Durable, Long-lasting Punches & Punch Blanks

Heads-above-the-rest performance
TuffPunch® PUNCHES AND PUNCH BLANKS

Product Applications
Dayton Lamina TuffPunch® Punches and Punch Blanks are Commercial quality products manufactured with thicker, larger, and 10° angled diameter heads, and are designed to reduce punch load and significantly lower failure rates when using heavy gauge and high tensile material. (See p. 3 for additional information.) TuffPunch® products are well-suited for high-demand industries where frequency and heavier-than-normal impact punching activity occurs and where optimum performance is required.

Dayton’s TuffPunch® product line includes: Dayton Jektole® Punches; Regular Punches; Center Dowel Punches; Punch Blanks; and Retainers. Both standard sizes and standard alterations are shown in this catalog.

Minimizes Head Failure
All Dayton TuffPunch® products are designed with a 10°-angled head with a diameter equal to the shank diameter (see photo). This design allows the perforating forces to travel up from the shank and completely through the head. This eliminates the lateral shock waves that would otherwise put stress on the outer edge of the head, resulting in frequent failures—especially in heavy-duty applications.

In addition, Dayton TuffPunch® products are available in common shear angle configurations to reduce punch load and minimize the risk of slug pulling. Shear angle configurations include: chamfer; conical; double shear; and single shear. For more information, see “Standard Alterations” on p. 9.

Cryogenic Treatment Standard
DayKool™ (XCR)—a cryogenic steel conditioning process used primarily with hard, thick materials to improve strength, toughness, and dimensional stability—is standard on all Dayton TuffPunch® products.

The DayKool™ process utilizes a liquid nitrogen vapor to cool the steel to −184° C (-300° F), which creates metallurgical changes in the structure that disperse carbides throughout the metal. The result: increased wear resistance (finely dispersed carbides provide more evenly distributed wear); less sharpening time; no loss of resistance after sharpening; longer die runs; and less downtime.

Surface Coatings
Punches can be coated to increase material hardness, reduce galling, and improve wear/and or corrosion resistance.

Surface Treatments
DayTride® (XN)—A low temperature, cost-effective surface application that treats all exposed surfaces. Provides increased dimensional stability. Ideal for punches and die buttons. Approx. hardness: RC73.

XVP—A thin film coating provides superior hardness (harder than carbide). Super-smooth finish on the point helps reduce galling and maintenance. Ideal for higher-than-normal punching frequency.

XPS—Super-smooth polish on the point to reduce galling and improve punch life. Use with the appropriate coating for your application to maximize punch life and reduce maintenance costs. Excellent for extruding applications.

Abrasive Wear


ZeronPlus™ (XNA)—Superior hardness (harder than carbide); provides superior abrasive wear resistance and excellent lubricity. Provides highest temperature resistance, thermal shock stability, & hot hardness. Approx. hardness: *Vickers 3200.

Adhesive Wear


XCDP—Super-smooth finish combined with a DLC coating for a very low coefficient of friction with high wear resistance. Approx. hardness: *Vickers 5000.

Extrusion Coatings
XNP—The ultimate coating for improved resistance to galling; excellent wear resistance, superior surface finish, and high lubricity. Ideal for extruding and forming applications. Tolerance is ±.005 mm. Approx. hardness: *Vickers 3100.

XNAProgress (XNAP)—Ultra-hard 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.

Miscellaneous Coating
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.

*Vickers used when RC exceeds 80.
TuffPunch®, DayKool™, DayTAN™, ZeronPlus™, DayTride® and DAYTIN® are trademarks of Dayton Lamina Corp.

www.daytonlamina.com
Center Dowel Punches & Retainers

This catalog contains Center Dowel Punches (Jektole® and Regular) and TuffPunch® Single Head Punch Retainers, designed specifically to be used with all TuffPunch® punches. Only one dowel is required for round punches, reducing machining time by up to 50%. The in-line center dowel assures precise punch-to-matrix alignment, giving you higher quality parts, longer punch life, and reduced downtime. Shaped punches use a secondary dowel for precise alignment.

Use of the TuffPunch® Center Dowel Punch and Retainer eliminates hand-fitting, cutting mounting time by nearly 50%. Simply pull the retainer from its box, and screw it into the die set. This heads-above-the-rest TuffPunch® combination gives you true dimensional accuracy every time.

Ordering Information

Each page contains detailed instructions on how to order specific Dayton TuffPunch® products. Individual drawings show product shape, dimensions, tolerances, and concentricity. When ordering, you are asked to specify quantity, type, shank and length codes (for example), and other applicable data.

How to Order

In the example above, the type specified is “APRF.” “A” stands for Press-Fit, “P” stands for regular punch, “R” stands for rectangle, and “F” stands for TuffPunch®. 16 is the shank diameter. 25 is the point length, and 90 is the overall length. P 8.5 represents the point dimension, and W 8.0 represents the point width, when applicable.

Standard Alterations

Punches, retainers, and punch blanks are available in sizes other than those listed in the catalog. These special order products can be manufactured for a slight additional charge.

When ordering, you are asked to specify different designations for various non-standard dimensions. For example, if the P & W dimensions are smaller than standard, an “X” must be placed in front of the P or W dimension, e.g., “XP” and “XW.” If the point length is longer than standard, designate “XBR” for the point length. The sample drawing above is from the “Standard Alterations” section on p. 9.

Other special order designations include: “XL” for overall length shortened; “XK” for no side hole and no components (for air ejection of slugs); and other special designations for surface coatings.

Jektole® Punches and Clearances

Jektole®—Dayton’s slug ejection punch—permits doubling punch to matrix clearance; produces up to three times the number of hits between sharpenings; and reduces burr heights. Jektole® is available in TuffPunch® Punches and Punch Blanks. For additional information on standard sizes and standard alterations, see pp. 4 and 9.

Special Features

There are several features that contribute to minimizing failures. In addition to the head design and large fillet under the head, all punch shapes with sharp corners will have a carefully blended radius ground to reduce loading on the punch. The reduced load and standard cryogenic treatment result in fewer punch point problems caused by chipping, wear, or breakage.

Product Designation

When ordering, you are asked to specify quantity, product type, length codes, and point or hole size (for example). In addition, use the following chart to define the product as a part number.

<table>
<thead>
<tr>
<th>Description</th>
<th>Line</th>
<th>Product</th>
<th>Shape</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>A for Press-Fit</td>
<td>P for Punch (Regular)</td>
<td>X for Round</td>
<td>F for TuffPunch®</td>
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<tr>
<td>Press-Fit Dia. D (shank diameter)</td>
<td>16</td>
<td>19</td>
<td>80</td>
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<tr>
<td>Overall Length</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Product Series</td>
<td>Length</td>
<td>Point or Hole Size</td>
<td>Dimensions, as specified</td>
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<tr>
<td>APXF</td>
<td>16 19 80 P8.3</td>
<td>19</td>
<td>80</td>
<td></td>
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</table>
**TuffPunch® Jektole® Punches**

**Material**
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

**TuffPunch® Jektole® Punch Blanks**

**Material**
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

**How to Order**
Specify: Qty. Type D Code L
Example: 6 AJXF 16 19-80 P 10.3

**Standard Alterations**
See p. 9 for additional ordering instructions.

**Surface Coatings**
See p. 2 for details.

**Note:** DayKool™ (XCR)—a cryogenic steel conditioning process used primarily with hard, thick materials to improve strength, toughness, and dimensional stability—is standard on all Dayton TuffPunch® products. For additional information, see p. 2.

**Note:** Sharp corners will have a 0.13 radius to minimize wear.

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

**Note:** Centerline to flat minimum = 2.0 for J6 and 3.0 for J9.

**Surface Coatings**
See p. 2 for details.

**Code/Added Delivery**
- XCN — TiCN +3 days
- XN — DayTride® +3 days
- XNT — DayTiN® +3 days

**Shank** D **Catalog Number**
- **AJBF**
  - **AJBF 08**
  - **AJBF 10**
  - **AJBF 13**
  - **AJBF 16**
  - **AJBF 20**
  - **AJBF 25**

**L**
- **50**
- **60**
- **70**
- **80**
- **90**
- **100**

**Jektole® Group**
- **J4M**
- **J6M**
- **J9M**

**DayKool™ (XCR) side hole position allows alternate point lengths shown on AJ_F above.**

**HOW TO ORDER**
Specify: Qty. Type D Code L
Example: 6 AJBF 20 80

**Standard Alterations**
See p. 9 for additional ordering instructions.

**Surface Coatings**
See p. 2 for details.

**Code/Added Delivery**
- XCN — TiCN +3 days
- XN — DayTride® +3 days
- XNT — DayTiN® +3 days

**Note:** When L = 50, L1 is 8.0.

**Alternate point length not available.**

**Note:** Jektole® side position allows alternate point lengths shown on AJ_F above.
**TuffPunch® Regular Punches**

**Material**
- Steel: PS4 (CPM M4), RC 60-62
- Heads RC 40-55

**HOW TO ORDER**
- Specify: Qty., Type, D Code, L
- Example: 6 APXF 16 19-80 P 10.3
- 12 APRF 16 25-80 P 10.5, W 8.0
- 10 APLF 16 19-70 P 10.2, W 7.2

**Surface Coatings**
- See p. 2 for details.
- Code/Added Delivery
  - XCN — TiCN  +3 days
  - XN — DayTride® +3 days
  - XNT — DayTiN® +3 days

**Standard Alterations**
- See p. 9 for additional ordering instructions.

**TuffPunch® Regular Punch Blanks**

**Material**
- Steel: PS4 (CPM M4), RC 60-62
- Heads RC 40-55

**HOW TO ORDER**
- Specify: Qty., Type, D Code, L
- Example: 6 APBF 20 80

**Surface Coatings**
- See p. 2 for details.
- Code/Added Delivery
  - XCN — TiCN  +3 days
  - XN — DayTride® +3 days
  - XNT — DayTiN® +3 days

**Standard Alterations**
- See p. 9 for additional ordering instructions.
**TuffPunch® Jektole® Center Dowel Punches**

**Material**
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

**Type SJ_F**

- **Note:** The standard location of a key flat is parallel to the P dimension.
- **For additional information, see p. 10.**

**Note:** Sharp corners will have a 0.13 radius to minimize wear.

**Material**
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

**HOW TO ORDER**
Specify: Qty. Type D Code L P (or P&W) Dimension

- **Example:** 10 SJXF 20 80 P 13.3
- **10 SJRF 25 80 P 14.5, W 8.0
- **16 SJLF 20 90 P 13.2, W 7.2**

**Surface Coatings**
See p. 2 for details.

- **Code/Added Delivery**
  - XCN — TiCN +3 days
  - XN — DayTride® +3 days
  - XNT — DayTiN® +3 days

**TuffPunch® Jektole® Center Dowel Blanks**

**Material**
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

**Type SJBF**

- **Note:** DayKool™ (XCR)—a cryogenic steel conditioning process used primarily with hard, thick materials to improve strength, toughness, and dimensional stability—is standard on all Dayton TuffPunch® products. For additional information, see p. 2.

**Material**
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

**HOW TO ORDER**
Specify: Qty. Type D Code L

- **Example:** 9 SJBF 38 120

**Standard Alterations**
See p. 9 for additional ordering instructions.

**Surface Coatings**
See p. 2 for details.

- **Code/Added Delivery**
  - XCN — TiCN +3 days
  - XN — DayTride® +3 days
  - XNT — DayTiN® +3 days
TuffPunch® Regular Center Dowel Punches

Material
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

SPXF

SPOF

SPRF

SPKF

SPLF

SPHF

SPJF

SPNF

SPVF

SPYF

SPZF

SPBF

HPF

Surface Coatings
See p.2 for details.

Code/Added Delivery
XCN — TiCN +3 days
XN — DayTride® +3 days
XNT — DayTiN® +3 days

TuffPunch® Regular Center Dowel Blanks

Material
Steel: PS4 (CPM M4), RC 60-62
Heads RC 40-55

SPBF

Standard Alterations
See p.9 for additional ordering instructions.

HOW TO ORDER
Specify: Qty. Type D Code L
Example: 6 SPBF 25 110

Note: The standard location of a key flat is parallel to the P dimension. For additional information, see p.10.

Standard Alterations
See p.9 for additional ordering instructions.

Round 1 Day
Shape 2 Days

HOW TO ORDER
Specify: Qty. Type D Code L
Example: 10 SPXF 20 90 P 13.3
16 SPRF 25 80 P 19.5, W 9.0
16 SPLF 20 90 P 13.2, W 7.2

Surface Coatings
See p.2 for details.

Code/Added Delivery
XCN — TiCN +3 days
XN — DayTride® +3 days
XNT — DayTiN® +3 days

Blanks 1 Day

Note: TuffPunch® (XCR)—a cryogenic steel conditioning process used primarily with hard, thick materials to improve strength, toughness, and dimensional stability—is standard on all Dayton TuffPunch® products. For additional information, see p.2.
### TuffPunch® Single Head Retainers

**Features/Benefits**

TuffPunch® ARTF and ARTFS Single Head Punch Retainers are designed specifically for use with TuffPunch® Punches—Jektol® and Regular. Only one dowel is required for round punches, reducing machining time by up to 50%. The in-line center dowel assures precise punch-to-matrix alignment, giving you higher quality parts, longer punch life, and reduced downtime. Shaped punches use a secondary dowel for precise alignment.

Use of the TuffPunch® Center Dowel Punch and Retainer also eliminates hand-fitting, cutting mounting time by nearly 50%. Simply pull the retainer from its box, and screw it into the die set. This TuffPunch® combination gives you true dimensional accuracy every time.

### HOW TO ORDER

Specify:  
- Qty.  
- Type  
- D

Example:  
- 4 ARTF 10  
- 6 ARTFS 25

ARTF and ARTFS TuffPunch® Retainer sets include:  
- 2 Screws  
- 2 Dowels

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Standard Alterations—Punches and Punch Blanks

Standard Alterations
Punches are available in sizes other than those listed on the individual product pages.

Jektole®, Regular, and Center Dowel

XP, XW P & W Dimensions
Smaller than Standard

XP

XW

XBR (Straight Before Radius)
It is recommended that point lengths be kept as short as possible for optimum strength.

Shear Angles (XS)
TuffPunch® products are available in common shear angle configurations for all standard shapes. Shear angles are also available for classified shapes as special orders.
Shear angles are available in any angle. Specify angle in whole degrees. If half degree is necessary, specify as a decimal, e.g., 8.5°. (Tolerance on all angles is ±15 minutes.) Use the chart below to determine the product designation, then simply add the alteration code shown next to the drawings, along with the angle desired.

Example: APXF 16-90-80 P 8.3 XS20 A5°.

Shear Angles (XS)

XL  Overall Length Shortened (25 min.)  Stock removal from end point, which shortens L1 length.
XLB  Overall Length Shortened  Stock removal from end point. Point length L1 maintained. (Min. shank length 25)
LL  Precision Overall Length  Same as XL except overall length is held to ±0.02.
XK  No Side Hole
For air ejection. No cost.
XS  Shear Angles
See information at right.
XJ  Smaller Jektole Components

For Round Punches Only
Views are reflected view.

Note: For surface coatings information, see p. 2 and the individual product pages.
Orientation
The standard location for all locking devices is 0°, and is always on the long side (P) of the shape. Custom locations are measured counterclockwise from 0°.

Single Flats: X2
Order Example: X2 — 90°

Double Flats: X3
Locking Devices: X3
Order Example: X3 — 90°
Second Flat is always parallel to the first flat.

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

Dowel Slots: X4 & X41
For standard locations, specify X4 (3.0 Dowel) or X41 (4.0 Dowel). For alternate locations, specify X4 or X41 and degree required.
Order Example: X4 — 90°

Dowel Slots: X7 & X71
Specify X7 (3.0 Dowel) or X71 (4.0 Dowel). For custom locations, specify X7 or X71 and degree required.
Order Example: X71 — 135°

Additional Flats

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Dowel Slots
F = .5D + 1/2 Dowel Dia.

Location Tolerance
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How To Specify
The most common locking devices—flat, double flat, and dowel—are available. Simply select the type, then add the code to the component description.

How To Order
Specify: Qty, Type, D Code, L (or P&W) Dimension, F (or P&W) Locking Device.
Example: 1 A1RF 16 25-80 P8.5, W8.0 X2

Standard and Alternate Locations
Definitions: Standard Location is at 0°. Alternate Location is 90°, 180°, or 270°. Alternate locations are available at no additional charge.

Custom Locations
Definitions: Custom Location is any angle other than: 0°, 90°, 180°, or 270°.
Other Dayton Products

Ball Lock Punches, Matrixes, Pilots, & Retainers
Dayton Ball Lock Products 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 True Position® Retainers (the recognized industry standard) eliminate hand fitting, reduce mounting time, and are ideally suited for both round and complex-shaped products. True Position® allows easy replacement of broken or worn punches.

MaxLife® Die Springs
Dayton MaxLife® Die Springs are: made to exact specifications; manufactured to outperform and outlast other major brands; designed specifically for press and mold dies; and ensure optimum operation in heavy industry applications. Corrosion-resistant Dayton die springs are made from pre-tempered chrome silicon wire, and optimize the working life of press and mold dies.

Urethane Stripping & Forming Products
Durable, yet flexible, Dayton urethane strippers and forming products provide superior stripping over conventional strippers; develop higher load-bearing capacity; are tear- and oil-resistant; provide exceptional dampening; and are easy to install and replace.

Dayton dual durometer SMARTStrip™ Strippers (two elastomers molded into a single piece) are a cost-effective alternative to metal spring strippers.

Dayton provides a full range of leading-edge die component products: headed punches, guides, and matrixes; positive-locking Ball Lock products; retainers; slug-ejection punches; retaining systems; die springs; and others. For details, contact Dayton Lamina or your nearest Dayton Lamina Distributor.

® True Position and MaxLife are registered trademarks of Dayton Lamina.
™ SMARTStrip is a trademark of Dayton Lamina.
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.

*Dayton Lamina’s line of Danly products is available only to North America.

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