 Day

Features/Benefits

The ***in-line dowel*** assures precise punch-to-die button alignment, giving you higher quality parts, longer punch life, and reduced production downtime.

The True Position® Retainer ***eliminates hand fitting***, cutting mounting time by nearly 50%. Simply pull the retainer from its box, and screw it into the die set. True Position® gives you true dimensional accuracy every time.

Only ***one dowel is required for round punches***, which reduces machining time by up to 50%. Shaped punches use the secondary dowel for precise alignment.

The ***precision-ground ball hole*** assures perfect alignment of any punch shape, even if the retainer is replaced.

The True Position® Retainer allows ***complete interchangeability between Heavy Duty and Light Duty retainers*** in the event of an engineering change.

Use of the True Position® Retainer can ***cut retainer inventory requirements by 50%***.

True Position® is a registered trademark of Dayton Progress Corporation.

Backing Plugs

The three Backing Plugs shown above are used with Multi-Position™, True Position®, and End and Square Retainers—both heavy duty and light duty. To determine which backing plug is used with a specific type of retainer, see "Accessories—Retainers" on p. 36.

The Type C Solid Backing Plug is standard with all Multi-Position™ Retainers. The Type A Backing Plug with dowels for location can be specified; this eliminates the need for dowels in the retainer. Die Button Retainers require a detailed drawing.

True Position® Retainers

Don't waste time and money building a retainer for just one punch. Fitting isolated punches or pilots onto a die set is quick and easy with True Position® Retainers. These cost-effective time-savers can be mounted with screws from either top or bottom, eliminating the need to build and fit one-of-a-kind retainers.

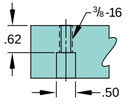
True Position® Retainers are recognized as the standard in the industry for interchangeable retainers. All are quality built; ground top to bottom; and hardened to approximately RC 58-60.

True Position® gives you true dimensional accuracy each and every time!

Standard Alterations
Multi-Position™ Retainers

Standard Jackscrew Hole

Jackscrews make it easier to pull retainers off the dowels.

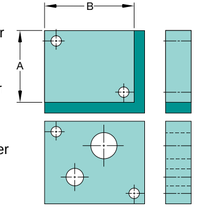


Special Size

Any amount of material can be removed from the sides of the retainer for a custom size. Edges are saw cut ±.03.

Clearance Holes

Clearance holes or tapped holes can be detailed, as shown in the order example.



Holes are drilled through the retainer unless otherwise specified.

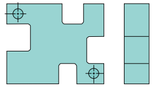
Location ±.010

Diameter +.015 –.000

The following alterations require detailed drawings:

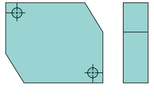
Notches

Notches to clear other tooling can be added to any side of the retainer. Notches are saw cut ±.03.



Angles

As with notches, angles can be added to clear other tooling in the die. Angles are saw cut ±.03.

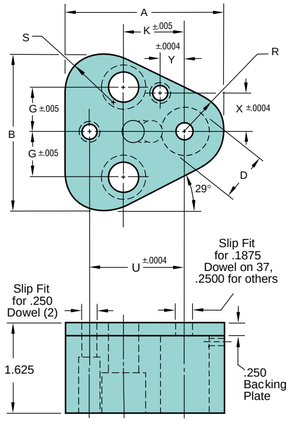


Single Punch Retainer
with Backing Plate

True Position®

HRTB
Heavy Duty

Retainer sets include:
- 1 Ball
- 1 Spring
- 2 Screws
- 2 Dowels
- 1 Ball Release Set Screw



HOW TO ORDER

Specify:	Qty.	Code	D
Example:	23	HRTB	37

Back Plate	Code	D	A	B	G	K	R	S	U	X	Y	Screw Size
HRTB	37	.3750	1.75	1.72	.438	.750	.38	.47	1.060	.354	.295	5/16-18
HRTB	50	.5000	2.00	1.97	.562	.750	.50	.60	1.180	.472	.256	3/8-16
HRTB	62	.6250	2.12	2.09	.625	.750	.56	.66	1.250	.532	.236	3/8-16
HRTB	75	.7500	2.38	2.34	.688	.750	.69	.79	1.320	.650	.197	3/8-16
HRTB	87	.8750	2.50	2.47	.688	.750	.75	.85	1.400	.728	.197	3/8-16
HRTB	100	1.0000	2.75	2.72	.781	.938	.88	.97	1.600	.866	.276	1/2-13
HRTB	125	1.2500	2.75	2.72	.781	.938	.88	.97	1.600	.866	.276	1/2-13

Features/Benefits

HRTB True Position® Retainers come complete with an ***integrated, hardened backing plate***. With all the features of the original True Position® Retainer, the HRTB satisfies the needs of applications where more bearing surface is desired. True Position® gives you true dimensional accuracy each and every time!

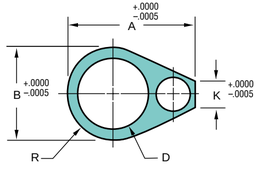
®True Position is a registered trademark of Dayton Progress Corporation.

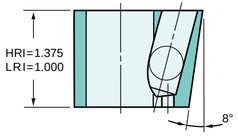
EZ Fit™ Retainer Inserts

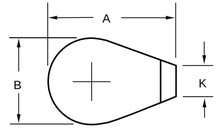
True Position® Retainers

Type **HRI** Heavy Duty

Type **LRI** Light Duty







The shape shown above can be easily cut using wire EDM to assure a proper fit. The insert (utilizing both the straight and 8° angled sides) fits securely and is designed to clear the retainer by a small amount, making assembly and disassembly easier.

Each insert comes complete with wire cutting instructions that show recommended dimensions and tolerances for optimum performance.

HOW TO ORDER

Specify:	Qty.	Type	Code
Example:	5	HRI	37
	12	LRI	62

Heavy Duty

Type	Punch Hole Dia. D	Code	A	B	K
HRI	0.3750	37	1.0630	0.6250	0.3882
	0.5000	50	1.3190	0.7500	0.5250
	0.6250	62	1.4570	0.9000	0.4698
	0.7500	75	1.6040	1.0600	0.4202
	0.8750	87	1.7320	11950	0.4182
	1.0000	100	1.8700	1.3200	0.4111
	1.2500	125	2.1260	1.5700	0.3951

Light Duty

Type	Punch Hole Dia. D	Code	A	B	K
LRI	0.2500	25	0.7750	0.4375	0.3125
	0.3750	37	0.9000	0.5625	0.3125
	0.5000	50	1.1200	0.7500	0.3125
	0.6250	62	1.2500	0.8750	0.3125
	0.7500	75	1.4700	1.0700	0.3125
	0.8750	87	1.6000	11950	0.3125
	1.0000	100	1.7200	1.3200	0.3125

Features/Benefits

Dayton EZ Fit™ Ball Lock Retainer Inserts give you the ability to build, reconfigure, and custom-make retainers in-house as die specifications change. In addition, the unique single-piece teardrop shape, combined with both a straight and an angled wedge side, holds your ball lock punch securely in place.

EZ Fit™ reduces costs and downtime—and simplifies tooling changeover.

FDS® FIRM DELIVERY SCHEDULE
1 Day

™ EZ Fit is a trademark of Dayton Progress Corporation.
Mfg. under Patent No. 6,679,147.

True Position® Retainers

See p.28

See p.27

The ***in-line dowel assures precise punch-to-die button alignment***, giving you higher quality parts, longer punch life, and reduced production downtime.

The True Position® Retainer ***eliminates hand fitting***, cutting mounting time by nearly 50%. Simply pull the retainer from its box, and screw it into the die set.

Only ***one dowel is required for round punches***, which reduces machining time by up to 50%. Shaped punches use the secondary dowel for precise alignment.

The ***precision-ground ball hole assures perfect alignment of any punch shape***, even if the retainer is replaced.

The True Position® Retainer allows complete ***interchangeability between Heavy Duty and Light Duty retainers*** in the event of an engineering change.

Use of the True Position® Retainer can ***cut retainer inventory requirements by 50%***.

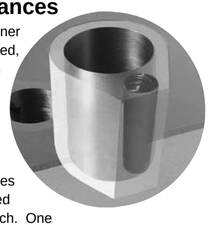
Backing Plates

The Backing Plates are standard with Dayton's HRTB True Position® Single Punch Retainers. The Backing Plate has the same function as the backing plug model True Position® Retainer, i.e., to prevent the punch shank from penetrating the punch plate.

For optimum resistance on impact HRTB Retainers have integrated, hardened Backing Plates. The Backing Plates cover the entire surface of the retainer, spreading the load over a large area.

EZ Fit™ Retainer Inserts

Tighter Tolerances



Dayton EZ Fit™ Retainer Inserts utilize a patented, state-of-the-art design that assures tighter, more precise tolerances than other retainer inserts on the market. The unique teardrop shape provides a single, tightly secured receptacle for the punch. One side of the piece (the flat side) is cut at an 8° angle to create a wedge shape. The hole in the retainer is wire cut to create a snug fit. (See cutaway.)

EZ Fit™ Retainer Inserts are also ideal for repairing or making engineering changes.

Repair/Engineering Changes

When job specifications change, the location(s) of the punches in the die set change, and reconfigured retainers are required. This means ordering new retainers or modifying existing retainers in-house. This can slow the process; often requires specialized equipment and knowledge; and the integrity of the original retainer can be compromised.

Now—with the help of the all-new Dayton EZ Fit™ Ball Lock Retainer Insert—this process can be simplified and completed in-house at a fraction of the cost of replacing existing retainers.

In-house Modifications

To retrofit the EZ Fit™ Insert, simply wire cut the hole to the specified size and install. (See instructions at www.daytonlamina.com/ezfit for EDM wire cutting.) The process is quick, easy, effective, and far less expensive than part replacement costs.

End Retainers
Heavy Duty/Light Duty

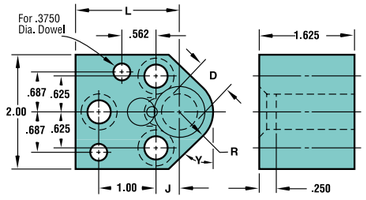
Type
HRE
Heavy Duty

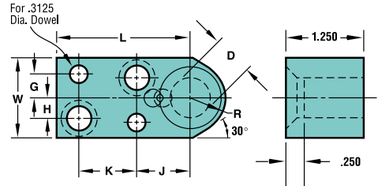
Type
LRE
Light Duty

HOW TO ORDER

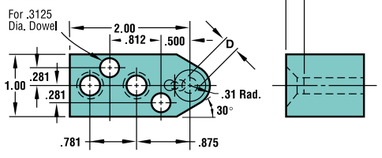
Specify:	Qty.	Type	D
Example:	15	HRE	100
	12	LRE	87

Retainer sets include:
- Backing Plug
- Ball
- Spring
- Screws
- Dowels





LRE 25



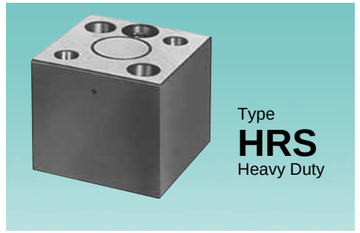
Catalog Number									
Type	D	L	J	R	Y	Screw Size
HRE	.5000	1.75	.375	.50	40°	3/8-16
	.6250	1.81	.438	.56	45°	3/8-16
	.7500	1.88	.500	.69	60°	3/8-16
	.8750	1.94	.562	.75	60°	3/8-16
	1.0000	2.00	.625	.81	60°	3/8-16
	1.2500	2.12	.750	1.00	—	3/8-16

Catalog Number									
Type	D	G	H	J	K	L	R	W	Screw Size
LRE	.2500	See Drawing							1/4-20
	.3750	.375	.281	.906	.969	2.25	.38	1.25	3/8-16
	.5000	.375	.281	.906	.969	2.25	.50	1.25	3/8-16
	.6250	.375	.281	.906	.969	2.25	.56	1.25	3/8-16
	.7500	.438	.344	1.125	1.000	2.50	.69	1.38	3/8-16
	.8750	.438	.344	1.125	1.000	2.50	.75	1.50	3/8-16
	1.0000	.438	.344	1.125	1.000	2.50	.81	1.62	3/8-16

FIRM DELIVERY SCHEDULE
1 Day

Note: Screw and Dowel Locations ± .005.

Square Retainers
Heavy Duty/Light Duty



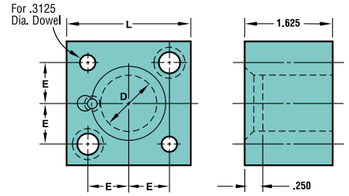
Type
HRS
Heavy Duty

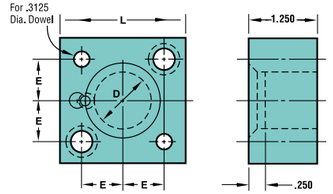
Type
LRS
Light Duty

HOW TO ORDER

Specify:	Qty.	Type	D
Example:	12	HRS	62
	8	LRS	37

Retainer sets include:
- Backing Plug
- Ball
- Spring
- Screws
- Dowels





Catalog Number				
Type	D	L	E	Screw Size
HRS	.5000	1.88	.562	3/8-16
	.6250	2.00	.625	3/8-16
	.7500	2.12	.688	3/8-16
	.8750	2.38	.750	1/2-13
	1.0000	2.38	.750	1/2-13
	1.2500	2.62	.812	1/2-13

Catalog Number				
Type	D	L	E	Screw Size
LRS	.2500	1.25	.312	1/4-20
	.3750	1.38	.375	5/16-18
	.5000	1.50	.438	5/16-18
	.6250	1.62	.500	5/16-16
	.7500	1.88	.562	3/8-16
	.8750	2.00	.625	3/8-16
	1.0000	2.25	.750	3/8-16
*LRS	1.2500	2.25	.750	3/8-16
	1.5000	2.75	1.000	3/8-16
	1.7500	2.75	1.000	3/8-16

*May be furnished with Backing Plate instead of Backing Plug.

FIRM DELIVERY SCHEDULE
1 Day

Note: Screw and Dowel Locations ± .005.

Classified Shapes — Ball Lock

Classified shapes (83 common shapes, no detailing required) are available on all punches and die buttons, as indicated in this catalog. The 83 available common shapes are shown here and on p. 33. Also, see the outside of the pullout tab for notes and drawing references.

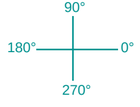
Ordering Information

***Corner Dimensions**

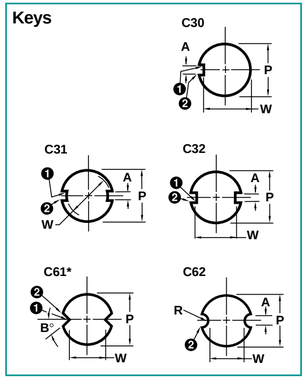
Dimensions should be the theoretical sharp corners for shapes C22, C24, C34, C61, and C88. However, some reduction of these dimensions will result from fitting the punch and die button under conditions where the clearance is .0025 or less per side.

†Shape Center

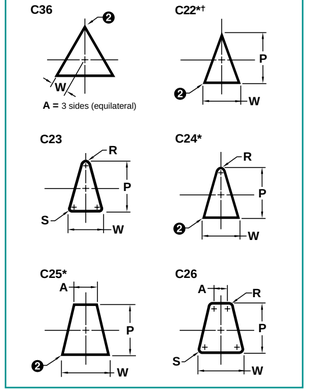
Shapes are centered on the punch shanks as shown. Shapes in guide bushings and die buttons are also centered as shown with the exception of shapes C22 and C34. Due to clearance, the P dimension on these shapes will not be centered.



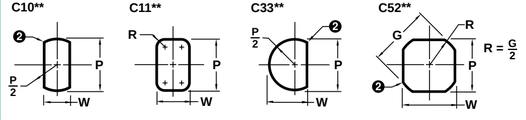
Keys



Triangles / Trapezoids

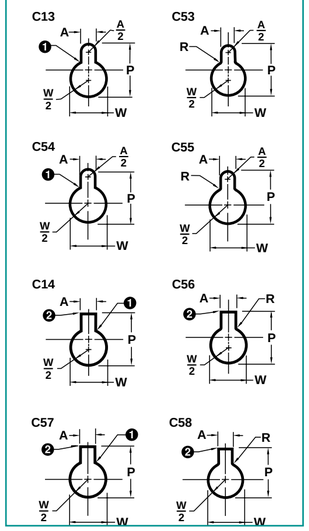


Flatted Rounds

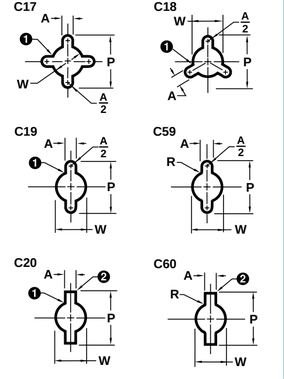


** Now standard. See product pages.

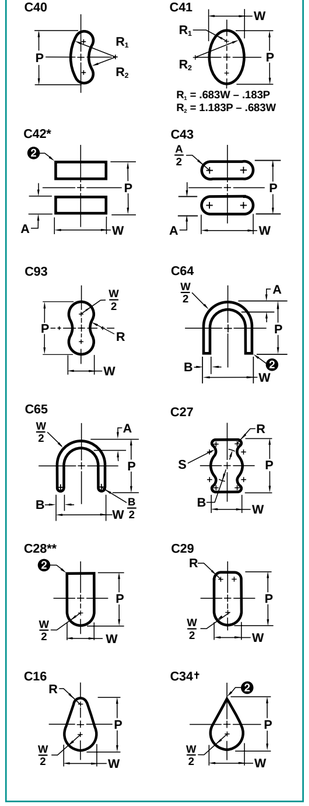
Mono Lobes



Multi Lobes



Miscellaneous



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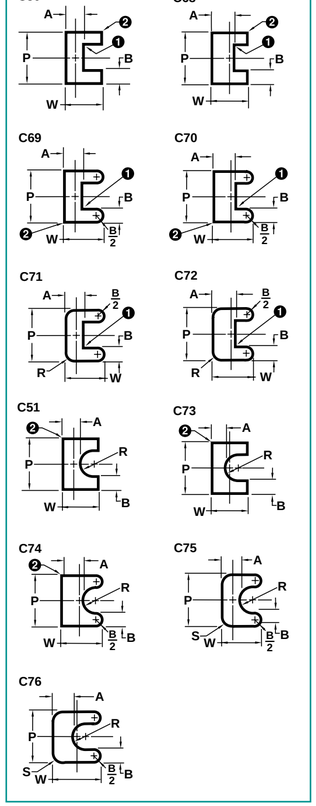
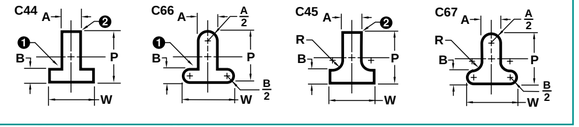
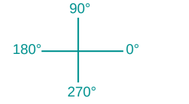


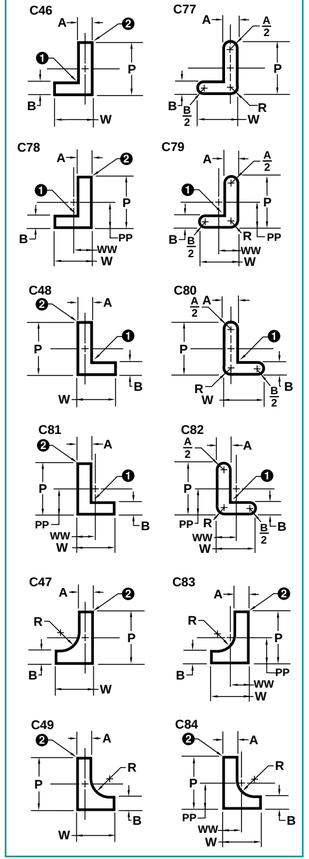
Ts



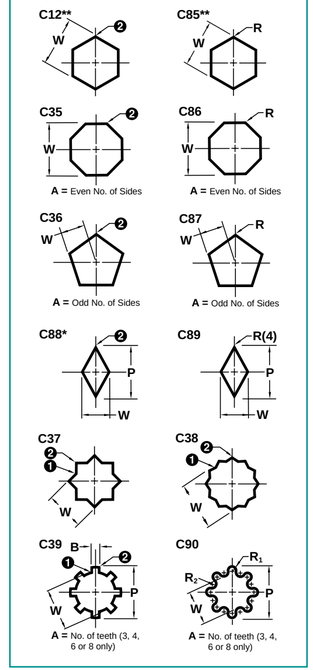
*See "Corner Dimensions" note on p. 32.



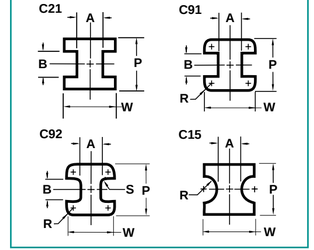
Ls



Polygons



Duo Tees



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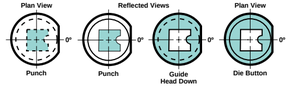
Classified Shapes — Ball Lock

DAYTON Dayton Progress Corporation

33

Classified Shapes
Ordering Information

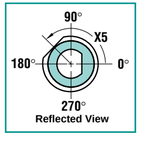
Reflected View—Punches and Guides



The reflected view is used for punches and guides. It is the view as seen in a mirror held below a punch or guide in its operating position. It is the same as a plan view from the head end, in which the point shape is shown dotted. A reflected view is shown with solid lines.

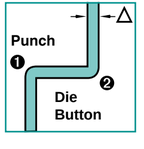
Orientation and Locking

The locking device orientation is standard at 0°. For types of locking methods and custom locations, see p. 40.



Clearance

Normal grinding methods produce ❶ .007 max fillet on the punch and ❷ .007 max fillet on the die button with matching corner shape on the die button and punch, respectively. When ordering die buttons, please specify punch dimensions and clearance per side (Δ).



DAYTON Dayton Progress Corporation

Form Punch Shapes

Dayton Progress Form Punches are available on round punches (i.e., those designated as standard “X” shaped punches).

When ordering, change the “X” designator to a “W.” In addition, specify other dimensions, as shown in the example below. Specify alterations, if applicable.

The shapes shown below are standard, but are not the only shapes Dayton provides. Others are available with a detailed drawing attached to the order.

Form Punches are also available on standard punch blanks. Form Punches other than those are available as specials.

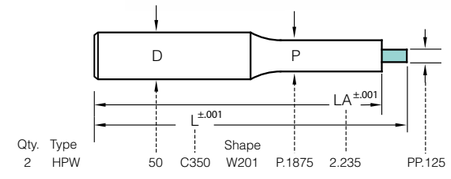
FDS FIRM DELIVERY SCHEDULE

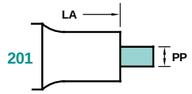
1-19, 5 Days

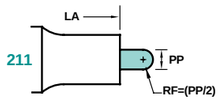
HOW TO ORDER

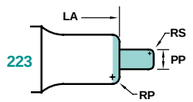
Specify:	Qty.	Type	Code	L	Steel	W Shape	P	PP	LA	Alterations
Example:	2	HPW	50	B350	M2	W201	P.1875	PP.1250	LA2.235	XNT

“P” is the point dimension of the product. The “P” dimensions are not shown below. When “P” = “D,” shank tolerance applies.

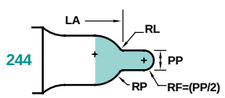


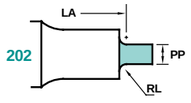


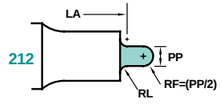


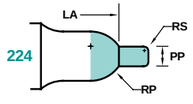


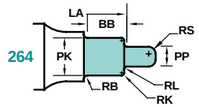
RP must be ≤ (P - PP) /2



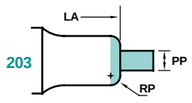




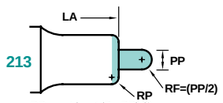




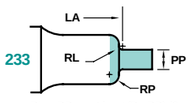
RK + RL must be ≤ (PK - PP) /2



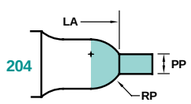
RP must be ≤ (P - PP) /2

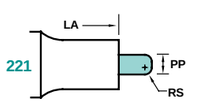


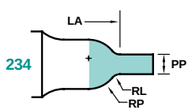
RP must be ≤ (P - PP) /2

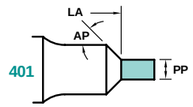


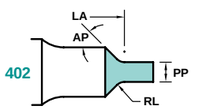
RL + RP must be ≤ (P - PP) /2

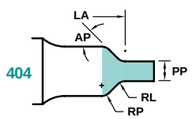


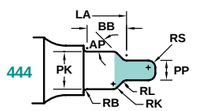


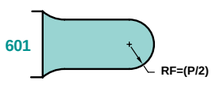


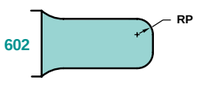


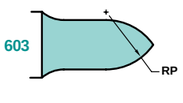




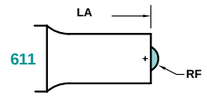


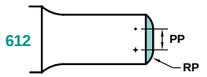


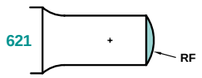


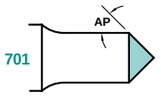


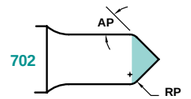
Form Punch Shapes

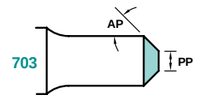


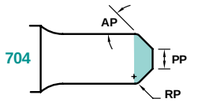


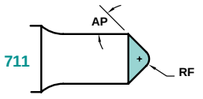


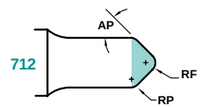


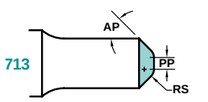


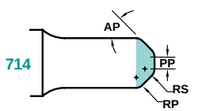


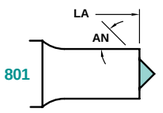


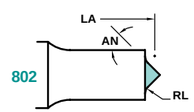


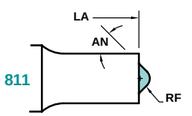


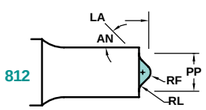


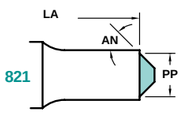






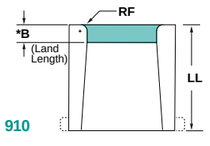


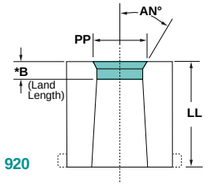


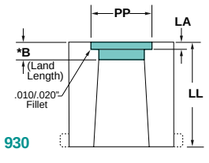


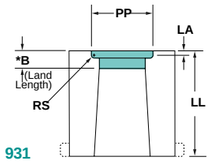
Form Die Button Shapes

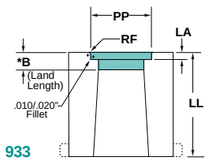
Dayton Die Buttons are available for all the Form Punches shown here, i.e., round punches designated as standard “X” shaped punches. When ordering, please change the “X” designator to a “W.” Die Buttons are available as headed or headless with a counterbore relief, or as headed or headless with a tapered relief.

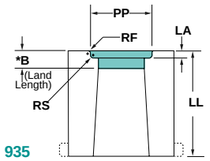












HOW TO ORDER

Specify:	Qty.	Type	Code	LL	Steel	W Shape	P	PP	LA	RS	RF	AN°	Alterations
Example:	4	LDW	125	118	M2	W935	.50	.625	.15	.05	.03		XNT

*B (Land Length) will be per catalog standard, unless XB is ordered. O.A.L. will be held to LL tolerance, i.e., ±.001.

FDS FIRM DELIVERY SCHEDULE

1-19, 5 Days

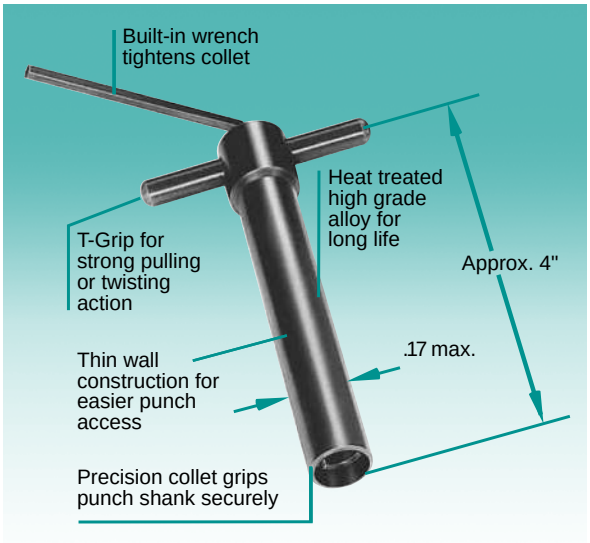
Accessories
Retainers

Reg. U.S. Pat. & TM Office		Backing Plugs: Type A Standard in Single-hole Retainers	Backing Plugs: Type B Optional for Die Buttons	Backing Plugs: Type C Standard in Multi-Position™ Retainers	Socket Head Cap Screw	Retainer Nut	Dowel	Ball Release Screw	Ball	Standard Spring	Extra Heavy Duty Spring	Booster Spring	Retainer Drill Bushing
Heavy Duty **HRT**	37	573345			574112 5/16-18 x 1 3/4	574953 5/16-18	574015 3/16 x 3/4	575275 10-24 x 1	813109 3/8 Dia.	573922	573981	269026	572683
	50	573426			574198 3/8-16 x 2	830097 3/8-16	574031 1/4 x 3/4		813168 1/2 Dia.	573949	574007	269042	572756
	62	573493											572837
	75	573566											572918
	87	573647											572985
	100	573728			574279 1/2-13 x 2	830127 1/2-13							573051
	125	573795											573124
HRS	50			573434	574198 3/8-16 x 2	830097 3/8-16	817007 5/16 x 1 1/2		813168 1/2 Dia.	573949	574007	269042	
	62			573507									
	75			573574									
	87			573655	574279 1/2-13 x 2	830127 1/2-13							
	100			573736									
	125			573809									
HRE	50			573434	574198 3/8-16 x 2	830097 3/8-16	817015 3/8 x 1 1/2		813168 1/2 Dia.	573949	574007	269042	
	62			573507									
	75			573574									
	87			573655									
	100			573736									
	125			573809									
Light Duty **LRT**	25	573264			505439 5/16-18 x 1 1/2	574953 5/16-18	573973 1/8 x 3/4	575259 8-32 x 1	813028 1/4 Dia.	573876			572616
	37	573345					574015 3/16 x 3/4						572683
	50	573426	573442		574163 3/8-16 x 1 1/2	830097 3/8-16			813052 5/16 Dia.	573892			572756
	62	573493	573515										572837
	75	573566	573582				574031 1/4 x 3/4		813109 3/8 Dia.	573914			572918
	87	573647	573663										572985
	100	573728	573744		574252 1/2-13 x 1 3/4	830127 1/2-13							573051
LRS	25			573272	505226 1/4-20 x 1 1/2	830038 1/4-20	817007 5/16 x 1 1/2		813028 1/4 Dia.	573876			
	37			573353	505439 5/16-18 x 1 1/2	830062 5/16-18							
	50		573442	573434					813052 5/16 Dia.	573892			
	62		573515	573507									
	75		573582	573574	574163 3/8-16 x 1 1/2	830097 3/8-16			813109 3/8 Dia.	573914			
	87		573663	573655									
	100		573744	573736									
	125									814105			
	150												
	175												
LRE	25			573272	505226 1/4-20 x 1 1/2	830038 1/4-20	817007 5/16 x 1 1/2		813028 1/4 Dia.	573876			
	37			573353	574163 3/8-16 x 1 1/2	830097 3/8-16							
	50		573442	573434					813052 5/16 Dia.	573892			
	62		573515	573507									
	75		573582	573574					813109 3/8 Dia.	573914			
	87		573663	573655									
	100		573744	573736									

HOW TO ORDER

Specify:	Qty.	Product #
Example:	150	813109 (Ball for HRT with .3750 dia.)
	28	817007 (Dowel for HRS)
	43	573876 (Spring for LRE with .2500 dia.)

Accessories
Miscellaneous



Punch Pullers

Dayton Punch Pullers simplify and speed the removal of ball lock punches from retainers. You no longer have to improvise with vise grips or other tools that can slip from the punch, making removal difficult or hazardous.

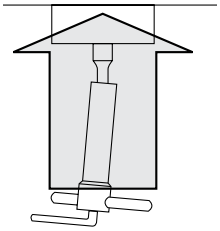
Dayton Punch Pullers are made of high-grade alloy steel and are heat-treated and precision machined for long, reliable service. Dayton Punch Pullers, which can improve performance and save downtime, are available in shank sizes from .250" to 1.250".

HOW TO ORDER

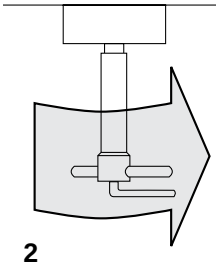
Specify:	Qty.	Product #
Example:	3	818097 (.250 shank diameter with 1.12 max point length)

Catalog Number	Shank Diameter In Inches	Max. Point Length
818097	.250	1.12
818119	.375	1.31
818127	.500	1.56
818135	.625	1.56
818143	.750	1.56
818151	.875	1.56
818178	1.000	1.81
818186	1.250	1.81

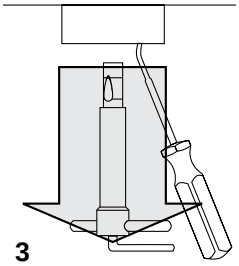
Removes ball lock punches quickly and easily



1
Slide Punch Puller over the shank.



2
Rotate the built-in wrench until tight.



3
Insert release tool and pull down.

Ball Release Tools

Cat. No. 818038

Angle Tip
(for all retainers)

Cat. No. 818046

Straight Tip
(for all retainers)

Cat. No. 818054 Light Duty
Cat. No. 818062 Heavy Duty

Threaded Tip
(for True Position® Retainers)

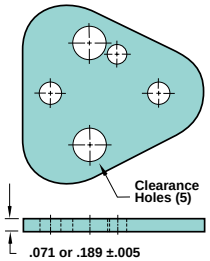
HOW TO ORDER

Specify:	Qty.	Product #
Example:	2	818046 (Straight Tip)

Shim/Backing Plate

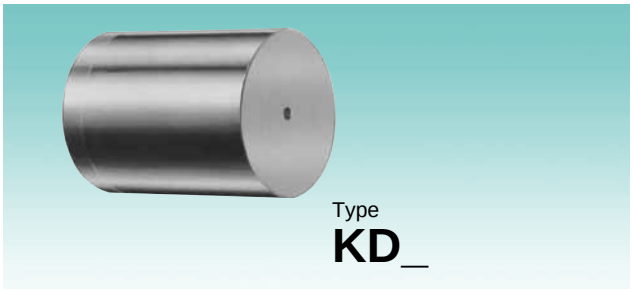
HOW TO ORDER

Specify:	Qty.	Product #
Example:	2	URSP 1318



	Thickness T	
D	**.189 (Rc54-56)**	**.071 (Soft)**
25	URBP 1048	URSP 1018
37	URBP 1048	URSP 1018
50	URBP 1348	URSP 1318
62	URBP 1648	URSP 1618
75	URBP 2048	URSP 2018
87	URBP 2248	URSP 2218
100	URBP 2548	URSP 2518
125	URBP 3248	URSP 3218

EDM Die Button Blanks



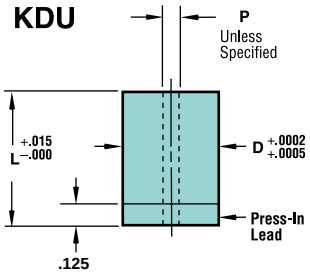
Type
KD_

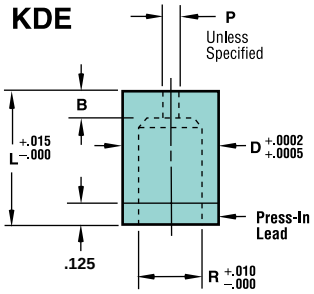
Material
Steel: M2, RC 60-63
Round P ±.005 | ◎ | .005 | P to D
D ≥ 1.75 +.0006 +.0002

HOW TO ORDER

Specify:	Qty.	Type	D Code	L	P	Steel
Example:	6	KDE	37	100	XP.020	M2
	5	KDU	50	112		M2

Standard "P" will be provided, unless otherwise specified.





Body		K_U		K_E										
Dia.	Std. P	Optional XP		Std. P	Optional XP		B	R	.75	.87	.93	1.00	1.125	1.25	1.375	1.50
.2500	.031	.020	—	.031	.020	—	.15	.156								
.3125	.031	.020	—	.031	.020	—	.25	.191								
.3750	.031	.020	—	.031	.020	—	.25	.228								
.4375	.031	.020	—	.031	.020	—	.25	.281								
.5000	.062	.020	—	.031	.020	—	.25	.312								
.6250	.062	.020	.031	.093	.020	.031	.25	.391								
.7500	.062	.020	.031	.093	.020	.031	.31	.468								
.8750	.062	.020	.031	.093	.020	.031	.31	.578								
1.0000	.062	.020	.031	.093	.020	.031	.31	.703	75	87	93	100	112	125	137	150
1.2500	.062	.020	.031	.125	.020	.031	.37	.828								
1.5000	.062	.020	.031	.125	.020	.031	.37	1.093								
1.7500	.125	.020	.031	.125	.020	.031	.37	1.430								
2.0000	.125	.020	.031	.125	.020	.031	.37	1.630								
2.2500	.125	.020	.031	.125	.020	.031	.37	1.830								
2.5000	.125	.020	.031	.125	.020	.031	.37	2.030								
2.7500	.125	.020	.031	.125	.020	.031	.37	2.230								

FIRM DELIVERY SCHEDULE

D ≤ 1.00 ***1 Day***
1.00 < D ≤ 1.50 ***2 Days***
(with XP, add 2 Days)

D > 1.50 ***4 Days***
(with or without XP)

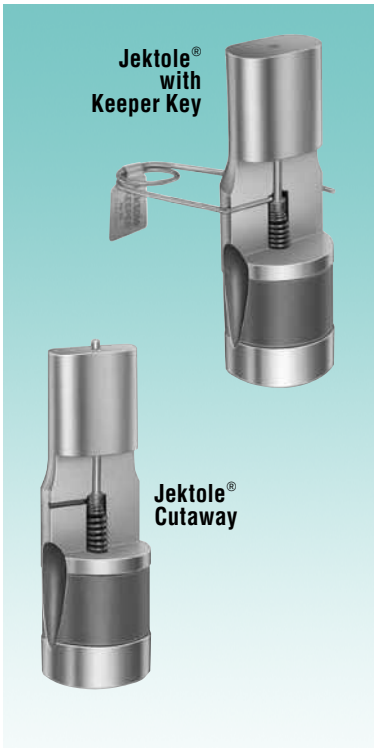
Features/Benefits

Select either round ***KDU EDM Die Button Blanks*** or round ***KDE Die Button Blanks***. Relief hole (R) provides sufficient clearance for slug removal during the stamping process in both types.

KDU Blanks are provided with a small straight through hole. They are commonly used for wire and vertical EDM operations. There are two key advantages with this type of blank: in wire cutting, a tapered relief can be cut instead of a round straight relief; in conventional EDM applications, you can customize the size of the relief to the shape you are cutting.

KDE Blanks are used with conventional (vertical) EDM machines. The hole (P) is used to introduce dielectric to the spark gap for flushing away eroded particles of steel. For the fastest delivery, use the standard (P) dimension given in the chart. If an optional (P) dimension is desired, simply specify "XP," and indicate the dimension.

Jektole® Data



The Engineered Clearance

Perforating punch-to-die button clearances in metal stamping dies has been universally expressed as a percentage of stock thickness, and for clarity should be articulated as percent per side (Δ =clearance per side).

Standard practice has called for Δ5%, and is commonly known as "regular clearance." Regular clearance has been applied almost universally to all applications involving the perforation of ferrous materials.

Jektole®, the ***Engineered Clearance***, is approximately twice regular clearance, i.e., Δ10-12%. This means greater productivity, improved maintenance, and a better return on your tooling investment.

In addition, clearances of up to Δ50% are not uncommon with some hard materials. Clearance tests have been performed by Dayton Progress to prove that increasing the clearance does not lessen hole quality—a common thought by some designers and engineers. Dayton clearance tests do, in fact, prove that the Jektole® ***Engineered Clearance*** provides many advantages and benefits.

Jektole® In Production

- Requires less press tonnage
- Reduces the pressure required to strip the punch, which, in turn, reduces punch wear
- Produces minimal burr
- Doubles—often triples—piece output per grind
- Reduces total punch costs

Jektole® In Maintenance

- Keeper Key holds pin in retracted position (see photo at left)
- Eliminates the need for disassembly before grinding
- Helps maintain proper pin extension
- Reduces downtime for regrinding

Standard Jektole® Data

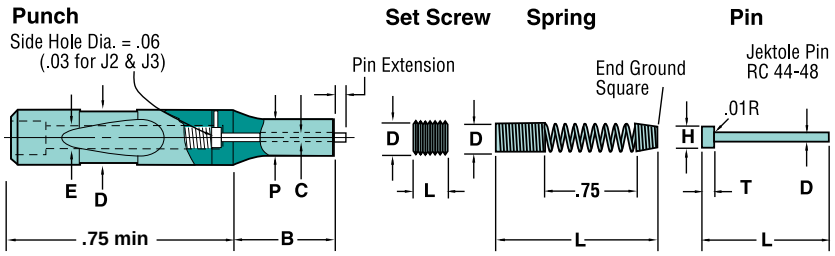
DIMENSION		J2*	J3	J4	J6	J9	J12
Std. Shank Dia.	D	.250	.250	.375	.500 .625	.750 .875 1.000	1.250
Point Hole Dia.	C	.020	.032	.046	.063	.094	.125
Shank Hole Dia.	E	.086	.109	.141	.172	.221	.275
Pin Extension		.030	.030	.060	.060	.060	.060
Keeper Key No.		920045			920053		**

* Point Diameters < .080 ** Keeper Key not available

Jektole® Design Limits

DIMENSION		J2	J3	J4	J6	J9	J12
Min. Shank Dia. (Light Duty)	D	.250	.250	.375	.500	.750	.875
Min. Shank Dia. (Heavy Duty)	D	.375	.375	.375	.500	.750	.875
Min. Point Dia.	P	.040	.064	.092	.126	.188	.250
Max. Point Lgth.	B	1.25	1.50	1.62	1.62	1.62	1.62

Jektole® Components



Universal Jektole® Components

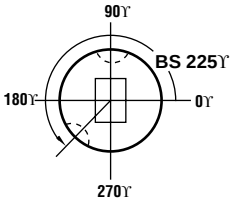
EJECTOR PINS		J2	J3	J4	J6	J9	J12
Overall Length	L	1.11	1.38	1.94	1.94	2.22	2.22
Pin Diameter	D	.017	.027	.041	.058	.089	.120
Head Diameter	H	.048	.073	.094	.120	.156	.188
Hd. Thickness	T	.031	.047	.062	.062	.094	.094
SPRINGS		J2	J3	J4	J6	J9	J12
Outside Dia.	D	.081	.104	.136	.167	.216	.270
Free Length	L	2.38	2.38	3.19	3.00	3.03	2.56
Pressure (.12Preload)	lbs.	.5	.75	1	1.5	2	2.5
SCREWS		J2	J3	J4	J6	J9	J12
Screw Size	D	#3-48	#5-40	#8-32	#10-32	1/4-28	5/16-24
Screw Length	L	.19	.19	.19	.19	.25	.25

Locking Devices

Orientation

The standard ball seat location is at 90°. Alternate locations of 0°, 180°, or 270° may be specified at no extra cost.

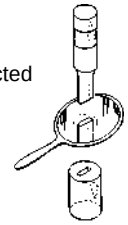
Custom ball seat locations may be specified as “BS” and at the degree required counter-clockwise from 0°. (See drawing on right.)



Views

A plan view is used for the die button, and a reflected view is used for the punch. The reflected view, a mirror image (see p. 32, “Classified Shapes”), simplifies orientation: All locking devices are in the same position.

Identify as “reflected view” on the punch drawing.



How to Specify

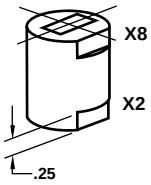
This page shows the most common locking devices available for press-fit die buttons—single flat, double flat, and dowel. Select the type, then add the code to the component description. (See “how to order” box on right.)

Single Flats X2, X5, X8, X9

The standard key flat locking device is at 0°. Specify “X2” (bottom) or “X8” (top) for die buttons.

Alternate locations of 90°, 180°, or 270° may be specified at no additional cost. Specify “X2” or “X8” and the degree required.

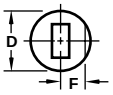
Example: X2—90°.



Custom Location

Specify “X5” (bottom) or “X9” (top) and the degree required counter-clockwise from 0°.

Example: X5—135°.

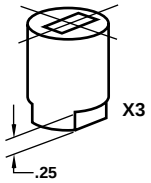


Double Flats X3, X6

The double key flat locking device is at 0°. Specify “X3” for die buttons.

Alternate locations of 90°, 180°, and 270° may be specified at no additional cost. Specify “X3” and the degree required.

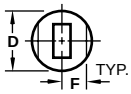
Example: X3—90°.



Custom Location

Specify “X6” for die buttons and the degree required counter-clockwise from 0°.

Example: X6—135°.



F Dimension for Flats

for Press-Fit Die Buttons

Body Dia.	25	37	50	62	75	87	100
F	.110	.165	.220	.270	.325	.380	.435
Body Dia.	**125**	**150**	**175**	**200**	**225**	**250**	**275**
F	.540	.650	.775	.900	1.025	1.150	1.275

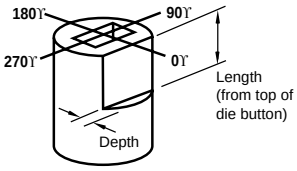
Location Tolerance

Flat		Dowel	
F	Radial	F	Radial
+ .0005 – .0000	.001/ inch	+ .0005 – .0000	0°-4'

HOW TO ORDER

Specify:	Qty.	Type	D Code	P (or P&W)	Steel	Alteration
Example:	5	KDO	87-100	P.394, W.209	A2	X2
	9	KDR	50-125	P.275, W.092	M2	X83

Additional Flat For Punches and Die Buttons



The depth of the flat is taken from the shank, not the head, on punches.

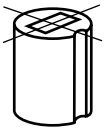
	Code	Depth	Length
Standard Location	X81	.060	.500
	X82	.060	.625
	X83	.060	.750
	X84	.060	Full Length
	X85	.093	.500
	X86	.093	.625
	X87	.093	.750
	X88	.093	Full Length
	X89	Specify Dimensions	
Custom Location	X91	.060	.500
	X92	.060	.625
	X93	.060	.750
	X94	.060	Full Length
	X95	.093	.500
	X96	.093	.625
	X97	.093	.750
	X98	.093	Full Length
	X99	Specify Dimensions	

Dowel Slots X0*, X1*, X4, X7, X41, X71

The standard dowel locking device is at 0°. Specify “X4” (.125 dowel) or “X41” (.1875 dowel) for die buttons. Specify “X0” (F=.5D) for die buttons only.

Alternate locations of 90°, 180°, or 270° may be specified at no additional cost. Specify “X0,” “X4,” or “X41” and the degree required.

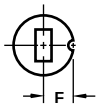
Example: X4—90°.



Custom Location

Specify “X7” (.125 dowel) or “X71” (.1875 dowel) for die buttons. Specify “X1” (F=.5D) for die buttons only. Specify “X1,” “X7,” or “X71,” and the degree required counter-clockwise from 0°.

Example: X71—135°.



F Dimension for Dowels

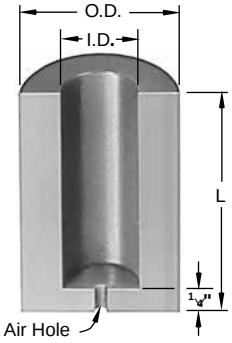
for Press-Fit Die Buttons

Body Dia.		25	31	37	43	50	62-275
X0*, X1*	F	.1250	.1562	.1875	.2188	.2500	D/2
X4, X7		.1625	.1875	.2125	.2375	.2625	D/2
X41, X71		.1938	.2188	.2438	.2688	.2938	D/2

Order example:
X0, X1, X4, & X7 — .1250 Dowel **X41 & X71** — .1875 Dowel

* Available on headless die buttons only

Urethane Strippers



Air Hole	I.D.
1/16	3/16-1/4
3/32	5/16
1/8	3/8-1

Features/Benefits

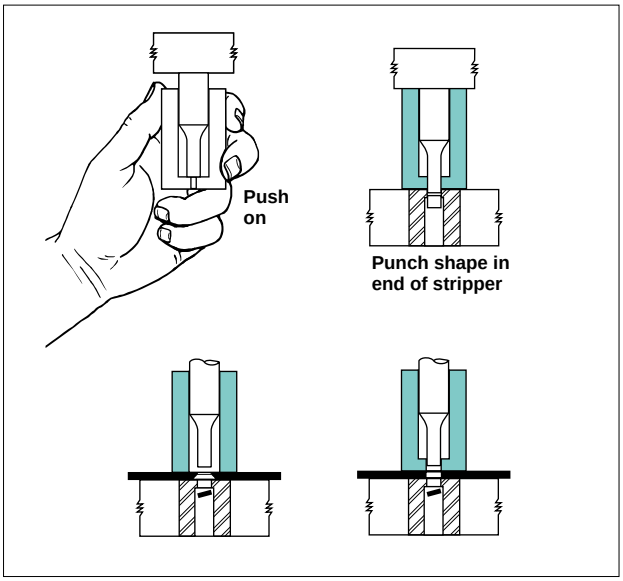
Dayton's durable, yet flexible, Urethane Strippers provide superior stripping over conventional strippers; develop higher load-bearing capacity due to the use of a unique curing agent; are tear- and oil-resistant; provide exceptional dampening of the punch, thus eliminating premature punch failure due to vibration; and are easy to install and replace.

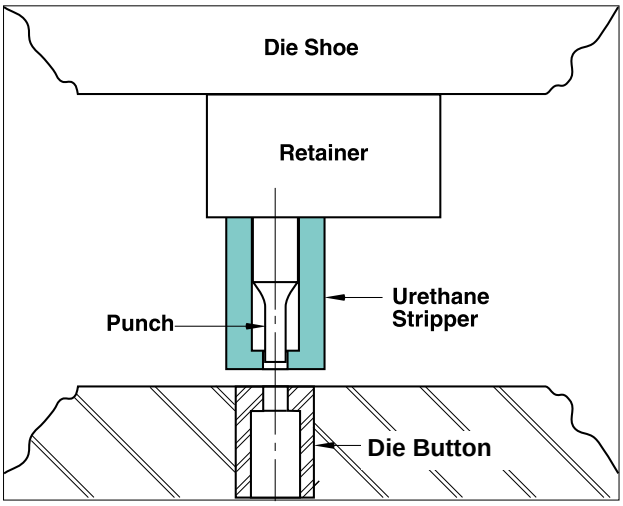
Strip-shape Dayton Urethane Strippers assure positive stripping and dampen punch vibration by gripping around the punch point. The closed-end feature holds the thin stock flat during the stripping cycle, and helps eliminate the potential for rejected parts.

HOW TO ORDER

Specify:	Qty.	Type	I.D.	L
Example:	12	USE	37	125

Catalog Number	I.D.	O.D.	L	Pressure at Deflection of 1/8	1/4	3/8
USE18-125	3/16	11/16	1 1/4	250	400	—
USE18-150			1 1/2	230	350	—
USE25-125	1/4	3/4	1 1/4	280	475	—
USE25-150			1 1/2	275	465	—
USE25-175			1 3/4	220	375	490
USE31-125	5/16	13/16	1 1/4	320	500	—
USE31-150			1 1/2	300	450	—
USE31-175			1 3/4	270	400	575
USE31-200			2	240	370	600
USE37-125	3/8	7/8	1 1/4	420	695	—
USE37-150			1 1/2	385	625	—
USE37-175			1 3/4	355	575	760
USE37-200			2	310	515	670
USE50-125	1/2	1	1 1/4	520	790	—
USE50-150			1 1/2	450	725	—
USE50-175			1 3/4	435	680	875
USE50-200			2	315	510	650
USE50-225			2 1/4	275	475	600
USE62-125	5/8	1 1/8	1 1/4	600	925	—
USE62-150			1 1/2	520	835	—
USE62-175			1 3/4	480	775	1000
USE62-200			2	440	730	935
USE75-175	3/4	1 1/2	1 3/4	500	800	1200
USE75-200			2	400	700	1100
USE75-225			2 1/4	350	650	1000
USE75-250			2 1/2	325	600	900
USE75-275			2 3/4	300	550	800
USE87-175	7/8	1 3/4	1 3/4	1500	2200	3400
USE87-200			2	1200	1900	2800
USE87-225			2 1/4	1150	1850	2400
USE87-250			2 1/2	900	1450	1900
USE87-275			2 3/4	850	1350	1800
USE100-175	1	2	1 3/4	2000	3000	3500
USE100-200			2	1600	2600	3400
USE100-225			2 1/4	1400	2300	3200
USE100-250			2 1/2	1200	2000	3000
USE100-275			2 3/4	1000	1800	2800





Shear Angles

Shear Angles can be applied to all punch points. These angles are used primarily to reduce slug pulling. Single and Double Shears can be used to reduce the punching force as well as minimize slug pulling. These alterations are prepriced and do not add to the standard delivery of the product.

Shear Angles are also available on Classified Shapes, but are available as special order only.

Standard ball seat location is at 90°.

Simply add the alteration code shown next to the drawings, and the angle desired, to your punch catalog number. Tolerance on all angles is ±15 minutes.

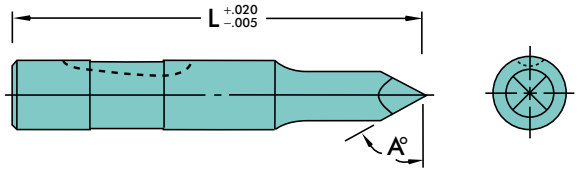
LL not available on XS19, XS21, XS22, and XS23.

HOW TO ORDER

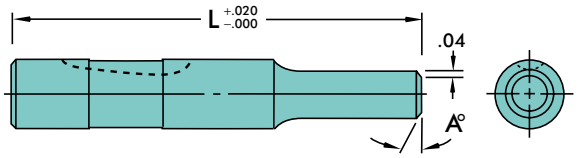
Type	Code	L	P (or P&W)	Steel	Alteration
HPL	100	C350	P.872, W.401	A2	XS23 A3°

For Round Punches Only

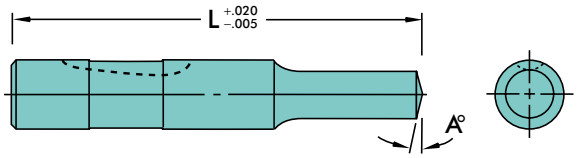
XS19 Nail Point



XS20 Chamfer

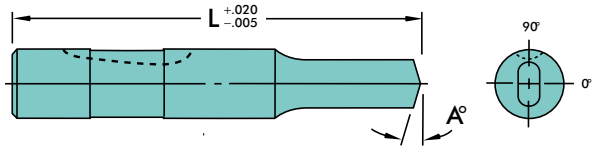


XS21 Conical

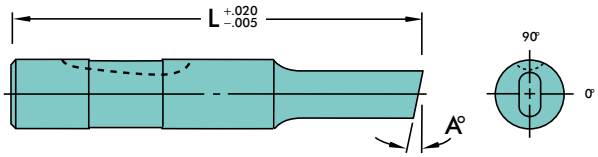


For Round & Shape Punches

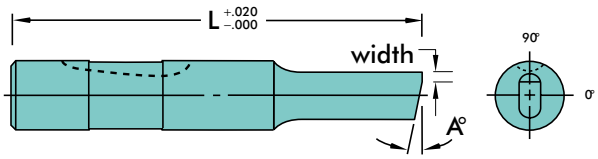
XS22 Double Shear



XS23 Single Shear



XS24 Single Shear Angle with Flat



Shown as reflected view.

VersaPlus® Premium Products

PUNCHES

Standard features on all Dayton VersaPlus® punch products include precision concentricity between the point and the shank (resulting in better punch and die alignment); a super-smooth finish on the point (resulting in less galling and reduced maintenance costs); and state-of-the-art-coatings that provide superior hardness.

Jektole® Punches

VersaPlus® Jektole® Punches permit doubling punch to die button clearance; produce up to three times (or more) the number of hits between sharpenings; and reduce burr heights.

Regular Punches

VersaPlus® Regular Punches provide three times better alignment than other major brands; offer longer tool life; and can significantly improve finished part quality.

Straight Punches

VersaPlus® Straight Punches—Jektole® and Regular—are available in a wide range of sizes; can be designed and formed to accommodate your specific punching needs; and provide longer die runs, less downtime, and reduced maintenance costs.

PILOTS

Standard features on all Dayton VersaPlus® pilots include smoother pick-up action; less hole distortion; and state-of-the-art coatings to provide superior hardness.

Regular Pilots

VersaPlus® Regular Pilots are built to exact tolerances; the parabolic point shape allows for smooth pick-up action; and pilots offer a wide range of unique punching and fabricating applications.

Positive Pick-Up Pilots

VersaPlus® Positive Pick-Up Pilots provide smoother pick-up without the risk of distorting the hole; in addition, the unique design moves the stock farther than conventional pilots.

If optimum performance is a MUST, this may be the only punch you'll ever need!

® VersaPlus is a registered trademark of Dayton Progress.

VersaPlus® sets the new industry standard for high-performance punches and pilots. VersaPlus® means less downtime, longer production runs, and better value for your stamping dollar.

Commitment to Quality & Customer Satisfaction

Dayton Lamina is a leading manufacturer of tool, die and mold components for the metal-working and plastics industries. As a customer-focused, world-class supplier of choice, we provide the brands, product breadth, distribution network and technical support for all your metal forming needs.

Our goal is to give our customers the most innovative and value-added products and services.

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