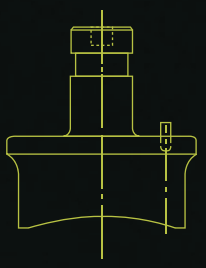
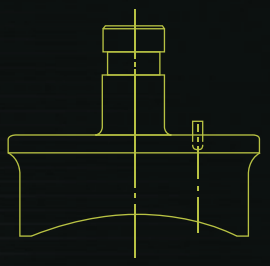
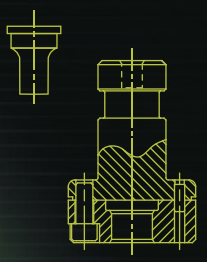
Whitney Tooling

28XX™, 36TC™ and 44TC™ Punches, Dies and Accessories

From The Leader in Plate Technology







MegaFab™

PIRANHA WHITNEY BERTSCH

Keep your Whitney performing at its best.

The information you need.

Technical assistance and phone support.

The tooling you need.

28XX™, 36TC™, 44TC™, TuffSkin™, SlugMagic™, Ironworker, Special Tooling design service.

The parts you need.

Repair parts and upgrade options for Whitney equipment.

The service you need.

Technical Service Engineers for contracted on-site machine maintenance or repair.

The training you need.

Professional training on-site or at Whitney for operators, programmers and maintenance personnel.

Pull it all together with one call to Whitney's Express Services Department.

1-800-338-5471

Contents

Tooling from Whitney

W.A. Whitney is committed to providing you with the best tooling prices and delivery in the industry.

Whitney's engineering and manufacturing personnel are experienced in designing and producing quality tooling specifically for Whitney machine tools. Coupled with the latest production machinery, heat treat and coating technologies, and inspection equipment, you are assured that your Whitney tools will do the job right and produce profits for your operation.

Specialty tools are engineered to meet your specific needs and thoroughly tested in the appropriate Whitney machine tool. You provide the specifications and drawings, or work with our tooling engineers to complete the information you need for your special order.

Experienced engineering, rapid delivery, rigid quality control and fair pricing make Whitney tooling the right choice.

Depend on Whitney.

Fast Tooling Shipment

24-hour shipment of most standard punches and dies.

Existing design specials are manufactured and shipped within five days.

Custom engineered tooling delivery time is estimated at the time of order.

Unless specific shipping instructions are provided Whitney will ship the best, most economical way. All shipments are f.o.b. the Whitney plant, Rockford, Illinois.

Inches or Metric

Whitney is equally familiar with inches and metric measurements guaranteeing the right size for your punching job. You specify the system and size.

Ordering

Before ordering standard tooling know…

1. The type and thickness of material to be punched.
2. The type of equipment the tooling will be used in, including the manufacturer's name and the model number.
3. Pin location if ordering shaped or special purpose tooling.
4. Any deviation from standard sizes or styles.

To order Special Purpose Tooling call: 1-800-338-5471.

Policies and Terms

Returns—Prior to returning goods, approval must be received from Whitney's Customer Service Department, 1-800-338-5471. All tools authorized for return are to be shipped prepaid to Whitney. Credit will not be allowed on damaged or used tooling.

Specials—Non-standard punches and dies are non-cancellable and non-returnable.

Restocking charge—$20 charge on items less than $100; 20% of cost on items more than $100.

Terms—All prices are net, f.o.b. factory. Minimum order is $50. Cash discount is 1% for payment in 10 days. Net 30 days.

Questions?

Your inquiries are always welcome and receive prompt attention. Contact us by email at tooling@wawhitney.com or phone at 1-800-338-5471.

How to Order Tooling from Whitney

Use Online Ordering for Fastest Tooling Delivery

Using Whitney's Online Ordering System begins with establishing a secure account for your company. To set-up your account—or to check to see if your company has an account—call 1-800-338-5471 to talk with a Customer Service Representative.

When your account has been activated via your phone call, complete registration online at www.wawhitney.com.

Select the Online Ordering and follow the easy steps. An Online Ordering Guide and your company's confirmation and password will be sent to you via email. The Online Ordering Guide provides easy-to-follow, detailed steps to successfully place your tooling order. To preview the Online Ordering Guide go to www.wawhitney.com.

When you use Online Ordering, your order is electronically forwarded directly to production beginning the manufacturing process. This gets your tooling out the door and to your machine faster.

Four easy ways:

1. Online via www.megafab.com.
2. Fax Tooling Order Form (page 5) to 815-964-0831.
3. Call 1-800-338-5471.
4. Contact your Whitney distributor.

Other Ordering Options

If you do not have convenient access to the Internet or if you prefer other ordering methods, your tooling needs will still be entered into production with speed and efficiency.

Copy the Tooling Order Form on page 5, complete all information and fax to 815-964-0831 or call 1-800-338-5471 to talk with a Customer Service Representative.

Or, place your order through your Whitney distributor.

Top 10 reasons you should use Whitney's Online Ordering System:

10) The Online Ordering Configurator generates the correct tool number automatically and makes sure the tool will work in your application by checking compressive tool strength, die clearance and tonnage.

9) Online Ordering is a great LEAN tool that allows shop personnel to order tooling immediately—without paperwork delays.

8) Your order receives immediate attention—no need to wait for faxes to go through.

7) You can review your order information for completeness before submitting.

6) You receive instant confirmation of your order via email.

5) There is no need to confirm verbal orders with formal written purchase orders.

4) Online Ordering sends your order to manufacturing as soon as it is received. Your order is completed and shipped faster.

3) You can also order your spare parts via Online Ordering. You can check Whitney's on-hand inventory and, if needed, lead times for your order.

2) You can check the status of your order at anytime via your own, secure account.

And the Number 1 reason…It's fast!

Automatic Tooling Configurator

Whatever ordering method you choose, eliminate the need for reference materials and lengthy calculations to determine the right tool for your job. Access the Automatic Tooling Configurator, at:

www.megafab.com

In less than 30 seconds, the Tooling Configuration leads you through a short series of questions and provides the correct tool and die set for your application.

Enter your machine model number, the type and thickness of material being processed, and the shape and dimensions of the hole. The Tooling Configurator does the rest.

If ordering online, the proper part numbers can be added to your "shopping cart".

If ordering via fax, phone or through your distributor, use the part numbers provided by the Tooling Configurator to assure your tooling selection.

Tooling Order Form

Company Name ______________________ Phone # ______________________

Contact Name ______________________ Fax # ______________________

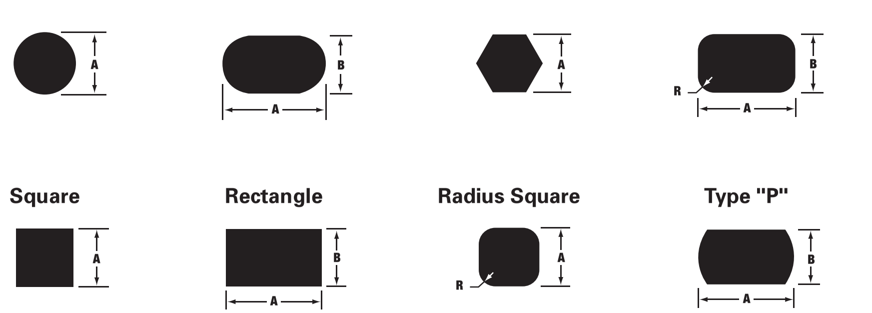
Machine Model ______________ Address ______________________ Email ______________________

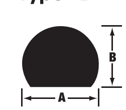
Tons: ❑ 33 ❑ 40 ❑ 50 ❑ 55 ❑ 60 ❑ 100 ______________________ PO# ______________________

Ship Via: ❑ Fed Ex Econ ❑ Fed Ex Priority 1 (10:00 a.m.) | ❑ UPS Ground ❑ UPS 3rd Day ❑ UPS 2nd Day ❑ UPS Next Day | ❑ ____________ OTHER

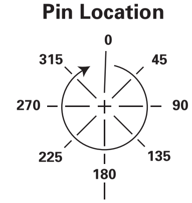
Account # __ __ __ __ __ __ __ __ __ | Account # __ __ __ __ __ __

	Shape	A-Dim.	B-Dim.	R-Dim.	Material Type	Thickness	Punch or Die Type (CHECK ALL THAT APPLY)	Pin Location	Punch or Die Part Numbers	Quantity	Punches Price Each	Dies Price Each	Total Price
Punch							❑ Full Body ❑ Insert ❑ H.S.S. ❑ TuffSkin™						
Die							❑ SlugMagic™						
Punch							❑ Full Body ❑ Insert ❑ H.S.S. ❑ TuffSkin™						
Die							❑ SlugMagic™						
Punch							❑ Full Body ❑ Insert ❑ H.S.S. ❑ TuffSkin™						
Die							❑ SlugMagic™						
Punch							❑ Full Body ❑ Insert ❑ H.S.S. ❑ TuffSkin™						
Die							❑ SlugMagic™						





Pin Location



TOOL LOAD POSITION

Order online at www.megafab.com
by phone at 800-338-5471
or fax this form to 815-964-0831

MegaFab™

PIRANHA WHITNEY BERTSCH

With a few simple questions the Online Ordering Tooling Configurator provides the correct tool and die set for your application!

Whitney Punch Styles

Whitney manufactures three different styles of punches for its lines of punch presses. This table shows many of the machine models manufactured by Whitney and the tooling style used.

Tooling for other Whitney products, such as Beamlines, Anglematics and Portable Presses, as well as most brands of Ironworkers is included in Whitney's Ironworker, Portable Press and Beamline Tooling Catalog.

28XX™		36TC™	44TC™
612	646	645 ATC	4400MAX
613	647 (A,B,C,D)	647 Plus & Plus II	
614	647 (Custom)	647 ATC	
615	650	3400 Series	
625	651	3500 ATC	
626	652	3600 ATC	
627	653	3700 Series	
628	655	661 Series	
630	1330 & 2330		
635	1524		
636	1530 & 2530		
637	1548 & 2548		

All standard punches—and dies—are made from shock-resistant tool steel. This material is economical and holds up in high shock applications without chipping. However, two options are available for increased tool life.

TuffSkin™, Whitney's recommendation to protect your tooling investment, combines high speed steel (HSS) as the tooling material with a coating that further increases tool life. TuffSkin customers find that the additional investment in tooling pays off in greatly extended tool life.

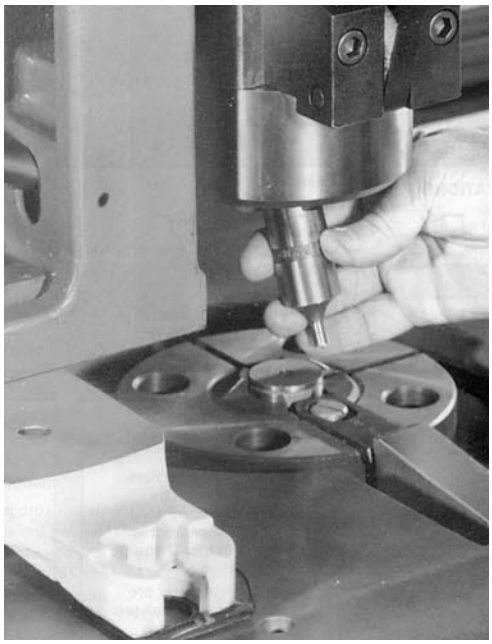
You also have the option of specifying HSS without the TuffSkin coating.

Tooling Style Descriptions

28XX Tooling is quick change tooling used with presses that have manual tool change. Tools are loaded from beneath the punching cylinder. The punch is secured into the cylinder by clamping against a whistle notch located in the punch shank.

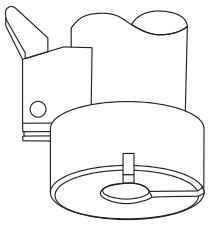
28XX Punches are available up to 5.000" (127 mm) in diameter. All round punches through 1.453" (36.9 mm) diameter (or equivalent size shape) are flat-faced, with a center point on the punch face. Larger punches are standard with 1/8" (3.2 mm) concave shear and no center point. Square punches with a single side dimension between 0.986" (25.04 mm) and 2.000" (50.8 mm) are standard with 1/8" (3.2 mm) double concave shear. Other shear types are available at customer request.

All shaped punches have a single pin location that allows for 0° and 90° positioning. Other pin locations can be specified and provided at additional cost. See page 28 for standard pin orientations.



Quick Change Punch Adapters for 28XX™ Tooling

Cam-lock Quick Change Punch Adapter



Use the Cam-lock Quick Change Punch Adapter on the following:

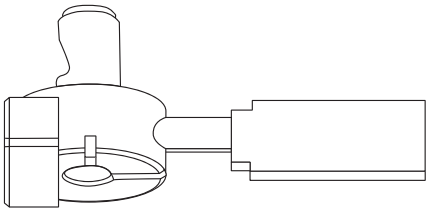
Duplicating Press
Model 615A

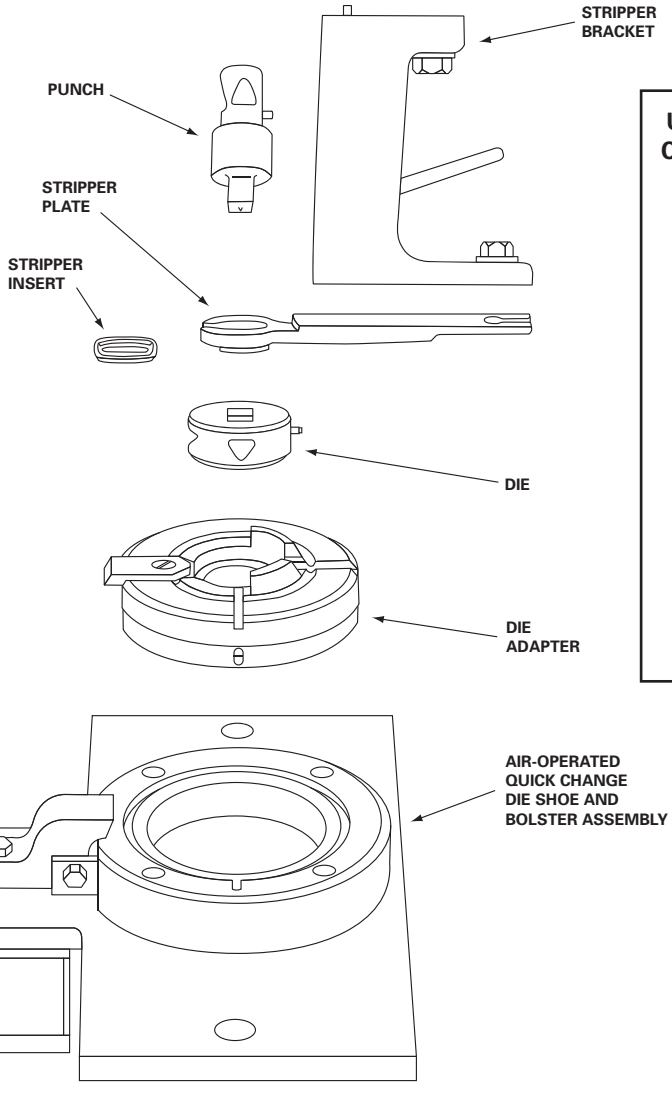
Use the Air-hydraulic Quick Change Punch Adapter on the following:

Duplicating Presses
Model 635A
Models 630CNC & 650CNC

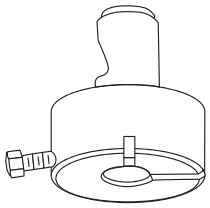
Numerically Controlled Presses
Model 637A (NC)
Models 647A & 647B (NC)
Models 647C & 647D (NC)
Model 647 Custom
Models 2330CNC & 2348CNC
Models 2530CNC & 2548CNC

Air-hydraulic Quick Change Punch Adapter





Manual Quick Change Punch Adapter



Use the Manual Quick Change Punch Adapter on the following:

Scale Gaging Presses (E Type)
Model 615E
Model 627E
Model 652E
Model 653E

Duplicating Presses
Model 652-50
Model 653-50

Numerically Controlled Presses
Model 1524

Online Ordering is a great LEAN tool that allows shop personnel to order tooling immediately—without paperwork delays!

36TC™ Tooling is a cartridge style tool used with punch presses that have automatic tool change, or manual cartridge style tool change. Tools are loaded into the cylinder from the front. The punch is secured into the cylinder by a groove in the punch shank and a lock-up mechanism that clamps on the front of the tool.

36TC Punches are available up to 5.000" (127 mm) in diameter. All round punches through 1.719" (43.66 mm) diameter (or equivalent size shape) are flat faced (Style I). Punches 1.720" (43.69 mm) through 2.469" (62.7 mm) in diameter are standard with 1/4" (6.35 mm) concave shear (Style II). Punches 2.470" (62.74 mm) and larger are standard with 7/16" (11.11 mm) shear (Style III). Concave shear punches are not recommended for material over 1/4" (6.35 mm) thick. House top shear punches are recommended for material over 1/4" (6.35 mm) thick and for high shear strength materials. Other shear types are available at customer request.

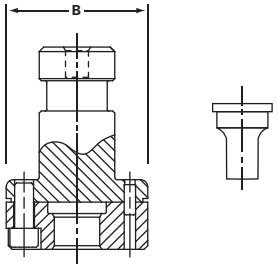
36TC Punch House Top Shear

36TC Insert Holders & Inserts

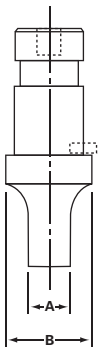
All shaped punches have a single pin location that allows for 0° and 90° positioning. Other pin locations can be specified and provided at additional cost. See page 28 for standard pin orientations.

Punches .750" (19.0 mm) and smaller (diameter or equivalent shapes) are available as economical inserts. Interchangeable inserts fit into the Whitney insert punch holders. Insert punches are also available in HSS or TuffSkin™. Insert punches limited to 40 tons.

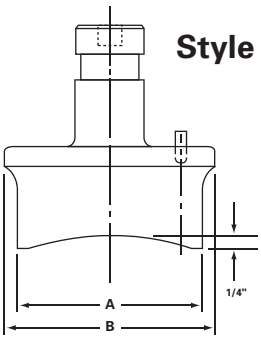
36TC Punch Styles & Dimensions



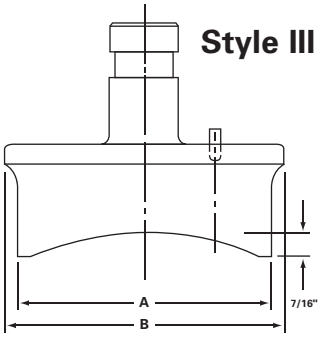
36TC Insert Punch Holder & Insert Punch
#8084-79360-15000



Style I



Style II



Style III

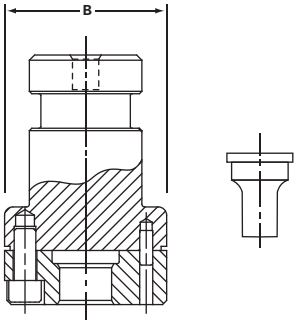
A	B	Style — 36TC
.05 to .750	2.34"	Insert Punch
Up to 1.719	2" (Flat Face)	I
1.720 to 2.469	2-1/2" with 1/4" Shear	II
2.470 to 2.969	3" with 7/16" Shear	III
2.970 to 3.469	3-1/2" with 7/16" Shear	III
3.470 to 4.000	4" with 7/16" Shear	III
4.001 to 5.000	5" with 7/16" Shear	III

44TC Tooling, a heavy-duty version of 36TC, Tooling has a larger diameter shank that withstands heavier punching loads. Tools are loaded into the cylinder from the front. The punch is secured into the cylinder by a groove in the punch shank, and a lock-up mechanism that clamps on the front of the tool.

44TC Punches are available up to 3.000" (76.2 mm) in diameter. All sizes are standard as flat faced.

Shaped punches have a single pin location that allows for 0° and 90° positioning. Other pin locations can be specified and provided at additional cost. See page 28 for standard pin orientations.

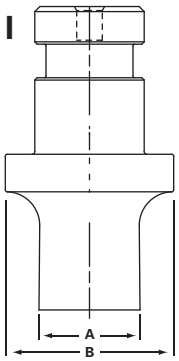
Punches .750" (19.0 mm) and smaller (diameter or equivalent shapes) are available as economical inserts. These interchangeable inserts fit into the Whitney Insert Punch Holders. Insert punches limited to 40 tons.



44TC Insert Punch Holder & Insert Punch

#8188-70440-15000

Style I



44TC Punch Styles & Dimensions

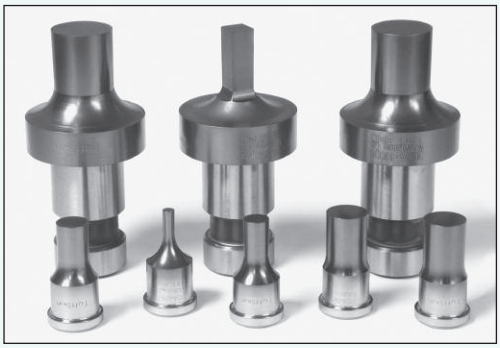
A	B	Style — 44TC
.05 to .750	2.34"	Insert Punch
Up to 2.469	2-1/2"	I
2.470 to 3.000	3"	I

TuffSkin™ Premium Tooling for 28XX™, 36TC and 44TC Styles

TuffSkin Premium Tooling, available only from Whitney, in 28XX, 36TC and 44TC styles, extends the life of tooling by three times in standard punching applications and up to ten times under severe applications. In addition to longer tool life, high lubricity, abrasion resistance and high compressive strength help you efficiently produce holes that are otherwise difficult and costly to achieve. And, unlike some coated tools, TuffSkin maintains its performance even after regrinding.

Here are your advantages when you specify TuffSkin on your tooling order:

- Dramatically improve tool life—three or more times the holes than with a standard tool; up to ten times more in tough applications.
- Ability to punch holes smaller than material thickness—even in high strength steels.
- Extend life of shave punches—for vertical holes in thick materials with minimum breakout.
- Greatly reduce wear from heavy punching applications such as perforating.
- Virtually eliminate galling—punch surface stays clean.
- Assure tool integrity when your machine runs unattended.
- Reduce costs of inspecting and resharpening punches.



With Whitney's Online Ordering your order receives immediate attention—no need to wait for faxes to go through!

Whitney Die Styles

Whitney offers several die styles to match the die to the application. These are classified in two categories:

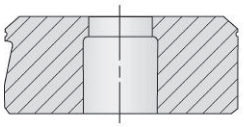
Standard Dies — Whitney recommends the use of standard dies for economy with manual and CNC gauging presses that use 28XX™ tooling. Standard dies can also be used on machines in conjunction with punches that have concave shear (concave shear distorts the slug so that it naturally retains itself inside a standard die).

Slug Retaining Dies — Whitney recommends slug retaining dies for reliability in presses that run in an automatic cycle—those using work clamps to grip and position the material—and for other applications susceptible to slug-pulling such as punching high strength steel.

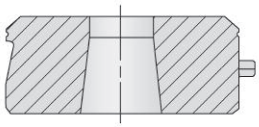
Standard Dies

Whitney offers two types of standard dies:

28XX Dies have a 1/4" (6.35 mm) straight land. This style die is recommended for material up to 1/4" (6.35 mm) thick. If used for thicker material, the slug will not adhere to the inside face of the die, and may be susceptible to slug pulling. 28XX dies are also recommended for use with large punches that have concave shear. Manual Duplicators use 28XX dies for all thicknesses.

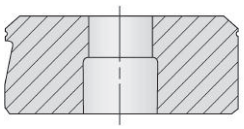


Round

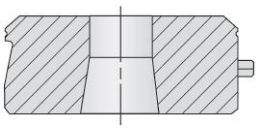


Shape

38XX Dies have a 1/2" (12.7 mm) straight land. This style die is recommended for material over 1/4" (6.35 mm) through 5/8" (15.88 mm) thick. If used for thinner material, several slugs may stack together inside the die causing premature failure of the punch or die.



Round



Shape

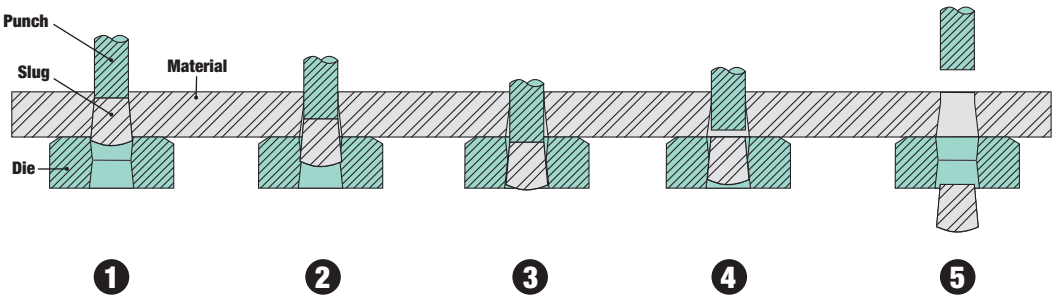
Both types of standard dies are available in rounds and shapes.

Slug Retaining Dies

SlugMagic™ Series Dies are made to prevent slug pulling in all standard flat face punching applications. The internal profile of this style is double conical (similar to an hourglass) so that it can trap the bottom portion of a slug, the thickest part, below the die's neck. SlugMagic dies are available in rounds and shapes. They are available only for machines that use 36TC™ and 44TC™ tooling.

Here is how SlugMagic Series dies work:

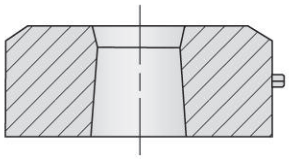
1. The punch enters the material and the slug begins to form. The top of the slug is sized by the punch, and the bottom of the slug is sized by the die. This means that the bottom of the slug is bigger than the top.
2. As the punch penetrates through the material, the slug is forced inside the die opening. The top of the die opening is conical in shape, and the bottom of the slug squeezes through the neck of the cone, an interference fit, since the slug width at this point is larger than the neck opening.



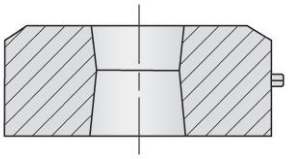
3. The punch reaches the bottom of the stroke. At this point, the bottom of the slug is past the neck of the cone.
4. Punch retracts. The neck of the cone prevents the bottom of the slug from pulling back up with the punch. The neck strips the slug from the punch.
5. Once the slug strips from the punch, it falls freely since it no longer adheres to the punch, and since the lower portion of the die has relief with a reverse conical shape. Multiple slugs *do not* stack up in SlugMagic dies.

To accommodate a range of thicknesses, SlugMagic dies are available in four different internal profile configurations. For your convenience, Whitney SlugMagic dies come with the material range clearly engraved on the outside of the die. Improper selection of profile configuration will negatively affect the ability of the die to retain slugs.

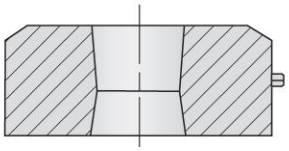
SlugMagic dies work equally well on machines with or without vacuum slug removal systems. They are recommended for replacing 34 style, 36 style, and 37 style dies in all standard punching applications. SlugMagic dies are NOT recommended for use with shave punches (see page 34).



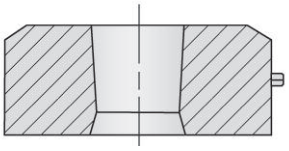
Series 2 – formulated for material up to and including 1/4" thick



Series 3 – formulated for material over 1/4" up to and including 1/2" thick

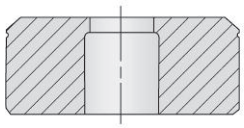


Series 4 – formulated for material over 1/2" up to and including 3/4" thick

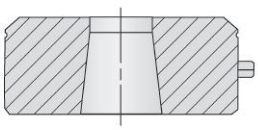


Series 5 – formulated for material over 3/4" up to and including 1" thick

34 Style Dies are designed to work with vacuum slug removal systems such as those found on Whitney Models 645 ATC, 647 ATC, 3500 ATC, 3600 ATC, 3700 ATC, and 3700 SST. Although these dies, by themselves, do not have slug retention properties, they have a small land that allows vacuum systems to draw the slug away from the die. While these dies are still available, Whitney recommends that the appropriate style SlugMagic dies be used in lieu of 34 style dies.

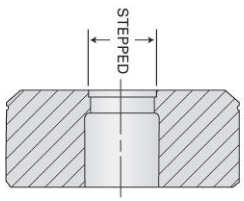


Round

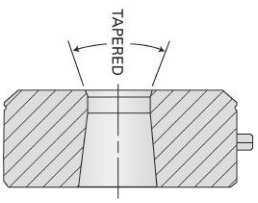


Shape

36 Style Dies are designed to retain slugs in material less than and including 1/4" (6.35 mm) thick. They are intended for use in machines that do not have vacuum style slug removal systems. Whitney recommends that SlugMagic Series 2 dies be used in lieu of 36 style dies for all applications except shaving (see page 34).



Round



Shape

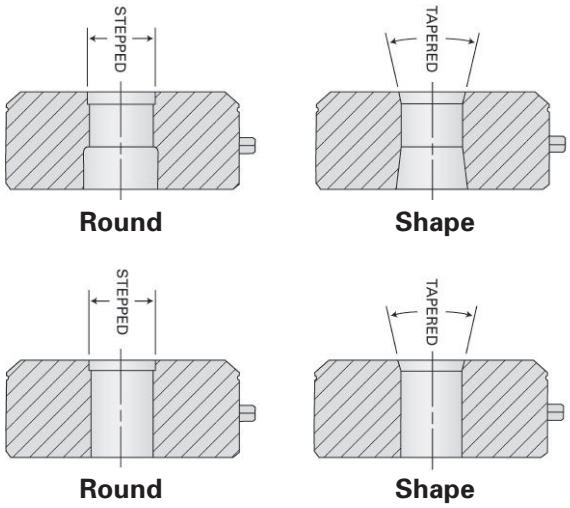
Whitney Dies

Related Topics
- How to Order .....p. 4
- Whitney Punch Styles .....p. 6
- Pin Locations .....p. 28

With Online Ordering you can review your order information for completeness before submitting!

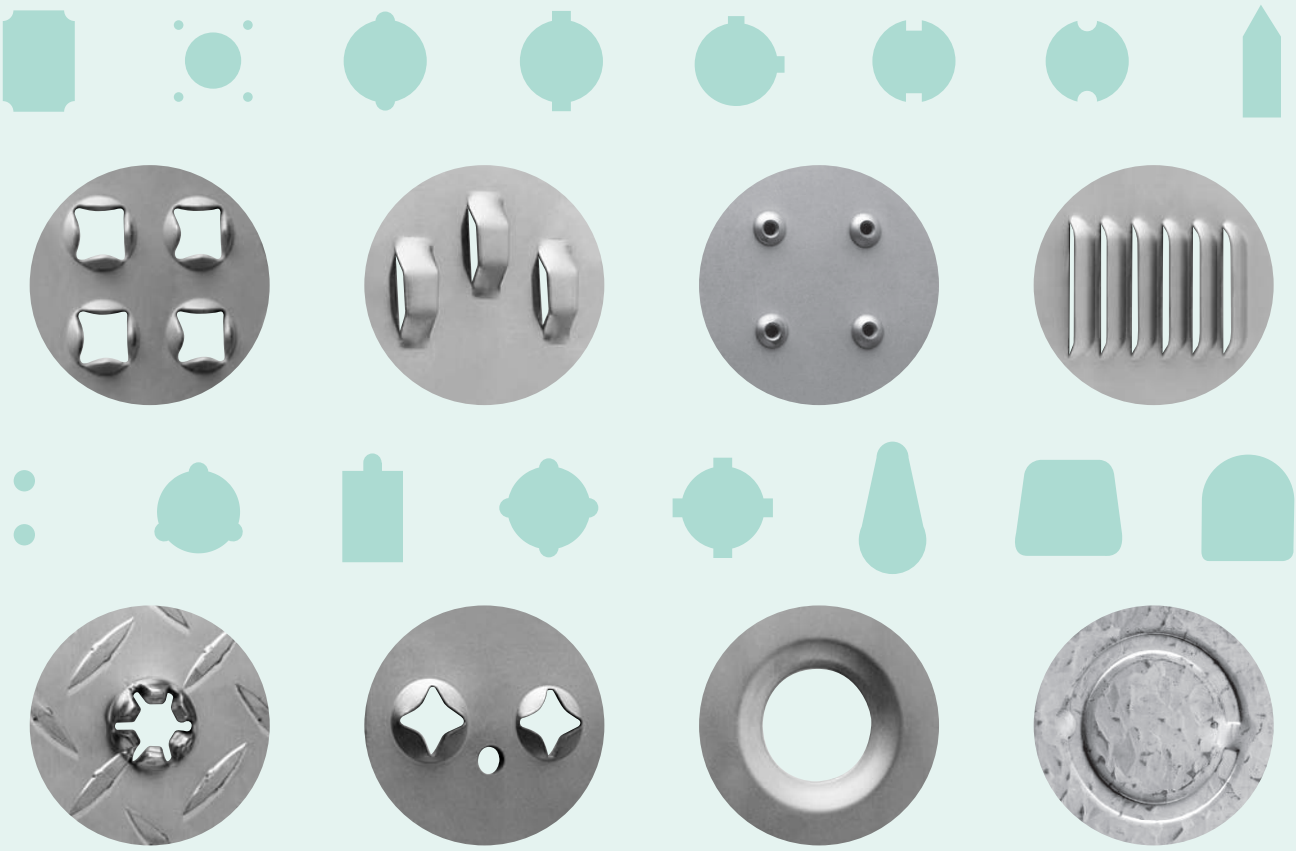
37 Style Dies are designed to retain slugs in material from 1/4" (6.35 mm) thick through 5/8" (15.88 mm) thick. They are intended for use in machines that do not have vacuum style slug removal systems. Whitney recommends that SlugMagic™ Series 3 or 4 dies be used in lieu of 37 style dies for all applications except shaving (see page 34).

44 Style Dies are designed to retain slugs in material over 1/2" (12.7 mm) thick through 1" (25.4 mm) thick. These dies have tabs that grip the side of the slug to keep it from pulling up. While effective, they are also more costly than other style dies. Whitney recommends that SlugMagic Series 4 or 5 dies be used in lieu of 44 style dies for all applications except shaving (see page 34).



Special Shapes and Forming

In addition to the standard shapes in the following section, many special shapes and forming tools are available. See the Special Tooling section on pages 32 to 39 for details.



28XX™ Punches and Dies

For CNC Fabricators and Duplicators

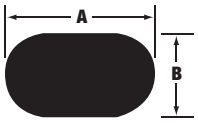
ROUND

Punch (6301-) Size "A"	Die (6302-) Size "A"	Die O.D.
.050 - .172	Thru .209	1-1/4
.173 - .812	.210 - .824	1-1/4
.813 - 1.000	.825 - 1.068	2-1/8
1.001 - 1.453	1.069 - 1.465	2-1/8
1.454 - 2.000	1.466 - 2.012	2-3/4
2.001 - 2.500	2.013 - 2.537	3-3/4
2.501 - 3.000	2.538 - 3.012	3-3/4
3.001 - 3.500	3.013 - 3.537	4-3/4
3.501 - 4.000	3.538 - 4.012	4-3/4
4.001 - 4.500	4.013 - 4.537	5-3/4
4.501 - 5.000	4.538 - 5.012	5-3/4

SQUARE

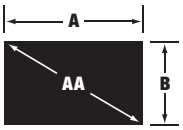
Punch (6311-) Size "A"	Die (6312-) Size "A"	Die O.D.
.125 - .500	Thru .512	1-1/4
.501 - .688	.513 - .724	2-1/8
.689 - 1.000	.725 - 1.012	2-1/8
1.001 - 1.406	1.013 - 1.418	2-3/4
1.407 - 1.766	1.419 - 1.778	3-3/4
1.767 - 2.125	1.779 - 2.137	3-3/4
2.126 - 2.469	2.138 - 2.481	4-3/4
2.470 - 2.812	2.482 - 2.824	4-3/4
2.813 - 3.156	2.825 - 3.168	5-3/4
3.157 - 3.500	3.169 - 3.512	5-3/4

OBROUND



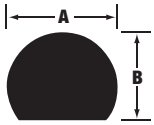
Punch (6321-) Size "A"	Die (6322-) Size "A"	Die O.D.
.125 - .812	Thru .824	1-1/4
.813 - 1.000	.825 - 1.068	2-1/8
1.001 - 1.453	1.069 - 1.465	2-1/8
1.454 - 2.000	1.466 - 2.012	2-3/4
2.001 - 2.500	2.013 - 2.537	3-3/4
2.501 - 3.000	2.538 - 3.012	3-3/4
3.001 - 3.500	3.013 - 3.537	4-3/4
3.501 - 4.000	3.538 - 4.012	4-3/4
4.001 - 4.500	4.013 - 4.537	5-3/4
4.501 - 5.000	4.538 - 5.012	5-3/4

RECTANGLE



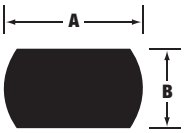
Punch (6331-) Size "AA"	Die (6332-) Size "AA"	Die O.D.
.125 - .750	Thru .762	1-1/4
.751 - .999	.763 - 1.068	2-1/8
1.000 - 1.438	1.069 - 1.450	2-1/8
1.439 - 2.000	1.451 - 2.012	2-3/4
2.001 - 2.500	2.013 - 2.537	3-3/4
2.501 - 3.000	2.538 - 3.012	3-3/4
3.001 - 3.500	3.013 - 3.537	4-3/4
3.501 - 4.000	3.538 - 4.012	4-3/4
4.001 - 4.500	4.013 - 4.537	5-3/4
4.501 - 5.000	4.538 - 5.012	5-3/4

TYPE D



Punch (6361-) Size "A"	Die (6362-) Size "A"	Die O.D.
.125 - .812	Thru .824	1-1/4
.813 - .999	.825 - 1.068	2-1/8
1.000 - 1.453	1.069 - 1.465	2-1/8
1.454 - 2.000	1.466 - 2.012	2-3/4
2.001 - 2.500	2.013 - 2.537	3-3/4
2.501 - 3.000	2.538 - 3.012	3-3/4

TYPE P

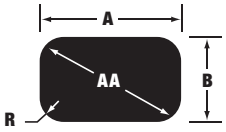


Punch (6351-) Size "A"	Die (6352-) Size "A"	Die O.D.
.125 - .812	Thru .824	1-1/4
.813 - .999	.825 - 1.068	2-1/8
1.000 - 1.453	1.069 - 1.465	2-1/8
1.454 - 2.000	1.466 - 2.012	2-3/4
2.001 - 2.500	2.013 - 2.537	3-3/4
2.501 - 3.000	2.538 - 3.012	3-3/4

HEX

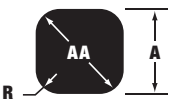
Punch (6341-) Size "A"	Die (6342-) Size "A"	Die O.D.
.125 - .688	Thru .700	1-1/4
.689 - 1.250	.701 - 1.262	2-1/8
1.251 - 1.719	1.263 - 1.731	2-3/4
1.720 - 2.594	1.732 - 2.606	3-3/4

RECTANGLE w/RADIUS CORNERS



Punch (8XXX-) Size "AA"	Die (8XXX-) O.D.
Thru .812	1-1/4
.813 - 1.453	2-1/8
1.454 - 2.000	2-3/4
2.001 - 3.000	3-3/4
3.001 - 4.000	4-3/4
4.001 - 5.000	5-3/4

SQUARE w/RADIUS CORNERS



Punch (8XXX-) Size "AA"	Die (8XXX-) O.D.
Thru .812	1-1/4
.813 - 1.453	2-1/8
1.454 - 2.000	2-3/4
2.001 - 3.000	3-3/4
3.001 - 4.000	4-3/4
4.001 - 5.000	5-3/4

With Online Ordering you receive instant confirmation of your order via email!

36TC™ Punches and Dies

For 3400 Series and 661 Series Machines

ROUND

Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 1.719	I
1.720 - 2.469	II
2.470 - 4.000	III
4.001 - 5.000	III

Insert = 3101- Styles I, II, III = 3601-

Die Size "A"	Die O.D.	6302-28XX	3602-36TC	3702-36TC	SX02-SlugMagic
Thru .824	1-1/4	N/R	•	•	•
.825 - 1.465	2-1/8	N/R	•	•	•
1.466 - 1.740	2-3/4	N/R	•	•	•
1.741 - 2.012	2-3/4	•	N/R	N/R	•
2.013 - 2.537	3-3/4	•	N/R	N/R	•
2.538 - 3.012	3-3/4	•	N/R	N/R	•
3.013 - 3.537	4-3/4	•	N/R	N/R	•
3.538 - 4.012	4-3/4	•	N/R	N/R	•
4.013 - 5.037	6-1/2*	N/A	•	N/R	•

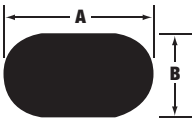
SQUARE

Punch Size "A"	Punch Style 36TC
Thru .530	Insert or I
.531 - 1.000	I
1.001 - 1.188	I
1.189 - 1.719	II
1.720 - 2.438	III
2.439 - 2.812	III
2.813 - 3.500	III

Insert = 3111- Styles I, II, III = 3611-

Die Size "A"	Die O.D.	6312-28XX	3812-38XX	3612-3712-	SX12-SlugMagic
Thru .512	1-1/4	•	•	N/R	•
.513 - 1.012	2-1/8	•	•	N/R	•
1.013 - 1.418	2-3/4	•	•	N/R	•
1.419 - 1.778	3-3/4	•	•	N/R	•
1.779 - 2.137	3-3/4	•	•	N/R	•
2.138 - 2.481	4-3/4	•	•	N/R	•
2.482 - 2.824	4-3/4	•	•	N/R	•
2.825 - 3.537	6-1/2*	N/A	N/R	•	•

OBROUND

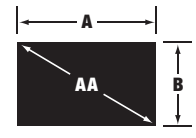


Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

Insert = 3121- Styles I, II, III = 3621-

Die Size "A"	Die O.D.	6322-28XX	3822-38XX	3622-3722-	SX22-SlugMagic
Thru .824	1-1/4	•	•	N/R	•
.825 - 1.465	2-1/8	•	•	N/R	•
1.466 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•
3.013 - 3.537	4-3/4	•	•	N/R	•
3.538 - 4.012	4-3/4	•	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	N/R	•	•

RECTANGLE



Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

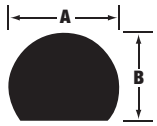
Insert = 3131- Styles I, II, III = 3631-

Die Size "AA"	Die O.D.	6332-28XX	3832-38XX	3632-3732-	SX32-SlugMagic
Thru .762	1-1/4	•	•	N/R	•
.763 - 1.450	2-1/8	•	•	N/R	•
1.451 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•
3.013 - 3.537	4-3/4	•	•	N/R	•
3.538 - 4.012	4-3/4	•	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	N/R	•	•

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.

* 6-1/2" dies are a combination unit incorporating both die and die adapter. Not available where indicated (N/A).

TYPE D

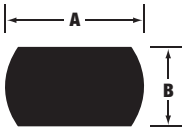


Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

Insert = 3161- Styles I, II, III = 3661-

Die Size "A"	Die O.D.	6362-28XX	3862-38XX	3662-3762-	SX62-SlugMagic
Thru .824	1-1/4	•	•	N/R	•
.825 - 1.465	2-1/8	•	•	N/R	•
1.466 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•
3.013 - 3.537	4-3/4	•	•	N/R	•
3.538 - 4.012	4-3/4	•	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	N/R	•	•

TYPE P



Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 -1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

Insert = 3151- Styles I, II, III = 3651-

Die Size "A"	Die O.D.	6352-28XX	3852-38XX	3652-3752-	SX52-SlugMagic
Thru .824	1-1/4	•	•	N/R	•
.825 - 1.465	2-1/8	•	•	N/R	•
1.466 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•
3.013 - 3.537	4-3/4	•	•	N/R	•
3.538 - 4.012	4-3/4	•	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	N/R	•	•

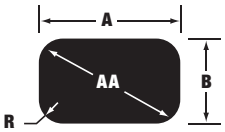
HEX

Punch Size "A"	Punch Style 36TC
Thru .649	Insert or I
.650 - 1.250	I
1.251 - 1.488	I
1.489 - 2.125	II
2.126 - 2.594	III
2.595 - 3.438	III
3.439 - 4.312	III

Insert = 3141- Styles I, II, III = 3641-

Die Size "A"	Die O.D.	6342-28XX	3842-38XX	3642-3742-	SX42-SlugMagic
Thru .700	1-1/4	•	•	N/R	•
.701 - 1.262	2-1/8	•	•	N/R	•
1.263 - 1.731	2-3/4	•	•	N/R	•
1.732 - 2.606	3-3/4	•	•	N/R	•
2.607 - 3.474	4-3/4	•	•	N/R	•
3.475 - 4.349	6-1/2*	N/A	N/R	•	•

RECTANGLE
w/RADIUS CORNERS



Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.438	I
1.439 - 2.000	II
2.001 - 3.000	III
3.001 - 4.000	III
4.001 - 5.000	III

Insert & Styles I, II, III = 8XXX-

Die Size "AA"	Die O.D.	8XXX-28XX	8XXX-38XX	8XXX-36TC	8XXX-SlugMagic
Thru .762	1-1/4	•	•	N/R	•
.763 - 1.450	2-1/8	•	•	N/R	•
1.451 - 2.012	2-3/4	•	•	N/R	•
2.013 - 3.012	3-3/4	•	•	N/R	•
3.013 - 4.012	4-3/4	•	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	N/R	•	•

SQUARE
w/RADIUS CORNERS

Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.438	I
1.439 - 2.000	II
2.001 - 3.000	III
3.001 - 4.000	III
4.001 - 5.000	III

Insert & Styles I, II, III = 8XXX-

Die Size "AA"	Die O.D.	8XXX-28XX	8XXX-38XX	8XXX-36TC	8XXX-SlugMagic
Thru .762	1-1/4	•	•	N/R	•
.763 - 1.450	2-1/8	•	•	N/R	•
1.451 - 2.012	2-3/4	•	•	N/R	•
2.013 - 3.012	3-3/4	•	•	N/R	•
3.013 - 4.012	4-3/4	•	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	N/R	•	•

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.

* 6-1/2" dies are a combination unit incorporating both die and die adapter. Not available where indicated (N/A).

With Online Ordering there is no need to confirm verbal orders with formal written purchase orders!

36TC™ Punches and Dies

For 645 ATC, 647 ATC, 3500 ATC, 3600 ATC and 3700 Series Machines

ROUND

Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 1.719	I
1.720 - 2.469	II
2.470 - 4.000	III
4.001 - 5.000	III

Insert = 3101- Styles I, II, III = 3601-

Die Size "A"	Die O.D.	6302-28XX	3402-34TC	3602-3702-	SX02-SlugMagic
Thru .824	1-1/4	N/R	•	N/R	•
.825 - 1.465	2-1/8	N/R	•	N/R	•
1.466 - 1.740	2-3/4	N/R	•	N/R	•
1.741 - 2.012	2-3/4	•	N/R	N/R	•
2.013 - 2.537	3-3/4	•	N/R	N/R	•
2.538 - 3.012	3-3/4	•	N/R	N/R	•
3.013 - 3.537	4-3/4	•	N/R	N/R	•
3.538 - 4.012	4-3/4	•	N/R	N/R	•
4.013 - 5.037	6-1/2*	N/A	N/R	•	•

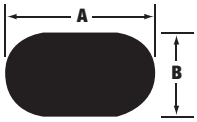
SQUARE

Punch Size "A"	Punch Style 36TC
Thru .530	Insert or I
.531 - 1.000	I
1.001 - 1.188	I
1.189 - 1.719	II
1.720 - 2.438	III
2.439 - 2.812	III
2.813 - 3.500	III

Insert = 3111- Styles I, II, III = 3611-

Die Size "A"	Die O.D.	3412-34TC	3612-3712-	SX12-SlugMagic
Thru .512	1-1/4	•	N/R	•
.513 - 1.012	2-1/8	•	N/R	•
1.013 - 1.418	2-3/4	•	N/R	•
1.419 - 2.137	3-3/4	•	N/R	•
2.138 - 2.824	4-3/4	•	N/R	•
2.825 - 3.537	6-1/2*	N/A	•	•

OBROUND

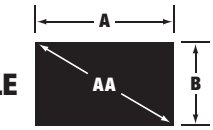


Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

Insert = 3121- Styles I, II, III = 3621-

Die Size "A"	Die O.D.	3422-34TC	3622-3722-	SX22-SlugMagic
Thru .824	1-1/4	•	N/R	•
.825 - 1.465	2-1/8	•	N/R	•
1.466 - 2.012	2-3/4	•	N/R	•
2.013 - 3.012	3-3/4	•	N/R	•
3.013 - 4.012	4-3/4	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	•	•

RECTANGLE



Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

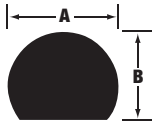
Insert = 3131- Styles I, II, III = 3631-

Die Size "AA"	Die O.D.	3432-34TC	3632-3732-	SX32-SlugMagic
Thru .762	1-1/4	•	N/R	•
.763 - 1.450	2-1/8	•	N/R	•
1.451 - 2.012	2-3/4	•	N/R	•
2.013 - 3.012	3-3/4	•	N/R	•
3.013 - 4.012	4-3/4	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	•	•

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.

* 6-1/2" dies are a combination unit incorporating both die and die adapter. Not available where indicated (N/A).

TYPE D

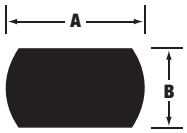


Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

Insert = 3161- Styles I, II, III = 3661-

Die Size "A"	Die O.D.	3462-34TC	3662-3762-	SX62-SlugMagic
Thru .824	1-1/4	•	N/R	•
.825 - 1.465	2-1/8	•	N/R	•
1.466 - 2.012	2-3/4	•	N/R	•
2.013 - 3.012	3-3/4	•	N/R	•
3.013 - 4.012	4-3/4	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	•	•

TYPE P



Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.469	III
3.470 - 4.000	III
4.001 - 5.000	III

Insert = 3151- Styles I, II, III = 3651-

Die Size "A"	Die O.D.	3452-34TC	3652-3752-	SX52-SlugMagic
Thru .824	1-1/4	•	N/R	•
.825 - 1.465	2-1/8	•	N/R	•
1.466 - 2.012	2-3/4	•	N/R	•
2.013 - 3.012	3-3/4	•	N/R	•
3.013 - 4.012	4-3/4	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	•	•

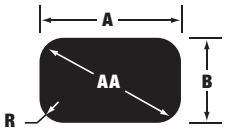
HEX

Punch Size "A"	Punch Style 36TC
Thru .649	Insert or I
.650 - 1.250	I
1.251 - 1.488	I
1.489 - 2.125	II
2.126 - 2.594	III
2.595 - 3.438	III
3.439 - 4.312	III

Insert = 3141- Styles I, II, III = 3641-

Die Size "A"	Die O.D.	3442-34TC	3642-3742-	SX42-SlugMagic
Thru .700	1-1/4	•	N/R	•
.701 - 1.262	2-1/8	•	N/R	•
1.263 - 1.731	2-3/4	•	N/R	•
1.732 - 2.606	3-3/4	•	N/R	•
2.607 - 3.474	4-3/4	•	N/R	•
3.475 - 4.349	6-1/2*	N/A	•	•

RECTANGLE
w/RADIUS CORNERS

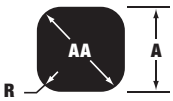


Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.438	I
1.439 - 2.000	II
2.001 - 3.000	III
3.001 - 4.000	III
4.001 - 5.000	III

Insert & Styles I, II, III = 8XXX-

Die Size "AA"	Die O.D.	8XXX-34TC	8XXX-36TC	8XXX-SlugMagic
Thru .762	1-1/4	•	N/R	•
.763 - 1.450	2-1/8	•	N/R	•
1.451 - 2.012	2-3/4	•	N/R	•
2.013 - 3.012	3-3/4	•	N/R	•
3.013 - 4.012	4-3/4	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	•	•

SQUARE
w/RADIUS CORNERS



Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.438	I
1.439 - 2.000	II
2.001 - 3.000	III
3.001 - 4.000	III
4.001 - 5.000	III

Insert & Styles I, II, III = 8XXX-

Die Size "AA"	Die O.D.	8XXX-34TC	8XXX-36TC	8XXX-SlugMagic
Thru .762	1-1/4	•	N/R	•
.763 - 1.450	2-1/8	•	N/R	•
1.451 - 2.012	2-3/4	•	N/R	•
2.013 - 3.012	3-3/4	•	N/R	•
3.013 - 4.012	4-3/4	•	N/R	•
4.013 - 5.037	6-1/2*	N/A	•	•

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.

* 6-1/2" dies are a combination unit incorporating both die and die adapter. Not available where indicated (N/A).

Online Ordering sends your order to manufacturing as soon as it is received. Your order is completed and shipped faster!

36TC™ Punches and Dies

For 647 Plus and 647 Plus II Machines

ROUND

Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 1.719	I
1.720 - 2.469	II
2.470 - 3.000	III

Insert = 3101- Styles I, II, III = 3601-

Die Size "A"	Die O.D.	6302-28XX	3602-36TC	3702-36TC	SX02-SlugMagic
Thru .824	1-1/4	N/R	•	•	•
.825 - 1.465	2-1/8	N/R	•	•	•
1.466 - 1.740	2-3/4	N/R	•	•	•
1.741 - 2.012	2-3/4	•	N/R	N/R	•
2.013 - 2.537	3-3/4	•	N/R	N/R	•
2.538 - 3.012	3-3/4	•	N/R	N/R	•

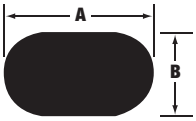
SQUARE

Punch Size "A"	Punch Style 36TC
Thru .530	Insert or I
.531 - 1.000	I
1.001 - 1.188	I
1.189 - 1.719	II
1.720 - 2.125	III

Insert = 3111- Styles I, II, III = 3611-

Die Size "A"	Die O.D.	6312-28XX	3812-38XX	3612-3712-	SX12-SlugMagic
Thru .512	1-1/4	•	•	N/R	•
.513 - 1.012	2-1/8	•	•	N/R	•
1.013 - 1.418	2-3/4	•	•	N/R	•
1.419 - 1.778	3-3/4	•	•	N/R	•
1.779 - 2.137	3-3/4	•	•	N/R	•

OBROUND

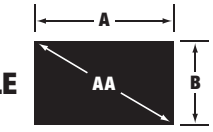


Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.000	III

Insert = 3121- Styles I, II, III = 3621-

Die Size "A"	Die O.D.	6322-28XX	3822-38XX	3622-3722-	SX22-SlugMagic
Thru .824	1-1/4	•	•	N/R	•
.825 - 1.465	2-1/8	•	•	N/R	•
1.466 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•

RECTANGLE



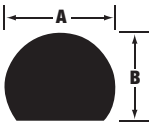
Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.000	III

Insert = 3131- Styles I, II, III = 3631-

Die Size "AA"	Die O.D.	6332-28XX	3832-38XX	3632-3732-	SX32-SlugMagic
Thru .762	1-1/4	•	•	N/R	•
.763 - 1.450	2-1/8	•	•	N/R	•
1.451 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.

TYPE D

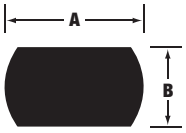


Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.000	III

Die Size "A"	Die O.D.	6362-28XX	3862-38XX	3662-3762-	SX62-SlugMagic
Thru .824	1-1/4	•	•	N/R	•
.825 - 1.465	2-1/8	•	•	N/R	•
1.466 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•

Insert = 3161- Styles I, II, III = 3661-

TYPE P



Punch Size "A"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.469	I
1.470 - 1.719	I
1.720 - 2.469	II
2.470 - 3.000	III

Die Size "A"	Die O.D.	6352-28XX	3852-38XX	3652-3752-	SX52-SlugMagic
Thru .824	1-1/4	•	•	N/R	•
.825 - 1.465	2-1/8	•	•	N/R	•
1.466 - 2.012	2-3/4	•	•	N/R	•
2.013 - 2.537	3-3/4	•	•	N/R	•
2.538 - 3.012	3-3/4	•	•	N/R	•

Insert = 3151- Styles I, II, III = 3651-

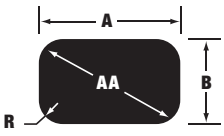
HEX

Punch Size "A"	Punch Style 36TC
Thru .649	Insert or I
.650 - 1.250	I
1.251 - 1.488	I
1.489 - 2.125	II
2.126 - 2.594	III

Die Size "A"	Die O.D.	6342-28XX	3842-38XX	3642-3742-	SX42-SlugMagic
Thru .700	1-1/4	•	•	N/R	•
.701 - 1.262	2-1/8	•	•	N/R	•
1.263 - 1.731	2-3/4	•	•	N/R	•
1.732 - 2.606	3-3/4	•	•	N/R	•

Insert = 3141- Styles I, II, III = 3641-

RECTANGLE
w/RADIUS CORNERS

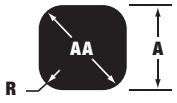


Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.438	I
1.439 - 2.000	II
2.001 - 3.000	III

Die Size "AA"	Die O.D.	8XXX-28XX	8XXX-38XX	8XXX-SlugMagic
Thru .762	1-1/4	•	•	•
.763 - 1.450	2-1/8	•	•	•
1.451 - 2.012	2-3/4	•	•	•
2.013 - 3.012	3-3/4	•	•	•

Insert & Styles I, II, III = 8XXX-

SQUARE
w/RADIUS CORNERS



Punch Size "AA"	Punch Style 36TC
Thru .750	Insert or I
.751 - 1.438	I
1.439 - 2.000	II
2.001 - 3.000	III

Die Size "AA"	Die O.D.	8XXX-28XX	8XXX-38XX	8XXX-SlugMagic
Thru .762	1-1/4	•	•	•
.763 - 1.450	2-1/8	•	•	•
1.451 - 2.012	2-3/4	•	•	•
2.013 - 3.012	3-3/4	•	•	•

Insert & Styles I, II, III = 8XXX-

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.

You can order spare parts via Online Ordering. Check Whitney's on-hand inventory and, if needed, lead times for your order!

44TC™ Punches and Dies

For 4400 MAX Machines

ROUND

Punch Size "A"	Punch Style 44TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 2.000	I
2.001 - 3.000	I

Insert = 3101- Style I = 4401-

Die Size "A"	Die O.D.	3602-36TC	3702-36TC	4402-44TC	SX02-SlugMagic
Thru .824	1-1/4	•	•	N/A	•
.825 - 1.465	2-1/8	•	•	N/A	•
1.466 - 2.012	2-3/4	•	•	•	•
2.013 - 3.012	3-3/4	•	•	•	•
3.013 - 3.082	4	3902-	4002-	•	•

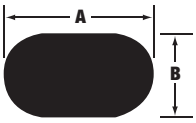
SQUARE

Punch Size "A"	Punch Style 44TC
Thru .530	Insert or I
.531 - .884	I
.885 - 1.414	I
1.415 - 2.121	I

Insert = 3111- Style I = 4411-

Die Size "A"	Die O.D.	3612-36TC	3712-36TC	4412-44TC	SX12-SlugMagic
Thru .512	1-1/4	•	•	N/A	•
.513 - 1.012	2-1/8	•	•	N/A	•
1.013 - 1.418	2-3/4	•	•	•	•
1.419 - 2.137	3-3/4	•	•	•	•
2.138 - 2.179	4	3912-	4012-	•	•

OBROUND

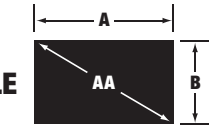


Punch Size "A"	Punch Style 44TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 2.000	I
2.001 - 3.000	I

Insert = 3121- Style I = 4421-

Die Size "A"	Die O.D.	3622-36TC	3722-36TC	4422-44TC	SX22-SlugMagic
Thru .824	1-1/4	•	•	N/A	•
.825 - 1.465	2-1/8	•	•	N/A	•
1.466 - 2.012	2-3/4	•	•	•	•
2.013 - 3.012	3-3/4	•	•	•	•
3.013 - 3.082	4	3922-	4022-	•	•

RECTANGLE



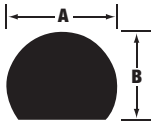
Punch Size "AA"	Punch Style 44TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 2.000	I
2.001 - 3.000	I

Insert = 3131- Style I = 4431-

Die Size "AA"	Die O.D.	3632-36TC	3732-36TC	4432-44TC	SX32-SlugMagic
Thru .762	1-1/4	•	•	N/A	•
.763 - 1.450	2-1/8	•	•	N/A	•
1.451 - 2.012	2-3/4	•	•	•	•
2.013 - 3.012	3-3/4	•	•	•	•
3.013 - 3.082	4	3932-	4032-	•	•

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.
3) 2-1/8" O.D. dies limited to 60 tons.

TYPE D

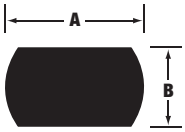


Punch Size "A"	Punch Style 44TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 2.000	I
2.001 - 3.000	I

Insert = 3161- Style I = 4461-

Die Size "A"	Die O.D.	3662-36TC	3762-36TC	4462-44TC	SX62-SlugMagic
Thru .824	1-1/4	•	•	N/A	•
.825 - 1.465	2-1/8	•	•	N/A	•
1.466 - 2.012	2-3/4	•	•	•	•
2.013 - 3.012	3-3/4	•	•	•	•
3.013 - 3.082	4	3962-	4062-	•	•

TYPE P



Punch Size "A"	Punch Style 44TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 2.000	I
2.001 - 3.000	I

Insert = 3151- Style I = 4451-

Die Size "A"	Die O.D.	3652-36TC	3752-36TC	4452-44TC	SX52-SlugMagic
Thru .824	1-1/4	•	•	N/A	•
.825 - 1.465	2-1/8	•	•	N/A	•
1.466 - 2.012	2-3/4	•	•	•	•
2.013 - 3.012	3-3/4	•	•	•	•
3.013 - 3.082	4	3952-	4052-	•	•

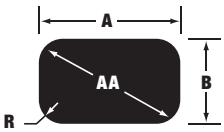
HEX

Punch Size "A"	Punch Style 44TC
Thru .649	Insert or I
.650 - 1.083	I
1.084 - 1.732	I
1.733 - 2.598	I

Insert = 3141- Style I = 4441-

Die Size "A"	Die O.D.	3642-36TC	3742-36TC	4442-44TC	SX42-SlugMagic
Thru .700	1-1/4	•	•	N/A	•
.701 - 1.262	2-1/8	•	•	N/A	•
1.263 - 1.731	2-3/4	•	•	•	•
1.732 - 2.606	3-3/4	•	•	•	•
2.607 - 2.669	4	3942-	4042-	•	•

RECTANGLE
w/RADIUS CORNERS



Punch Size "AA"	Punch Style 44TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 2.000	I
2.001 - 3.000	I

Insert & Style I = 8XXX-

Die Size "AA"	Die O.D.	8XXX-36 Style	8XXX-37 Style	8XXX-44 Style	8XXX-SlugMagic
Thru .762	1-1/4	•	•	N/A	•
.763 - 1.450	2-1/8	•	•	N/A	•
1.451 - 2.012	2-3/4	•	•	•	•
2.013 - 3.012	3-3/4	•	•	•	•
3.013 - 3.082	4	39 Style	40 Style	•	•

SQUARE
w/RADIUS CORNERS

Punch Size "AA"	Punch Style 44TC
Thru .750	Insert or I
.751 - 1.250	I
1.251 - 2.000	I
2.001 - 3.000	I

Insert & Style I = 8XXX-

Die Size "AA"	Die O.D.	8XXX-36 Style	8XXX-37 Style	8XXX-44 Style	8XXX-SlugMagic
Thru .762	1-1/4	•	•	N/A	•
.763 - 1.450	2-1/8	•	•	N/A	•
1.451 - 2.012	2-3/4	•	•	•	•
2.013 - 3.012	3-3/4	•	•	•	•
3.013 - 3.082	4	39 Style	40 Style	•	•

Notes: 1) SlugMagic™ dies used with flat faced punches only.
2) 1-1/4" O.D. dies limited to 40 tons.
3) 2-1/8" O.D. dies limited to 60 tons.

Calculating Tonnage Requirements

To determine the tonnage needed to punch a single hole with a flat faced punch:

- Calculate the Hole Perimeter using the formulas on page 23.
- Find the Material Shear Strength on the table on page 23.
- Then use the following equation:

Flat Face Punch Force (lbs.) = Punch Perimeter (inches) x Material Thickness (inches) x Material Shear Strength (lbs./in^2)

To change from pounds of punch force to tons of punch force use the following equation: tons = lbs/2000

Example: To punch a 1/4" square hole in 3/16" stainless steel

4(1/4") x 3/16" x 70,000 lbs/in^2 = 13,125 lbs (6.56 tons) of punching force.

Note: Tonnage to punch a hole is reduced when the punch has shear. To find actual punch force needed (for round holes only) find the shear factor on page 24 and use the following formula:

Actual Punch Force with Shear (lbs. or tons) = Flat Face Punch Force (lbs. or tons) x Shear Factor

28XX™ punches up thru 1.453" diameter have no shear; 1.454" thru 5.000" diameter have 1/8" shear.

36TC™ punches up thru 1.719" diameter have no shear; 1.720" thru 2.469" have 1/4" shear; 2.470" thru 5.000" have 7/16 shear.

44TC™ punches have no shear.

(For Shear Factor on other shapes contact Whitney.)

Tonnage Requirements for Round Holes in Mild Steel

HOLE DIA (INCHES)	20 GA .0359	18 GA 0.0478	16 GA 0.0598	14 GA 0.0747	12 GA 0.1046	11 GA 0.1196	10 GA 0.1345	3/16 0.1875	1/4 0.2500	5/16 0.3125	3/8 0.3750	1/2 0.5000	5/8 0.6250	3/4 0.7500	7/8 0.8750	1 1.0000
1/8	0.35	0.47	0.59	0.73	1.0	1.2										
3/16	0.53	0.70	0.88	1.1	1.5	1.8	2.0	2.8								
1/4	0.70	0.94	1.2	1.5	2.1	2.3	2.6	3.7	4.9							
5/16	0.88	1.2	1.5	1.8	2.6	2.9	3.3	4.6	6.1	7.7						
3/8	1.06	1.4	1.8	2.2	3.1	3.5	4.0	5.5	7.4	9.2	11.0					
7/16	1.23	1.6	2.1	2.6	3.6	4.1	4.6	6.4	8.6	10.7	12.9	17.2				
1/2	1.41	1.9	2.3	2.9	4.1	4.7	5.3	7.4	9.8	12.3	14.7	19.6				
9/16	1.59	2.1	2.6	3.3	4.6	5.3	5.9	8.3	11.0	13.8	16.6	22.1	27.6			
5/8	1.76	2.3	2.9	3.7	5.1	5.9	6.6	9.2	12.3	15.3	18.4	24.5	30.7			
11/16	1.94	2.6	3.2	4.0	5.6	6.5	7.3	10.1	13.5	16.9	20.2	27.0	33.7	40.5		
3/4	2.11	2.8	3.5	4.4	6.2	7.0	7.9	11.0	14.7	18.4	22.1	29.5	36.8	44.2		
13/16	2.29	3.1	3.8	4.8	6.7	7.6	8.6	12.0	16.0	19.9	23.9	31.9	39.9	47.9	55.8	
7/8	2.47	3.3	4.1	5.1	7.2	8.2	9.2	12.9	17.2	21.5	25.8	34.4	43.0	51.5	60.1	68.7
15/16	2.64	3.5	4.4	5.5	7.7	8.8	9.9	13.8	18.4	23.0	27.6	36.8	46.0	55.2	64.4	73.6
1.00	2.82	3.8	4.7	5.9	8.2	9.4	10.6	14.7	19.6	24.5	29.5	39.3	49.1	58.9	68.7	78.5
1.50	4.23	5.6	7.0	8.8	12.3	14.1	15.8	22.1	29.5	36.8	44.2	58.9	73.6	88.4	103	118
2.00	5.64	7.5	9.4	11.7	16.4	18.8	21.1	29.5	39.3	49.1	58.9	78.5	98.2	118	137	157
2.50	7.05	9.4	11.7	14.7	20.5	23.5	26.4	36.8	49.1	61.4	73.6	98.2	123	147	172	196
3.00	8.46	11.3	14.1	17.6	24.6	28.2	31.7	44.2	58.9	73.6	88.4	118	147	177	206	236
3.50	9.87	13.1	16.4	20.5	28.8	32.9	37.0	51.5	68.7	85.9	103	137	172	206	241	275
4.00	11.28	15.0	18.8	23.5	32.9	37.6	42.3	58.9	78.5	98.2	118	157	196	236	275	314
4.50	12.69	16.9	21.1	26.4	37.0	42.3	47.5	66.3	88.4	110	133	177	221	265	309	353
5.00	14.10	18.8	23.5	29.3	41.1	47.0	52.8	73.6	98.2	123	147	196	245	295	344	393

Single Hole Punching—When using a press for single round hole punching, refer to the chart above to determine the amount of force (tonnage) required to pierce a given hole. This chart is based on punching mild steel—50,000 PSI shear strength using flat face punches only.

Example: To pierce a 15/16" diameter hole through 10 gauge mild steel, the force required would be 9.9 tons.

Formulas for Calculating the Perimeter of Standard Shapes

Round
P = 3.142(A)

Square
P = 4(A)

Obround
P = 1.142(B) + 2(A)

Rectangle
P = 2(A) + 2(B)

Hexagon
P = 3.465(A)

Square with radius corners
P = 4(A) - 1.717(R)

Rectangle with radius corners
P = 2(A) + 2(B) - 1.717(R)

Average Shear Strength of Materials (pounds per square inch)

Material	Shear Strength (PSI)	Chart Multiplier
Aluminum		
1100-0	9,500	.19
1100-H14	11,000	.22
3003-H14	14,000	.28
2024-T4	44,000	.88
5005-H18	19,000	.38
6063-T5	18,000	.36
6061-T4	24,000	.48
6061-T6	29,000	.58
7075-T6	54,000	1.08
Brass		
Rolled Sheet (Soft)	42,000	.84
1/2 Hard	56,000	1.12
Hard	68,000	1.36
Copper		
1/4 Hard	29,000	.58
Hard	43,000	.86

Material	Shear Strength (PSI)	Chart Multiplier
Steel		
Mild Steel	50,000	1.00
Boiler Plate	55,000	1.10
Cold Drawn	60,000	1.20
40-50 Carbon	74,000	1.48
Structural A-36	60,000	1.20
Structural EX-TEN		
(ASTM-A572) – Grade 42	50,000	1.00
Grade 45	50,000	1.00
Grade 50	55,000	1.10
Grade 55	60,000	1.20
Grade 60	65,000	1.30
Grade 65	70,000	1.40
Structural COR-TEN		
(ASTM-A242)	60,000	1.20
Cold Rolled C-1018	60,000	1.20
Hot Rolled C-1050	125,000	2.50
Hot Rolled C-1095	125,000	2.50
Hot Rolled C-1095 Annealed	90,000	1.80
Stainless 302 Annealed	70,000	1.40
Stainless 304 Cold Rolled	70,000	1.40
Stainless 316 Cold Rolled	70,000	1.40
Steel, Abrasion Resisting	110,000	2.20
ASTM A656 – Grade 80	85,000	1.70

Chart Multiplier
For piercing materials with a different shear strength than 50,000 psi it is necessary to use a multiplier for calculating the proper amount of force required to punch the hole.

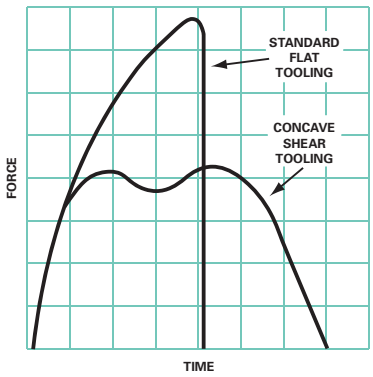
Example: To pierce a 15/16" diameter hole through 10 gage stainless steel (70,000 psi shear strength) the force required (from the table on page 22) is 9.9 tons. The multiplier is 1.4—therefore, 9.9 tons x 1.4 = 13.9 tons actual force.

These are average values only. Actual shear strength can be higher depending on actual tensile and yield strengths of material batch. Consult Whitney engineers with any punching problems.

Round Punches with Concave Shear

Use of shear can increase tonnage capability of press...

There are times when fabricating shops need to perform jobs that are beyond the tonnage capacities of their equipment. The use of concave shear punches can provide a solution. Special high capacity tooling can eliminate the need to purchase a larger and more expensive press for short-run production work. A concave ground punch can increase the tonnage capabilities of a hydraulic press between two and three times. 28XX™ or 34- style dies are used with the concave shear punches.

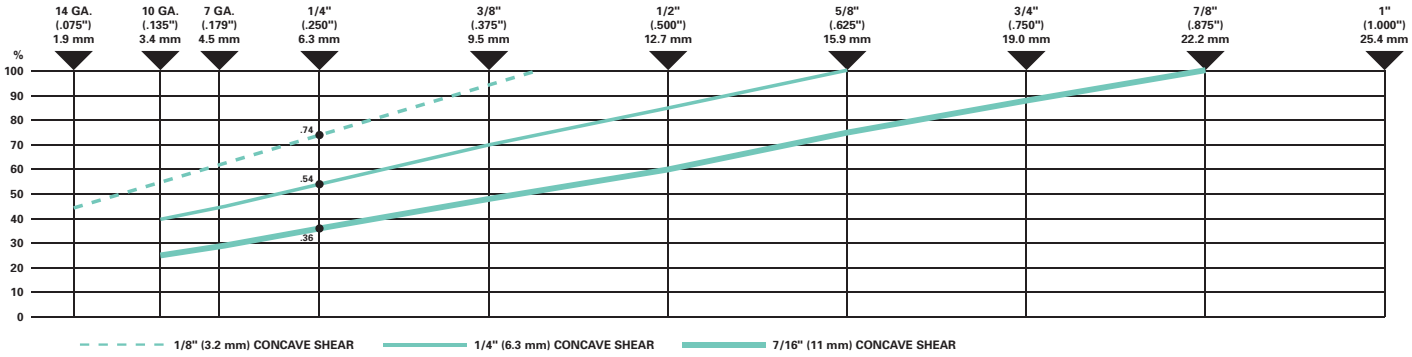


The force-energy curves above show the reduced force at a given time required when using flat versus concave ground tooling. The amount of energy within each curve is the same. The significant factors, when using hydraulic presses, are reduction in total force at any time, plus the gradual releasing of the force at breakthrough. Less friction means longer tool life.

Shear Factor Table for Round Punches

Thickness	Flat	1/8" Shear Factor	1/4" Shear Factor	7/16" Shear Factor
.135" (3.4 mm)	1	.55	.40	.25
.187" (5.0 mm)	1	.64	.45	.29
.250" (6.0 mm)	1	.74	.54	.36
.313" (8.0 mm)	1	.84	.64	.43
.375" (10.0 mm)	1	.95	.70	.48
.500" (12.0 mm)	1	1.00	.85	.60
.625" (16.0 mm)	1	1.00	1.00	.75
.750" (18.0 mm)	1	1.00	1.00	.88
.875" (22 0 mm)	1	1.00	1.00	1.00
1.00" (25.0 mm)	1	1.00	1.00	1.00

Shear Effectiveness Graph—Round Holes



To use the shear effectiveness graph:

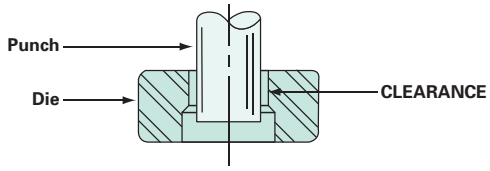
Determine required tonnage from chart on page 22; multiply this figure by percentage shown on the graph or value in Shear Factor Table.

Example: To punch a 4" diameter hole through 1/4" thick mild steel (50,000 PSI shear strength)

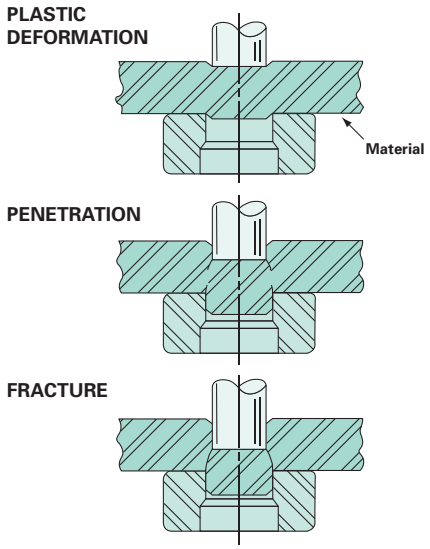
No Shear = 78.5 Tons (from chart on page 22)
1/8" Shear = 78.5 x .74 = 58.1 tons (requires 60 ton press)
1/4" Shear = 78.5 x .54 = 42.4 tons (requires 46 ton press)
7/16" Shear = 78.5 x .36 = 28.3 tons (requires 30 ton press)

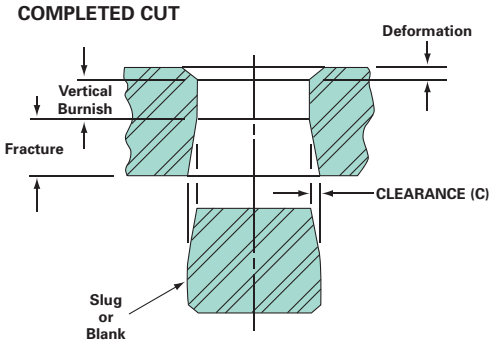
Determining Die Clearance

To receive optimum performance from a punch and die, the proper clearance must be provided in the die depending on the material to be pierced. The quality of the cut is determined by the amount of clearance between the opposing cutting edges of the punch and die.

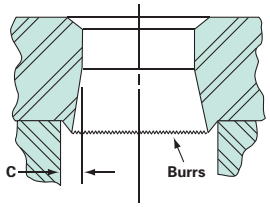


Without proper clearance, material will not fracture cleanly and excess punching pressures will result. The progressive stages of shear cutting are shown below:

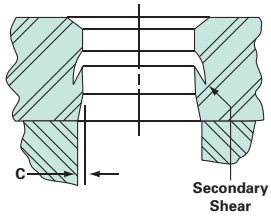




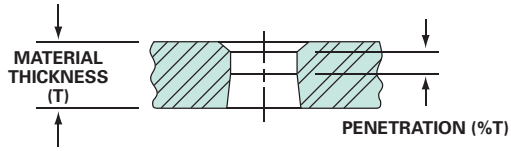
Excessive clearance between the cutting edges causes deformation of the hole, large burrs and a high angle of fracture.



Insufficient clearance shortens tool life and causes a fracture line or "secondary shear" in the material. Dull tools will create the same effect of too small a clearance, as well as burrs.



Proper clearance may be defined as that clearance which causes no secondary shear and a minimum plastic deformation and burr. Proper clearance, and the amount of punch penetration required, varies with the thickness and hardness of the material being pierced. No formula or tables are available which give exact clearances, but the percentages shown in the following charts have worked well on short run punching where it is important to select standard dies for punching a range of material types and thicknesses.



MATERIAL	%T	MATERIAL	%T
Aluminum	60	Steel, 0.10C Annl'd	50
Copper	55	Cold Rolled	38
Nickel	55	Steel, 0.30C Annl'd	33
Brass	50	Cold Rolled	22
Bronze	25	Silicon Steel	30

TYPE OF MATERIAL	% OVERALL CLEARANCE MIN.	BEST	MAX.
Aluminum, Soft	10	13	16
Brass, 1/2 Hard	10	13	16
Copper, 1/2 Hard	10	13	16
Mild Steel	12	16	20
Steel 0.50C	12	16	20
Stainless Steel	12	16	20

Related Topics
- How to Order .....p. 4
- Whitney Punch Styles .....p. 6
- Whitney Die Styles .....p. 10

With a few simple questions the Online Ordering Tooling Configurator provides the correct tool and die set for your application!

Determining Clearance

Whitney defines clearance as the total overall clearance, not side clearance. Clearance is a percentage of material thickness. Use the table below to determine appropriate clearance.

Clearance Table for Standard Inch Sizes

MATERIAL THICKNESS		12% MIN	14%	16% BEST	18%	20% MAX
20 GA	0.0359	0.0043	0.0050	0.0057	0.0065	0.0072
19 GA	0.0418	0.0050	0.0059	0.0067	0.0075	0.0084
18 GA	0.0478	0.0057	0.0067	0.0076	0.0086	0.0096
17 GA	0.0538	0.0065	0.0075	0.0086	0.0097	0.0108
16 GA	0.0598	0.0072	0.0084	0.0096	0.0108	0.0120
15 GA	0.0673	0.0081	0.0094	0.0108	0.0121	0.0135
14 GA	0.0747	0.0090	0.0105	0.0120	0.0134	0.0149
13 GA	0.0897	0.0108	0.0126	0.0144	0.0161	0.0179
12 GA	0.1046	0.0126	0.0146	0.0167	0.0188	0.0209
11 GA	0.1196	0.0144	0.0167	0.0191	0.0215	0.0239
1/8	0.1250	0.0150	0.0175	0.0200	0.0225	0.0250
10 GA	0.1345	0.0161	0.0188	0.0215	0.0242	0.0269
9 GA	0.1495	0.0179	0.0209	0.0239	0.0269	0.0299
8 GA	0.1644	0.0197	0.0230	0.0263	0.0296	0.0329
7 GA	0.1793	0.0215	0.0251	0.0287	0.0323	0.0359
3/16	0.1875	0.0225	0.0263	0.0300	0.0338	0.0375
6 GA	0.1943	0.0233	0.0272	0.0311	0.0350	0.0389
5 GA	0.2092	0.0251	0.0293	0.0335	0.0377	0.0418
4 GA	0.2242	0.0269	0.0314	0.0359	0.0404	0.0448
3 GA	0.2391	0.0287	0.0335	0.0383	0.0430	0.0478
1/4	0.2500	0.0300	0.0350	0.0400	0.0450	0.0500
5/16	0.3125	0.0375	0.0438	0.0500	0.0563	0.0625
3/8	0.3750	0.0450	0.0525	0.0600	0.0675	0.0750
7/16	0.4375	0.0525	0.0613	0.0700	0.0788	0.0875
1/2	0.5000	0.0600	0.0700	0.0800	0.0900	0.1000
5/8	0.6250	0.0750	0.0875	0.1000	0.1125	0.1250
3/4	0.7500	0.0900	0.1050	0.1200	0.1350	0.1500
7/8	0.8750	0.1050	0.1225	0.1400	0.1575	0.1750
1	1.0000	0.1200	0.1400	0.1600	0.1800	0.2000

Whitney recommends 15% to 17% clearance for all general purpose punching applications.

- Punching holes with 12%-14% clearance will produce good hole quality but shorten punch life.
- Punching holes with 18%-20% clearance will extend punch life but holes will have greater breakout and burrs.
- Punching outside the range of 12%-20% clearance is not recommended.

Clearance Table for Standard Metric Sizes

MATERIAL THICKNESS METRIC	MATERIAL THICKNESS INCH EQUIV.	12% MIN	14%	16% BEST	18%	20% MAX
1.00	0.0394	0.12	0.14	0.16	0.18	0.20
1.25	0.0492	0.15	0.18	0.20	0.23	0.25
1.50	0.0591	0.18	0.21	0.24	0.27	0.30
2.00	0.0787	0.24	0.28	0.32	0.36	0.40
2.50	0.0984	0.30	0.35	0.40	0.45	0.50
3.00	0.1181	0.36	0.42	0.48	0.54	0.60
4.00	0.1575	0.48	0.56	0.64	0.72	0.80
5.00	0.1969	0.60	0.70	0.80	0.90	1.00
6.00	0.2362	0.72	0.84	0.96	1.08	1.20
7.00	0.2756	0.84	0.98	1.12	1.26	1.40
8.00	0.3150	0.96	1.12	1.28	1.44	1.60
9.00	0.3543	1.08	1.26	1.44	1.62	1.80
10.00	0.3937	1.20	1.40	1.60	1.80	2.00
12.00	0.4724	1.44	1.68	1.92	2.16	2.40
15.00	0.5906	1.80	2.10	2.40	2.70	3.00
18.00	0.7087	2.16	2.52	2.88	3.24	3.60
20.00	0.7874	2.40	2.80	3.20	3.60	4.00
22.00	0.8661	2.64	3.08	3.52	3.96	4.40
25.00	0.9843	3.00	3.50	4.00	4.50	5.00

Related Topics
- How to Order .....p. 4
- Whitney Punch Styles .....p. 6
- Whitney Die Styles .....p. 10

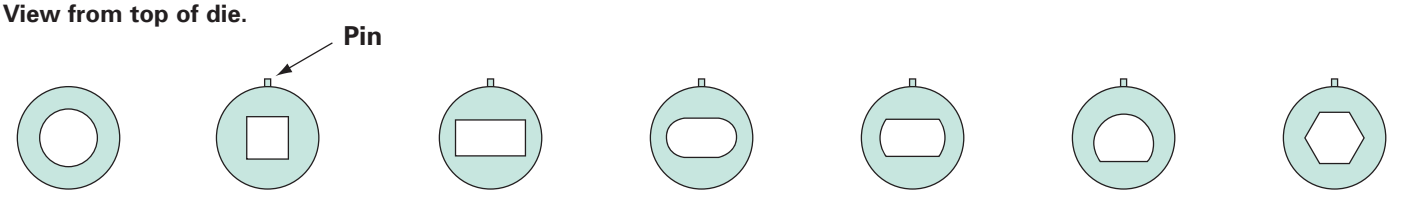
Online Ordering is a great LEAN tool that allows shop personnel to order tooling immediately—without paperwork delays!

Orientations and Pin Locations

All shaped punches and dies are pinned for 0° and 90° positioning. Pin locations are shown for standard shapes. Other pin locations may be specified, at additional cost, when ordering. Use the three step procedure shown here to determine the proper degree of location for a custom pin location.

Pin Locations for Standard Shapes

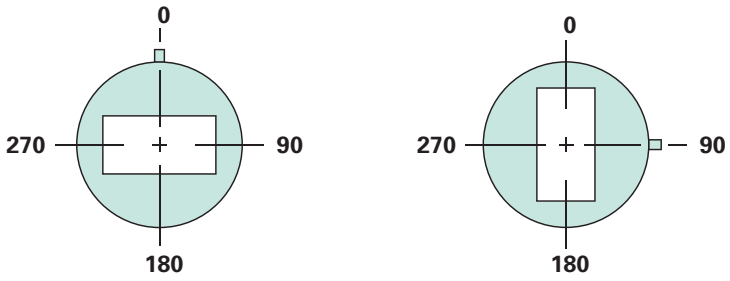
View from top of die.



Round No Pin | **Square** | **Rectangle** | **Obround** | **Type "P"** | **Type "D"** | **Hexagon**

Standard Shaped Dies—Orientations in Machine

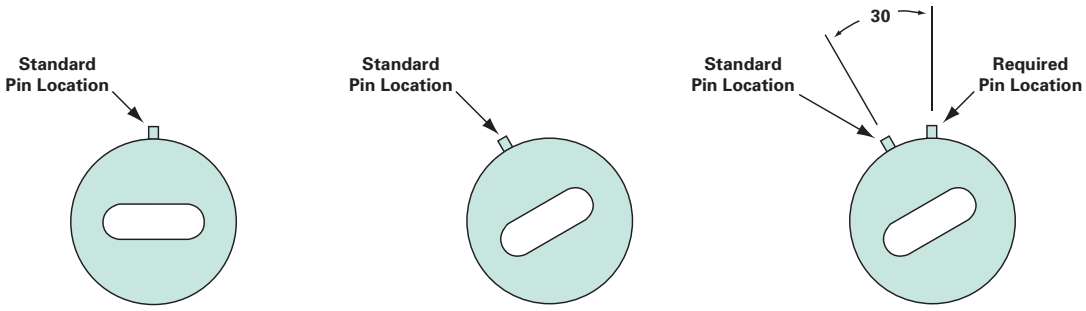
View from top of die.



Tool Load Position | **Tool Load Position**

Determining Custom Pin Location

View from top of die.



1. Determine pin location of standard die.

2. Rotate to desired location.

3. Determine angle from standard location to required location (clockwise is positive).

Sequence Punching

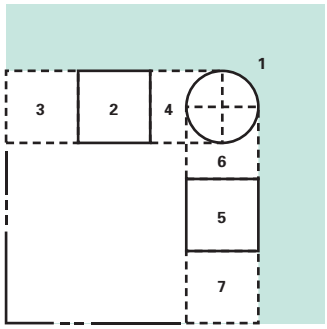
Avoid Off-Center Loading

To avoid off center loading on the punch and minimize the possibility of "shearing" the punch into the die, always stagger full punch areas and keep any areas that are less in size than the width or length of the punch in the center area of the punch when performing a punch operation.

Easy Corner Notching

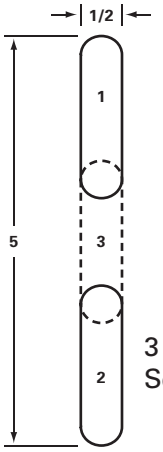
When punching the corner of a piece part, the following punching sequence may be used:

1. Punch a 1" diameter round hole;
2. Change to a 1" standard or shearproof square punch;
3. Proceed as shown in the illustration.



Slotting Sequences

Please note that the punching sequence is programmed to use punch to cut on material centers.



3 Hit Sequence

This slotting operation requires the use of a 1/2" x 2" obround punch and die.

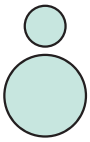
5 Hit Sequence

This operation requires the use of a 1/2" x 1-1/4" obround punch and die.

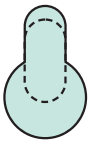
Making Keyhole Shapes

Keyhole shapes can be made in either of the following ways:

1. Punch large round hole;

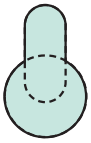


2. Punch small round hole;



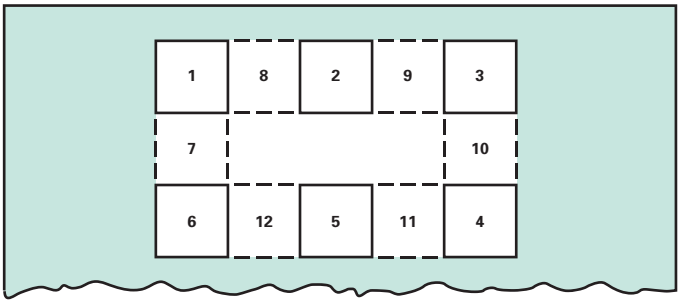
3. Use obround punch to complete cut.

1. Punch obround hole;

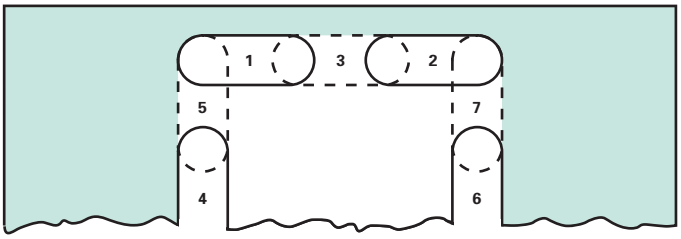


2. Punch overlapping round hole.

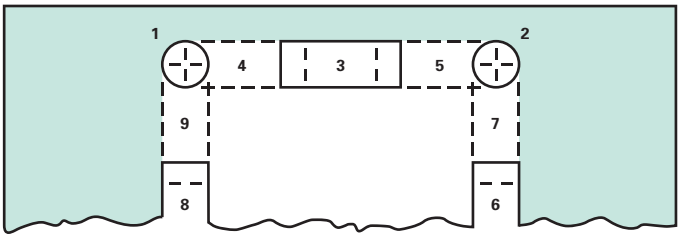
Making Large Cutouts



A 1-1/2" square punch and die is used to cut out this 7-1/2" x 4-1/2" hole from the center of a piece part.



Punching sequence using obround tooling.



This operation utilizes round and rectangular punch and die sets.

With Whitney's Online Ordering your order receives immediate attention—no need to wait for faxes to go through!

Table of Diagonals (Squares and Rectangles)

	1/8	5/32	3/16	7/32	1/4	9/32	5/16	11/32	3/8	13/32	7/16	15/32	1/2
1/8	.1767	.2001	.2253	.2519	.2795	.3077	.3365	.3657	.3953	.4250	.4550	.4851	.5153
5/32	.2001	.2209	.2440	.2689	.2948	.3217	.3494	.3775	.4062	.4352	.4645	.4941	.5240
3/16	.2253	.2440	.2651	.2881	.3125	.3378	.3644	.3914	.4192	.4474	.4759	.5048	.5340
7/32	.2519	.2689	.2881	.3093	.3322	.3563	.3814	.4074	.4340	.4614	.4891	.5172	.5458
1/4	.2795	.2948	.3125	.3322	.3535	.3763	.4001	.4250	.4507	.4770	.5035	.5312	.5591
9/32	.3077	.3217	.3378	.3563	.3763	.3977	.4204	.4441	.4687	.4941	.5201	.5467	.5737
5/16	.3365	.3494	.3644	.3814	.4001	.4204	.4419	.4645	.4881	.5125	.5376	.5633	.5897
11/32	.3657	.3775	.3914	.4074	.4250	.4441	.4645	.4861	.5067	.5321	.5564	.5812	.6067
3/8	.3953	.4062	.4192	.4340	.4507	.4687	.4881	.5087	.5303	.5528	.5762	.6003	.6250
13/32	.4250	.4352	.4474	.4614	.4770	.4941	.5125	.5321	.5528	.5745	.5570	.6203	.6442
7/16	.4550	.4645	.4759	.4891	.5035	.5201	.5376	.5564	.5762	.5970	.6187	.6412	.6644
15/32	.4851	.4941	.5048	.5172	.5312	.5467	.5633	.5812	.6003	.6203	.6412	.6629	.6854
1/2	.5153	.5240	.5340	.5458	.5591	.5737	.5897	.6067	.6250	.6442	.6644	.6854	.7071

Note:

For square sizes not shown, multiply square size x 1.414

For rectangular sizes not shown:

$$\text{Rect} = \sqrt{a^2 + b^2}$$

	17/32	9/16	19/32	5/8	21/32	11/16	23/32	3/4	25/32	13/16	27/32	7/8	29/32	15/16	31/32	1
1/8	.5457	.5762	.6067	.6373	.6680	.6987	.7295	.7603	.7911	.8220	.8529	.8839	.9148	.9458	.9768	1.0078
5/32	.5537	.5538	.6139	.6442	.6746	.7050	.7355	.7661	.7967	.8274	.8581	.8888	.9196	.9504	.9812	1.0121
3/16	.5633	.5929	.6226	.6525	.6825	.7126	.7428	.7731	.8034	.8339	.8643	.8948	.9254	.9560	.9867	1.0174
7/32	.5745	.6035	.6327	.6622	.6918	.7215	.7513	.7812	.8113	.8414	.8716	.9019	.9323	.9827	.9931	1.0236
1/4	.5871	.6155	.6442	.6731	.7022	.7315	.7610	.7906	.8203	.8501	.8800	.9100	.9401	.9703	1.0000	1.0307
9/32	.6011	.6289	.6570	.6853	.7140	.7428	.7718	.8010	.8303	.8598	.8894	.9191	.9488	.9788	1.0087	1.0387
5/16	.6163	.6434	.6709	.6987	.7268	.7552	.7837	.8125	.8414	.8705	.8997	.9291	.9586	.9882	1.0179	1.0477
11/32	.6327	.6592	.6861	.7133	.7408	.7686	.7967	.8250	.8535	.8822	.9111	.9401	.9692	.9985	1.0279	1.0574
3/8	.6503	.6760	.7022	.7288	.7558	.7831	.8107	8385	.8666	.8948	.9233	.9519	.9808	1.0097	1.0387	1.0680
13/32	.6688	.6938	.7194	.7454	.7718	.7985	.8256	.8529	.8805	.9084	.9364	.9647	.9931	1.0217	1.0506	1.0794
7/16	.6882	.7126	.7375	.7629	.7887	.8149	.8414	.8682	.8954	.9228	.9504	.9783	1.0063	1.0345	1.0629	1.0915
15/32	.7085	.7322	.7565	.7812	.8064	.8321	.8581	.8844	.9111	.9380	.9852	.9926	1.0203	1.0481	1.0762	1.1044
1/2	.7295	.7526	.7763	.8004	.8250	.8501	.8756	.9014	.9275	.9540	.9808	1.0077	1.0350	1.0625	1.0802	1.1180

	17/32	9/16	19/32	5/8	21/32	11/16	23/32	3/4	25/32	13/16	27/32	7/8	29/32	15/16	31/32	1
17/32	.7513	.7737	.7967	.8203	.8443	.8688	.8938	.9191	.9447	.9707	.9971	1.0236	1.0505	1.0775	1.1048	1.1323
9/16	.7737	.7955	.8179	.8408	.8643	.8883	.9127	.9375	.9627	.9882	1.0141	1.0402	1.0688	1.0933	1.1202	1.1473
19/32	.7967	.8179	.8397	.8620	.8850	.9084	.9323	.9566	.9813	1.0063	1.0317	1.0574	1.0834	1.1097	1.1362	1.1630
5/8	.8203	.8408	.8620	.8839	.9062	.9291	.9525	.9763	1.0005	1.0251	1.0500	1.0753	1.1009	1.1267	1.1529	1.1792
21/32	.8443	.8643	.8850	.9082	.9281	.9604	.9733	.9985	1.0203	1.0444	1.0889	1.0937	1.1189	1.1443	1.1701	1.1981
11/16	.8688	.8883	.9084	.9281	.9504	.9723	8946	1.0174	1.0407	1.0643	1.0884	1.1126	1.1375	1.1625	1.1879	1.2135
29/32	.8938	.9127	.9323	.9625	.9733	.9946	1.0164	1.0388	1.0618	1.0848	1.1084	1.1324	1.1566	1.1813	1.2062	1.2315
3/4	.9191	.9375	.9566	.9763	.9965	1.0174	1.0388	1.0606	1.0829	1.1057	1.1289	1.1524	1.1763	1.2006	1.2251	1.2500
25/32	.9447	.9627	.9813	1.0005	1.0203	1.0407	1.0616	1.0829	1.1048	1.1271	1.1499	1.1730	1.1965	1.2203	1.2445	1.2690
13/16	.9707	.9882	1.0063	1.0251	1.0444	1.0643	1.0848	1.1057	1.1271	1.1490	1.1713	1.1941	1.2171	1.2406	1.2644	1.2884
27/32	.9971	1.0141	1.0317	1.0500	1.0689	1.0884	1.1084	1.1289	1.1499	1.1713	1.1932	1.2155	1.2382	1.2613	1.2847	1.3084
7/8	1.0236	1.0402	1.0574	1.0753	1.0937	1.1128	1.1324	1.1524	1.1730	1.1941	1.2155	1.2374	1.2597	1.2824	1.3054	1.3287
29/32	1.0505	1.0686	1.0834	1.1009	1.1189	1.1375	1.1566	1.1763	1.1965	1.2171	1.2382	1.2597	1.2818	1.3039	1.3265	1.3495
15/16	1.0775	1.0933	1.1097	1.1267	1.1443	1.1625	1.1813	1.2006	1.2203	1.2406	1.2613	1.2824	1.3039	1.3258	1.3481	1.3707
31/32	1.1048	1.1202	1.1362	1.1529	1.1701	1.1878	1.2062	1.2251	1.2445	1.2644	1.2847	1.3054	1.3265	1.3481	1.3700	1.3923
1"	1.1323	1.1478	1.1630	1.1792	1.1961	1.2135	1.2315	1.2500	1.2690	1.2884	1.3084	1.3287	1.3495	1.3707	1.3923	1.4142

Punch and Die Regrinding

Increase tooling life, cut downtime and reduce tooling costs by resharpening tools. Guidelines show maximum grind life.

Tool Series *01 = Inch, 05 = Metric*	Diameter *Inch (mm)*	Length of New Tool *Inch (mm)*	Grind Life *Inch (mm)*	Sensing Hole Depth
INSERT PUNCHES				
3101 3105	.125" - .750" (3.18 - 19.05)	1.683" (42.75)	.188" (4.77)	NA NA
FULL BODY FLAT FACE PUNCHES				
3601 3605 4401 4405	.125" - 1.719" (3.18 - 43.66) .125" - 3.000" (3.18 - 76.20)	4.245" (107.82) 4.505 (114.43)	.438" (11.12) .438 (11.12)	.500" (12.70) .500" (12.70)
FULL BODY WITH 1/4" (6 mm) SHEAR PUNCHES				
3601 3605	1.720" - 2.469" (43.69 - 62.71)	4.205" (106.81)	.188" (4.77)	.210" (5.33)
FULL BODY WITH 7/16" (11 mm) SHEAR PUNCHES				
3601 3605	2.470" - 5.000" (62.74 - 127.00)	4.205" (106.81)	0 (0)	.060" (1.52)

For 28XX punches: Straight Before Radius (SBR) changes per punch point diameter—from 1/4" to 3/4".
For 36TC punches: Length to be held after regrind from bottom of sensing hole to cutting edge of punch is 3.745".
For 44TC punches: Length to be held after regrind from bottom of sensing hole to cutting edge of punch is 4.005".

When regrinding: Material thickness, SBR and depth that punch enters into die must be considered.

Tool Series *02 = Inch, 06 = Metric*	Length of New Tool *Inch (mm)*	Grind Life *Inch (mm)*
ROUND DIES 1-1/4" (31.75 mm) OD		
34 Style 3402 (3406)	.620" (15.75)	.040" (1.02)
36 Style 3602 (3606)	.620" (15.75)	.040" (1.02)
37 Style 3702 (3706)	.620" (15.75)	.090" (2.29)
ROUND DIES 2-1/8" (53.98 mm) OD		
34 Style 3402 (3406)	.880" (22.35)	.060" (1.52)
36 Style 3602 (3606)	.880" (22.35)	.040" (1.02)
37 Style 3702 (3706)	.880" (22.35)	.090" (2.29)
ROUND DIES 2-3/4" (69.85 mm) OD		
34 Style 3402 (3406)	1.160" (29.46)	.060" (1.52)
36 Style 3602 (3606)	1.160" (29.46)	.040" (1.02)
37 Style 3702 (3706)	1.160" (29.46)	.090" (2.29)
28XX 6302 (6306)	1.160" (29.46)	.150" (3.81)
ROUND DIES 3-3/4" (95.25 mm) OD		
28XX 6302 (6306)	1.160" (29.46)	.150" (3.81)
ROUND DIES 4-3/4 (120.65 mm) OD		
28XX 6302 (6306)	1.160" (29.46)	.150" (3.81)

Tool Series	Length of New Tool *Inch (mm)*	Grind Life *Inch (mm)*
SHAPED DIES 1-1/4" (31.75 mm) OD		
34 Style	.620" (15.75)	.060" (1.52)
28XX	.620" (15.75)	.090" (2.29)
SHAPED DIES 2-1/8" (53.98 mm) OD		
34 Style	.880" (22.35)	.060" (1.52)
28XX	.880" (22.35)	.090" (2.29)
SHAPED DIES 2-3/4" (69.85 mm) OD		
34 Style	1.160" (29.46)	.060" (1.52)
28XX	1.160" (29.46)	.090" (2.29)
SHAPED DIES 3-3/4" (95.25 mm) OD		
34 Style	1.160" (29.46)	.060" (1.52)
28XX	1.160" (29.46)	.090" (2.29)
SHAPED DIES 4-3/4" (120.65 mm) OD		
34 Style	1.160" (29.46)	.060" (1.52)
28XX	1.160" (29.46)	.090" (2.29)

With Online Ordering you can review your order information for completeness before submitting!

Special Tooling for Production Flexibility

Whitney's special tooling joins Whitney machines to add production flexibility for economical metal forming and marking.

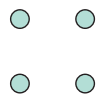
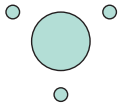
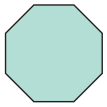
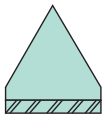
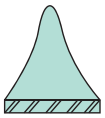
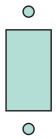
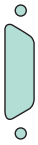
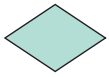
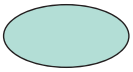
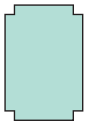
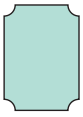
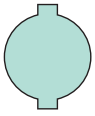
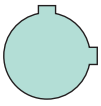
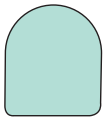
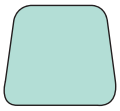
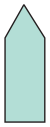
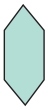
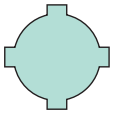
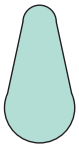
Features such as countersinks, louvers, tread plate, dimples, beads and part markings are done quickly and easily without secondary operations.

Tooling can also be developed in a nearly endless variety of shapes specific to your application needs.

Punches and dies manufactured to your specifications are thoroughly tested in Whitney machines, under shop conditions, to verify the design and ensure value for your investment.

Whitney Design Engineers know the machines and assist you with the best tooling design for accuracy, speed and durability.

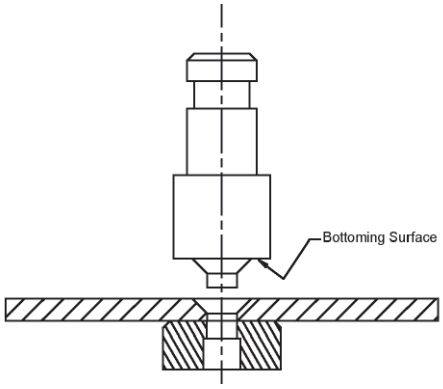
Special Shaped Punch and Die Sets

 008A	 008B	 014	 017A	 017B	 017C	 018A
 018C	 019	 020A	 020B	 024	 028	 030A
 030B	 030C	 033A	 033B	 038A	 040A	 040B
 040C	 042	 044	 050A	 050B	 053	 058
 060	 063	 066	 073	 080A	 080B	 110

Some of the many special shapes are shown here. Each has been assigned a shape code number for easy referencing. A fully dimensioned sketch or dxf file of the required shape must accompany your inquiry. Please refer to ordering information on page 4 for further details.

Use of Forming Tools on Whitney Presses

Most forming applications on Whitney machines are performed using "bottoming" style tooling. This type of tooling is shaped so that the construction of the tool is the same as the shape of the form it creates. A bottoming surface on the punch does not allow the punch to penetrate any farther than the height or depth of the form. This creates features that are very repeatable regardless of variations in material types and thickness.



For example, when performing a countersink, the shape of the countersink punch is the same as the shape of the form on the finished hole. The flat surface above the countersink protrusion provides a bottoming surface. Once this bottoming surface contacts the raw material, the countersink is complete, and formed exactly to print. As long as the bottoming surface contacts the raw material surface every time, the form is repeatable, since it always conforms to the shape of the tool.

When using form tooling with bottoming style tooling, the machine control must be programmed to reverse the ram using "pressure switch" mode instead of normal punching mode. Refer to your machine's operation manual for proper adjustments.

Some forms extrude metal beyond the top of the raw material (e.g. louvers, tread plate). These forms are normally done in a "form up" condition. This is done so that the formed features do not interfere with the table skins and die, eliminating potential interference and scratch points. The lower die becomes the "punch", and an integral spring stripper is typically included with the tool to keep the material from sticking on the die.

Countersink Punch & Die Sets

Eliminate secondary operations and PUNCH accurate and repeatable countersinks. By using Whitney's bottoming tooling, each countersink is the correct depth, and is concentric to the hole.

A typical countersink (below) is produced via a two-step operation. First, an oversize pilot diameter is punched. This is followed by using a countersink tool that cold-forms the final shape of the countersink.

Note: if the diameter of bottom through hole size is critical, a third punch may be required. Consult Whitney engineers on your application.

Formed countersinks in sheet metal are possible in a single hit. Contact Whitney with your application.

Plow Bolts

Plow bolts are used for single side assembly when it is not practical to use a wrench on both sides of a hole. The appropriate hole is a countersunk hole with a square pilot. This is performed by using the countersink procedure, followed by a third tool, a square punch.

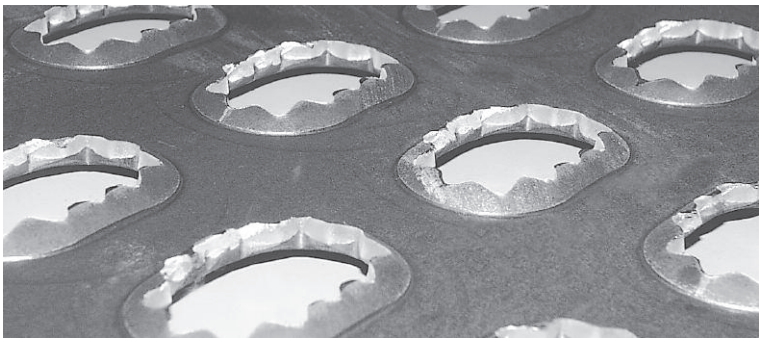
With Online Ordering you receive instant confirmation of your order via email!

Lance & Form Tooling

Lance & Form punches and dies accomplish two processes in one operation. They cut the workpiece as needed and form the cut section without creating a detached slug. This process creates parts such as supports for cross braces on trailers.

Tread Plate Tooling

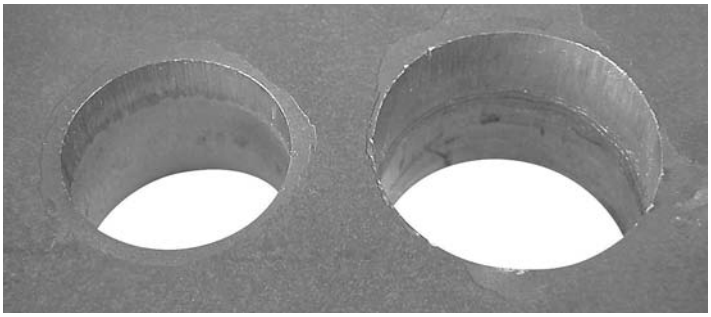
Tread Plate tooling is available in a variety of configurations. It's primarily used to punch and form patterns, creating a rough surface for stairs or flooring that would otherwise become slippery.



Shave Punches and Dies

Whitney's tooling for punching/shaving operations provides high quality holes with straight and smooth walls with very little breakout at the bottom. Two punches are used—the first is undersized from the desired finished hole diameter; the second "shaves" the first hole to the desired diameter. TuffSkin™ punches and 28XX, 34XX or 38XX dies made of HSS are required for the final shave operation because of the frictional forces and generated heat.

Note: Contact Whitney and request Punching and Shaving Application technical paper for more detailed information.



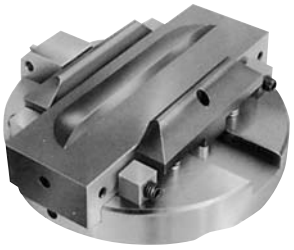
1.25" punched and shaved vertical hole in 1.00" thick A36 steel. This was done by pre-punching the hole with a one inch punch (on left), and shaving the hole to its final size (on right) for tapping purposes, or for installing a bushing.

Louvre Punch and Die Sets

28XX™ Style Tooling

Louvre punch and die combinations can be used with numerically controlled presses, precision gaging presses and manually operated duplicators. The louvers are formed in the "up" position which allows positive stripping of the materials from the die. Replaceable cutting and forming inserts allow five different lengths of cuts to be made. The customer chooses the length of one insert set to be included with the purchase price. Additional insert sets to produce other size louvers can be purchased separately. The pressure switch of the hydraulic press is used for proper forming.

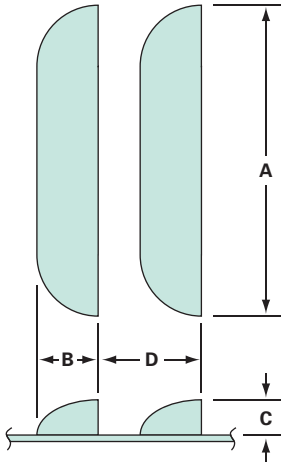
Maximum Material Capacity: 10 gage (.135") Mild Steel



36TC™ & 44TC™ Louvre Punch and Die Sets also available. Contact Whitney with your requirements.

Use with N/C Presses (28XX Style Tooling)

Length of Louvre A	B	C	D	Die O.D.	Punch & Die Assembly
2	5/8	3/16	15/16	5-3/4	8067-34630-25900
3	5/8	1/4	15/16	5-3/4	8002-85630-25900
4	3/4	1/4	1-1/8	5-3/4	8002-86630-25900
5	3/4	5/16	1-1/8	5-3/4	8004-49630-25900
6	3/4	5/16	1-1/8	5-3/4	8002-87630-25900



Use with Scale Gaging Presses and Duplicators (28XX Style Tooling)

Length of Louvre A	B	C	D	Die O.D.	Punch & Die Assembly
2	5/8	3/16	15/16	5-3/4	8067-39630-25900
3	5/8	1/4	15/16	5-3/4	8067-35630-25900
4	3/4	1/4	1-1/8	5-3/4	8067-36630-25900
5	3/4	5/16	1-1/8	5-3/4	8067-37630-25900
6	3/4	5/16	1-1/8	5-3/4	8067-38630-25900

With Online Ordering there is no need to confirm verbal orders with formal written purchase orders!

Center Marking Punch and Die Sets

Center Marking Punch and Die Sets—28XX™, 36TC™ and 44TC™—are used for marking center points in work requiring secondary operations such as drilling. They are also used to locate points for bend or shear lines or to check for correct punch locations.

Punches and dies can be used individually to mark either the top or the bottom of the material, or to simultaneously mark both surfaces.

When marking the top side of the material only, a flat "anvil" die is used with the marking punch. When marking the bottom side of the material only, a flat "anvil" punch is used with the marking die. The pressure switch cycle control on the hydraulic press is used to limit the marking force.

28XX Center Marking punches and dies feature replaceable center points.

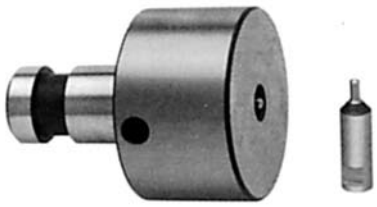
36TC and 44TC Center Marking Sets feature replaceable Center Marking Inserts.

28XX Center Marking Sets

	Part Number	Point Length	Anvil Number
Punch	8007-48630-15000	.06	8011-17630-00230
	8051-72630-15000	.12	
Die	8022-69630-15930	.06	6501-20000
	8051-73630-15930	.12	

	Replacement Part	Number	Point Length
Punch	Center	0081-23040-00000	.06
		0050-00310-00000	.12
	Shank	0081-23030-00000	—
	Urethane Sleeve	0081-23050-00000	—
Die	Center	0050-00320-00000	.06
		0050-00330-00000	.12
	Urethane Sleeve	0081-47340-00000	—

28XX



36TC

36TC and 44TC Center Marking Sets

Replacement Part	36TC	44TC
Center Marking Punch, Upper (includes insert)	8118-04360-15140	8197-76440-15040
Insert Holder only	0050-10060-00000	0050-18300-00000
Replacement Insert, Center*	8118-04020-00110	8118-04020-00110
Die Anvil	8023-70630-00240	8023-70630-00240

* 3/16" dia. x 110° included angle

Replacement inserts to your requirements can be provided.

Character Marking Tools

28XX™, 36TC™ and 44TC™ Style Tooling

Quickly and easily mark parts with characters and/or numbers with Whitney's Character marking tools. A slot in a blank punch combines with a keeper spring to hold the numbers or letters for the punching process. Numbers or letters can be changed within the punch as needed for specific applications.

Many combinations of character size, number of characters, multiple rows and other options are available. Contact Whitney with your requirements.

Rotary Ram Character Marking Punch

36TC Style Tooling

The Rotary Ram Character Marking Punch stamps characters on parts based on programmed command. Each punch contains 12 character stations for numbers, letters or other symbols. The marking punch assembly includes a special stripper and die anvil.

Character Marking Punch (w/o characters)	8144-23360-15050
1/4" or 5/16" high characters	Specify Character

Engraved Tools

28XX, 36TC and 44TC Style Tooling

Engraved tools make it possible to economically stamp logos or images on parts. Whitney engineers work with your DXF drawing to assure that the tonnage of your machine can effectively stamp the image at the desired size.

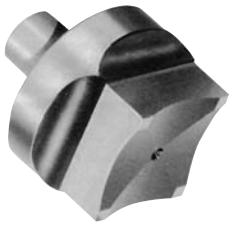
Online Ordering sends your order to manufacturing as soon as it is received. Your order is completed and shipped faster!

Nibbling Punch and Die Sets

28XX™ Style Tooling

Square With Corner Heels Fixed

Square nibbling punches with fixed corner heels are designed for use in mild steel, 50,000 shear, up to 1/4" thickness. Square dies are available in two styles: standard 0° - 90° indexing and 45° indexing with set screw retained locating pins. Die clearance *MUST* be 20% of the material thickness.



Use standard square 28XX dies or 45° indexing dies

Size	Punch Number	Dies				
		Std. 90° Indexing		45° & 90° Indexing		
		Clearance	O.D.	Number	Clearance	O.D.
1	8017-31630-01320 High Speed Steel*	.006 .012	2-1/8	8002-60630-01232	.006	2-3/4
		.021 .037	2-3/4	8004-75630-01234	.012	
	6311-10000 Shock Resisting	.006 .012	2-1/8	8023-42630-01236	.021	
		.021 .037	2-3/4	8021-58630-01232	.037	
2	8017-32630-01330 High Speed Steel*	.006 .012 .021 .037	3-3/4	8002-96630-01242	.006	4-3/4
				8002-97630-01244	.012	
	6311-20000 Shock Resisting			8014-42630-01246	.021	
				8021-46630-01242	.037	

*May be indexed 45°

Feed rate per stroke to be programmed

For 1" size:
Minimum 1/4"
and
Maximum 7/8"

For 2" size:
Minimum 3/8"
and
Maximum 1-3/4"

Hollow Ground

Hollow ground nibbling punches are designed for use in mild steel, 50,000 shear, up to 1/4" thickness. Their hollow ground faces assure sharpness, long life and easy penetration. The feed length per stroke should be programmed to at least the thickness of the material to be punched. Die clearance *MUST* be 20% of the material thickness.

Use standard round or square 28XX dies

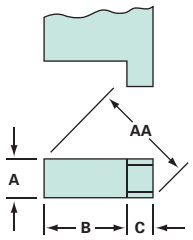
Style	Size	Punch Part Number	Feed Rate Min.	Feed Rate Max.
Round	3/4	8029-47630-00310	1/8	1/2
	7/8	8027-28630-00310	1/8	5/8
	1	8018-23630-00320	1/8	3/4
	1-1/2	8020-62630-00320	1/8	1-1/4
	1-3/4	8061-64630-00320	1/8	1-1/2
	2	8047-60630-00330	1/8	1-3/4
Square	1*	8027-47630-01320	1/8	3/4
	1-1/4	8045-69630-01330	1/8	1
	1-1/2	8037-55630-01330	1/8	1-1/4
	2*	8057-34630-01330	1/8	1-3/4

*Indexable 45° — See chart above for Indexing Dies

Heeled Edge Notch Punch and Die Sets

28XX™ Style Tooling

Heeled Edge Notch punch and die sets are designed with a back-up heel for edge notching or nibbling out large holes along the edge or in the center of a piece part. A starting hole is required when nibbling in the center of a piece part. A ground relief prevents "hang-up" while advancing the punch.



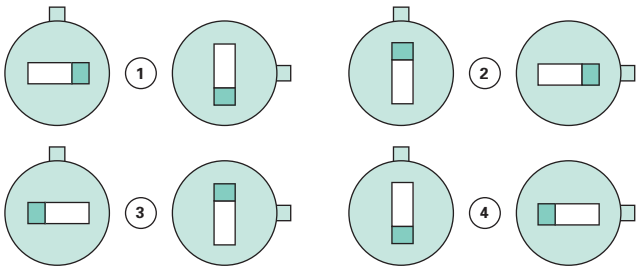
"C" can vary from 1/4" to 3/8"

Rectangular

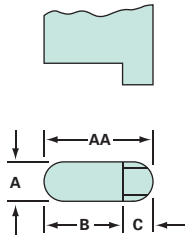
Use standard rectangular 28XX dies

Pin Location

View of Die — Back of Press



Purchase order must include heel location options (pin location) and required die clearance.



"C" is either 1/4" or "A"/2, whichever is greater

Obround

Use standard obround 28XX dies

Keyhole Punch and Die Sets

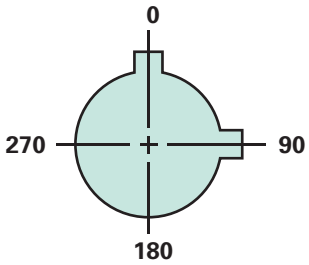
28XX Style Tooling

Keyholes are used for any slide lock type application. Common uses are to secure a bolt head or make a shelving unit.

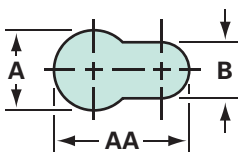
Listed below are standard keyhole punch and die sizes as required for use with round head, pan head and sheet metal screws. When ordering please indicate desired die clearance. All keyhole punch and dies sets shown here are indexable to 0°, 90°, 180° and 270°.

AA	A	B	Screw Size	Die O.D.
7/16	9/32	9/64	#3-5	1-1/4
5/8	13/32	13/64	#6-10	
7/8	17/32	9/32	#12 - 1/4	2-1/8
1	21/32	11/32	5/16	
1-1/4	25/32	13/32	3/8	
1-3/8	13/16	15/32	7/16	
1-1/2	7/8	17/32	1/2	2-3/4
1-5/8	1-1/16	21/32	5/8	

Pin Location



View of Die
Front of Press

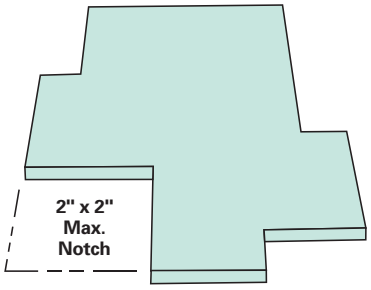


You can order spare parts via Online Ordering. Check Whitney's on-hand inventory and, if needed, lead times for your order!

Corner Notching Punch and Die Sets

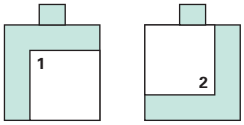
28XX™ Style Tooling. For manual presses only.

These corner notching punch and dies sets can cut a corner notch of up to 2" x 2" maximum. The operator is responsible for the depth and width of the notch. No special setup is required as the tooling fits in the standard quick change setup.



Use 2-5/16" Square Die

Maximum Material Capacity:
1/4" Mild Steel

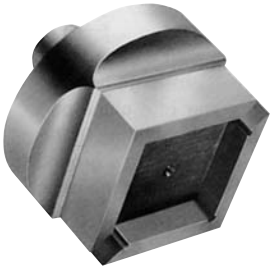


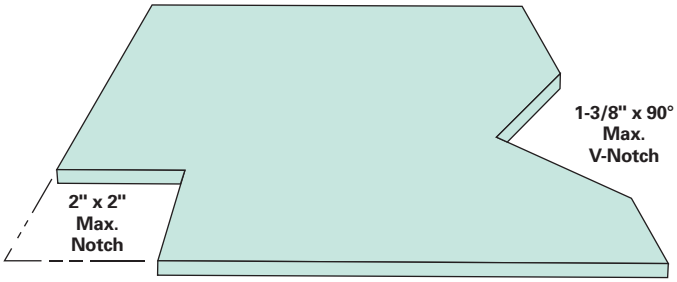
Pin Location	Punch	Die		
	Number	Number	Clearance	O.D.
1	8001-90630-31144	6312-23245	.012	4-3/4
2	8004-72630-31144	6312-23245	.012	4-3/4

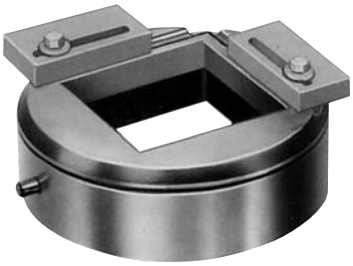
Notching Punch and Die Sets

28XX Style Tooling. For manual presses only.

This special punch and die set is especially suitable for making small corner notches. The two adjustable gages permit fast, accurate notching up to 2" x 2" maximum. It can also be used for V-notching up through 1-3/8" deep x 90°. This set fits into the quick change tooling setup but does require some modification to the die adapter to provide clearance for the adjustable gages.







Punch	Die		
Number	Number	Clearance	O.D.
8001-90630-31144	8002-14630-01904	.012	4-3/4

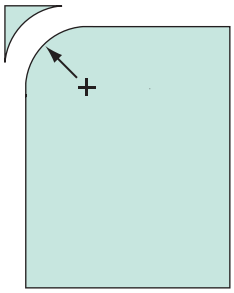
Maximum Material Capacity:
1/4" Mild Steel

Corner Rounding Punch and Die Sets

28XX™ Style Tooling. For manual presses only.

The corner rounding punch and die sets listed below are for use in mild steel only. (Punch and die sets for use on stainless steel are available on special order.) Two gage surfaces allow fast and accurate locating of sheet metal parts. Good, clean corners are easly cut and no special holders or adapters are required.

Radius "R"	Punch & Die Assembly Number	Die O.D.
1/8	8000-57631-80901	2-1/8
3/16	8000-58631-80901	
1/4	8000-59631-80901	
3/8	8000-60631-80901	
1/2	8000-61631-80901	
3/4	8001-07631-80901	2-3/4
7/8	8004-76631-80901	
1	8003-44631-80901	2-3/4
1-1/2	8004-77631-80901	3-3/4
2	8052-51631-80901	4-3/4



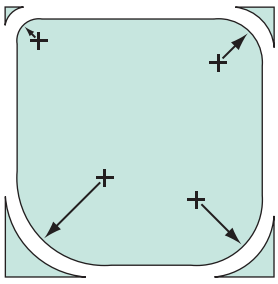
Maximum Material Capacity: 1/4" Mild Steel

Multiple Radius Corner Rounding Punch and Die Sets

28XX Style Tooling. For manual presses only.

One punch and die assembly can be used to punch any of four different radius corners, quickly and accurately. The work is located by two gage surfaces which assure clean corners.

No special holders or adapters are required with these mutiple radius punch and die sets. These are easily installed in the quick change punch adapter and die shoe.



Punches four radii sizes: 1/4", 1/2", 3/4" and 1".

Punch & Die Assembly No.	Max. Material Capacity	Die O.D.
8037-59630-99904	16 ga. - 7 ga.	5-3/4
8037-59630-99906	3/16 - 1/4	

With Online Ordering you can check the status of your order at anytime via your own, secure account!

Trim and Part Punch and Die Sets

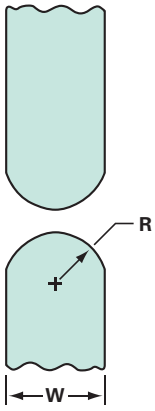
28XX™ Style Tooling. For manual presses only.

This tooling set is for use in mild steel only. It does not require any special holders or adapters and can be easily installed in the quick change punch adapter and die shoe. Two guides locate the work piece centrally in the the die and punch guide heels enter the die before the punch begins to cut, thus assuring perfect alignment. It is possible to trim off the ends of strips without shifting the punch out of alignment.

When ordering, please specify for 16 ga. through 5/32" or 3/16" through 1/4" material.

Hold-down straps are furnished only on dies for 3/16" through 1/4" material.

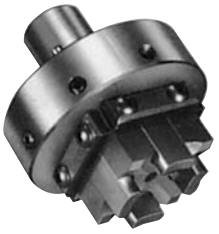
Maximum Material Capacity:
1/4" Mild Steel



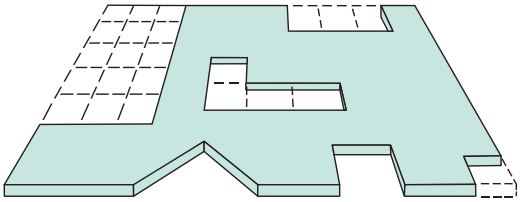
W	R	Die O.D.
1/4	5/32	2-1/8
3/8	7/32	
1/2	9/32	
5/8	11/32	2-3/4
3/4	13/32	
7/8	15/32	3-3/4
1	17/32	
1-1/4	21/32	
1-1/2	25/32	

Shearproof Punch and Die Sets

28XX Style Tooling. For manual presses only.



Shearproof tooling is primarily intended for use in stainless steel, where the resistance to deformation is high, but they can also be used in mild steel. Four spring loaded heels extend below the punch cutting surface. One or two of these heels are allowed to enter the die and act as guides before the punch face contacts the material when notching or nibbling holes.



The square shearproof punch is used for square hole punching, square edge notching and nibbling out large square or rectangular holes, either in the center or along the edge of a piece part. It can be programmed into a template or tape and can also be used in conjunction with the precision gaging on all manual presses.

Size	Punch Number	Die .006	Die .012	Die O.D.
1	8002-93630-41000	8002-60630-01232	8004-75630-01234	2-3/4
1-1/2	8002-94630-41900	8004-02630-01242	8004-03630-01244	3-3/4
2	8002-95630-41000	8002-96630-01242	8002-97630-01244	4-3/4
3	8003-93630-41000	8003-94630-01262	8005-47630-01264	5-3/4

Maximum Material Capacity: 10 gage (.135") Mild Steel or Stainless Steel

Electrical Knockout Punch and Die Sets

28XX™ Style Tooling (Also available in 36TC™ and 44TC™ Style Tooling)

Single and double electrical knockout punch and die sets can be used on precision gaging presses, manually operated duplicators or numericaly controlled presses. Knockout punches and dies are installed in an inverted order with the die fitting into the punch adapter and the punch in the die adapter. This allows the offset to be in the up position which eliminates interferences when repositioning the piece part.

These sets feature:

- Urethane inserts for positive stripping action
- Positive stop for controlled penetration
- Punch and die inserts that can be sharpened, shimmed and/or replaced
- Overall clearances of .010/.012; ideal for 14 and 16 gage material
- Dimensions which conform to NEMA, CSA and UL standards

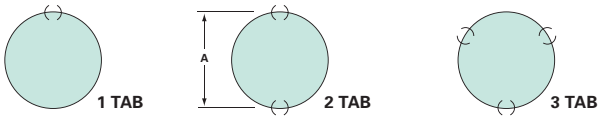
An inner inverted die in the double knockout die is relieved to permit punching over a smaller single knockout to obtain triple or quadruple knockout shapes.

Proper pressure can be exerted with the pressure switch cycle control of the hydraulic press.

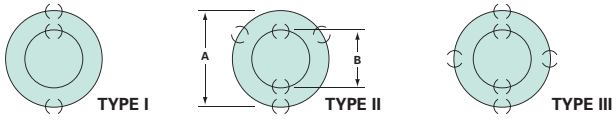
Maximum material capacity: 14 gage mild steel (12 and 10 gage are available on request)

Pipe Size	A Dia.	No. of Tabs	Required Tonnage*	Inverted Die Assembly	Inverted Punch Assembly		Minimum Center Distance
				Number	Number	O.D.	
1/2	.875	1	6.1	8002-50631-50904	8002-50631-50000	3-3/4	1-1/4
3/4	1.109	1	7.8	8002-51631-50904	8002-51631-50000		1-9/16
1	1.375	1	9.6	8002-52631-50904	8002-52631-50000		1-3/4
1-1/4	1.735	2	12.1	8002-53631-50904	8002-53631-50000	4-3/4	2-1/8
1-1/2	1.984	2	13.9	8002-54631-50904	8002-54631-50000		2-7/16
2	2.469	2	17.2	8002-55631-50904	8002-55631-50000		3
2-1/2	2.969	2	20.7	8002-56631-50904	8002-56631-50000	5-3/4	3-5/8
3	3.594	3	25.1	8002-57631-50904	8002-57631-50000		4-7/16

Single Knockouts (see chart above)



Double Knockouts (see chart below)

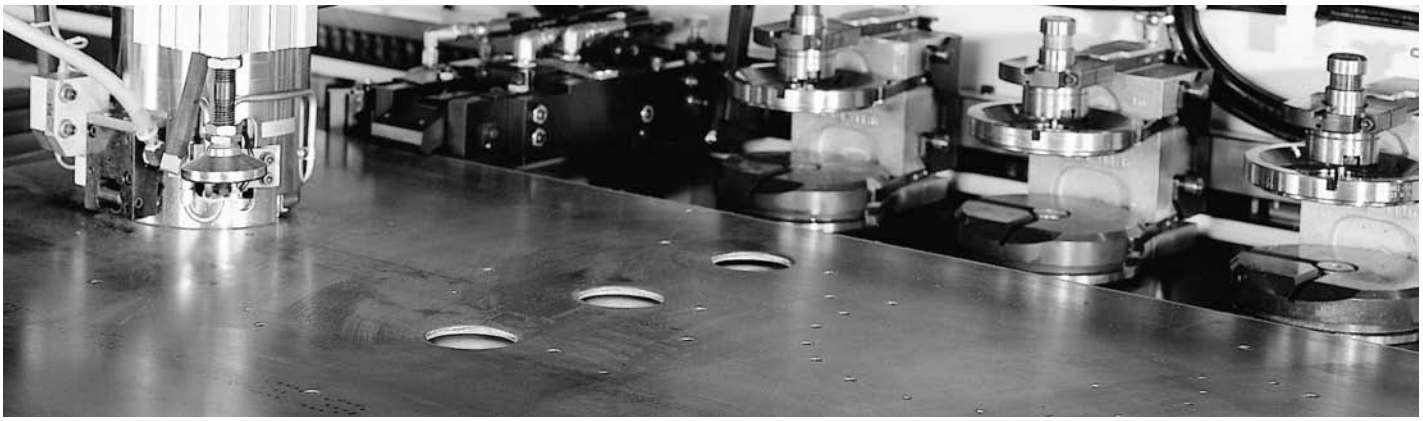


Pipe Size	A Dia.	No. of Type	Required Tonnage*	Inverted Die Assembly	Inverted Punch Assembly		Min. Center Distance
				Number	Number	O.D.	
1/2 x 3/4	.875 x 1.109	I	13.9	8002-64631-60204	8002-64631-60100	3-3/4	Consult Whitney
1/2 x 1	.875 x 1.375	I	15.7	8002-65631-60904	8002-65631-60000		
1/2 x 1-1/4	.875 x 1.734	I	18.2	8002-66631-60904	8002-66631-60000		
3/4 x 1	1.109 x 1.375	I	17.4	8002-67631-60904	8002-67631-60000		
3/4 x 1-1/4	1.109 x 1.734	I	19.9	8002-68631-60904	8002-68631-60000		
1 x 1-1/4	1.375 x 1.734	II	21.7	8002-69631-60904	8002-69631-60000		
1 x 1-1/2	1.375 x 1.984	I	23.5	8002-70631-60904	8002-70631-60000		
1-1/4 x 1-1/2	1.734 x 1.984	III	26.0	8004-79631-60904	8004-79631-60000		

* Based upon 14 ga. cold rolled mild steel with 60,000 PSI shear strength.

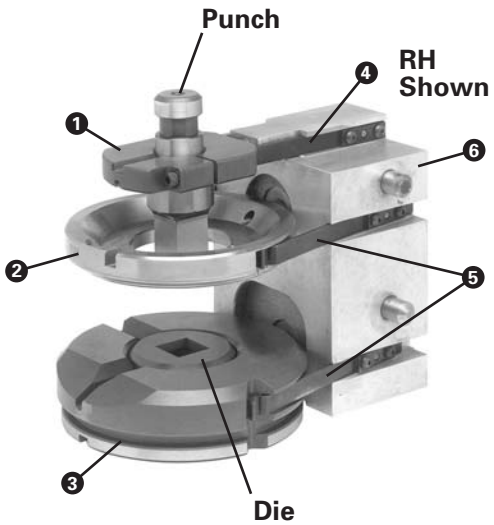
Whitney Tooling Accessories

Quick change and automatic tool change punches and dies require accessories to retain the tooling in the machine tool changer, storage racks and tool caddy or transporter. See the tooling set-up procedure for your specific machine requirements. Sharpening fixtures, punch and die shims and other accessories help you properly maintain your tooling and extend its life.



Tooling Accessories for 645 ATC, 647 ATC, 661 Series, 3400 Series, 3500 ATC, 3600 ATC and 3700 Series Machines

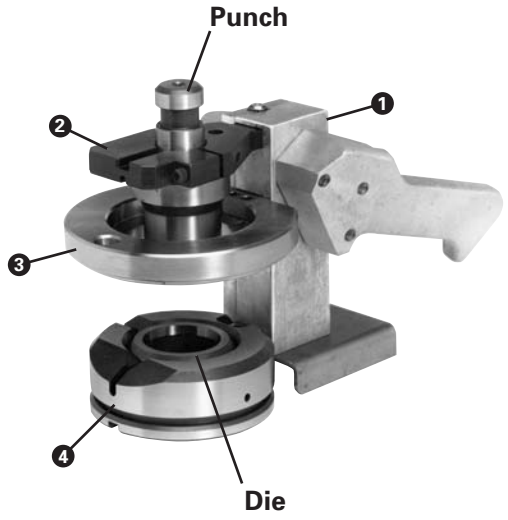
Item	Description	Part No.	Heavy Duty
1	Punch Ring	661-339	665-376
2	Stripper 1.000 I.D. 1.875 I.D. 2.625 I.D. 3.625 I.D. 4.125 I.D. 5.125 I.D.	 661-934 640-790 640-791 640-792 640-793 662-906	 661-934 640-790 640-791 640-792 640-793 662-906
3	Die Adapter (for Die O.D.) 1.250 2.125 2.750 3.750 4.750	 661-334 661-335 661-336 661-337 661-338	 661-334 661-335 661-336 661-337 661-338
4	Spring - Punch	662-113	RH = 665-377 LH = 665-378
5	Spring - Stripper and Die	662-113	662-113
6	Cartridge Assembly* (661 ATC & 3400 RTC only)	670-003	667-444
	Retrofit Kit		665-375



* Contact Whitney for cartridge assembly (681-365) used with 3400 Series Tool Caddy.

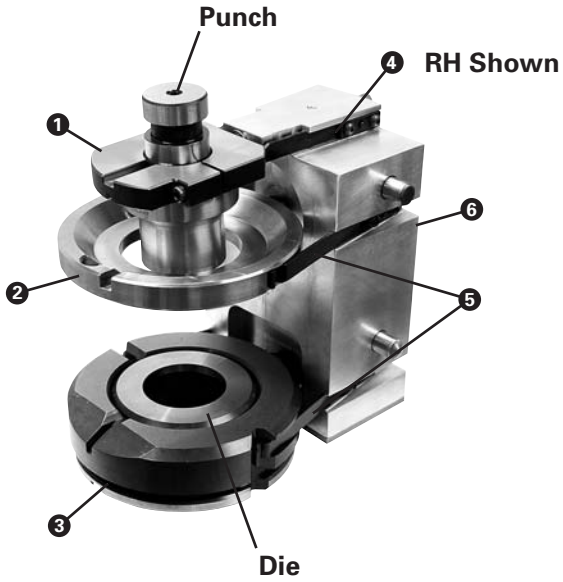
Tooling Accessories for 647 Plus and 647 Plus II Machines

Item	Description	Part No.
1	Loading Cartridge	641-110
2	Punch Ring	641-243
3	Stripper 1.000 I.D. 1.875 I.D. 2.625 I.D. 3.125 I.D. 3.625 I.D.	 641-234 641-235 641-236 641-535 641-237
4	Die Adapter (for Die O.D.) 1.250 2.125 2.750 3.750	 641-226 641-227 641-228 641-229



Tooling Accessories for 4400 MAX Machines

Item	Description	Part No.
1	Punch Ring	400-308
2	Stripper 1.000 I.D. 1.875 I.D. 2.625 I.D. 3.156 I.D. 4.488 I.D.*	 400-294 400-295 400-296 400-297 400-683
3	Die Adapter (for Die O.D.) 1.250 2.125 2.750 3.750 4.000 4.750**	 400-501 400-502 400-305 400-520 400-306 400-769
4	Spring - Punch (RH) Spring - Punch (LH)	665-377 665-378
5	Spring - Stripper and Die	662-113
6	Cartridge Assembly	400-625



* Character Marking Punch only ** Louvre only

With a few simple questions the Online Ordering Tooling Configurator provides the correct tool and die set for your application!

Stripper Selection

For machines that use 28XX™ style tooling use table below for chosing stripper plate and stripper insert.

Die OD	Die Adapter Number	Stripper Plate No.	Stripper Insert No.
1-1/4	636-381	630-287	636-306
2-1/8	636-382	630-286	636-307
2-3/4	636-436	630-285	636-308
3-3/4	636-437	630-284	636-309
4-3/4	636-438	630-283	636-310
5-3/4	None Req'd*	808-051	636-311

*Die fits directly into bolster assembly

36TC™ — For 647 Plus and 647 Plus II machines use table below to select stripper.

Stripper Plate Assembly			Use with Punch Blank Diameter
Part No.	No.	Bore	
641-235	#1	1.88	2.00
641-236	#2	2.62	2.50
641-535	#3	3.12	3.00
641-234	–	1.00	Insert Style
641-237	–	3.62	3.50

For all other machines that use 36TC style tooling use the table below to select stripper,

Part No.	Bore	Use with Punch Blank Diameter
640-790	1.88	2.00
640-791	2.62	2.50
640-792	3.62	3.50
640-793	4.12	4.00
662-906	5.12	5.00
661-934	1.00	Insert Style

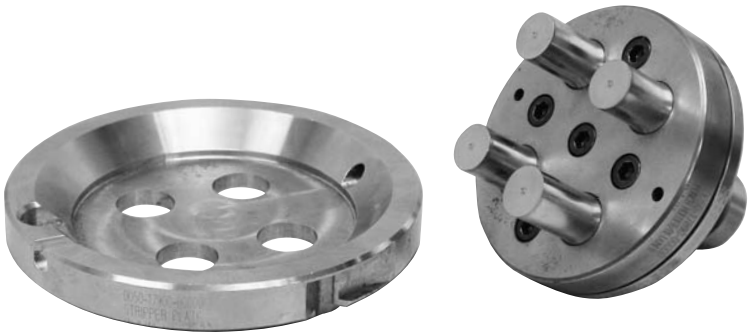
For machines that use 44TC™ style tooling use the table below to select stripper,

Part No.	Bore	Use with Punch Range
400295	1.87	.062 - 1.469
400296	2.62	1.470 - 2.469
400297	3.16	2.470 - 3.000
400294	1.00	Insert Style .050 - .750

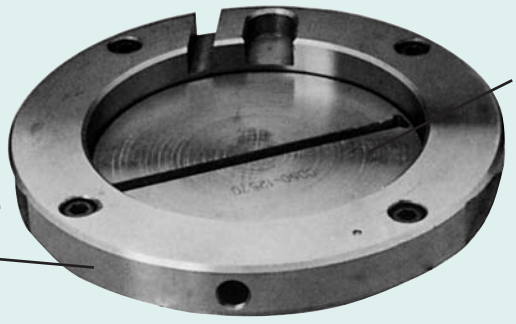
Punch range is either the diameter of the round or equivalent across corner dimension of shape.

Fitted Strippers

Some applications with 36TC™ and 44TC tooling may require a fitted stripper to keep the sheet flat. Fitted strippers may be needed for large shaped punches or when holes are on close centers with a small amount of material left between holes. Fitted strippers are normally used in thinner gage materials. In some cases fitted strippers may cause the punch to require a longer than standard straight length on punch shape. Consult with Whitney to discuss your application.



Rotary Strippers for Use With Rotary Ram Machines



Description	Ordering Information	Maximum Length
Rotary Stripper Assembly (minus insert)	0050-11130-00000	2.75" (70 mm)
Rotary Stripper Assembly (minus insert)	0050-12540-00000	3.94" (100 mm)
Blank Rotary Stripper Insert	0050-11160-00000	2.75" (70 mm)
Blank Rotary Stripper Insert	0050-13110-00000	3.94" (100 mm)
Rotary Stripper Insert	State Punch Part Number	2.75" (70 mm)
Rotary Stripper Insert	State Punch Part Number	3.94" (100 mm)

Online Ordering is a great LEAN tool that allows shop personnel to order tooling immediately—without paperwork delays!

Urethane Stripper Sleeve

For 28XX™ Style Tooling

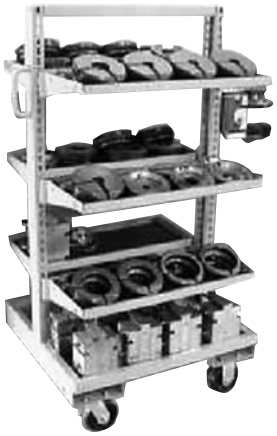
Urethane stripper sleeves can be used in place of the conventional, spring-type strippers when punching close-center holes in light gauge metal and with numerous other special applications. Unlike spring-type strippers, no marking or deformity of the material occurs.

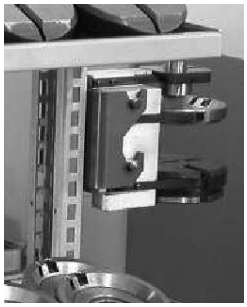
Strippers are supplied with only a small hole. The first punch stroke produces a snug fit of the stripper to the punch.

Part Number	Punch Size	Fits Punch Body Diameter of
0006-30050-00000	Thru 63/64	1
0050-00690-00000	1 - 1-7/32	1-1/4
0050-01550-00000	1.22 - 1-29/64	1-1/2
0050-01270-00000	1.45 - 1-23/32	1-3/4
0050-02360-00000	1.72 - 1-31/32	2

Tool Carts

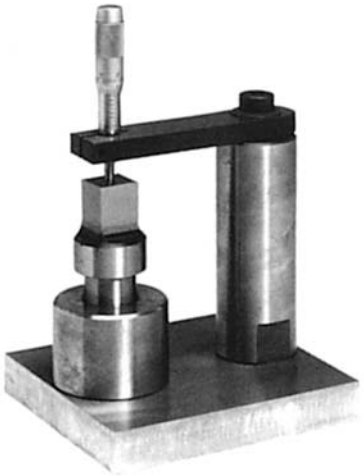
The Whitney Tool Transporter (right) holds and easily transports eight staged punch and die sets and cartridges. Add efficiency to tooling preparation and reduce the risk of damage to tools or injury when moving tools between the machine and tool crib. This rugged, unique Tool Transporter conveniently keeps tool cartridges ready for use, reducing set-up time and the opportunity for tooling to be misplaced. It also helps keep the area around your Whitney machine clutter-free.





The Tool Transport Cart (left) has room for cartridges, strippers, die adapters, and punch alignment rings. A cartridge holder is mounted to right-hand side upright for tool assembly.

36TC™ Punch Setting Gauge

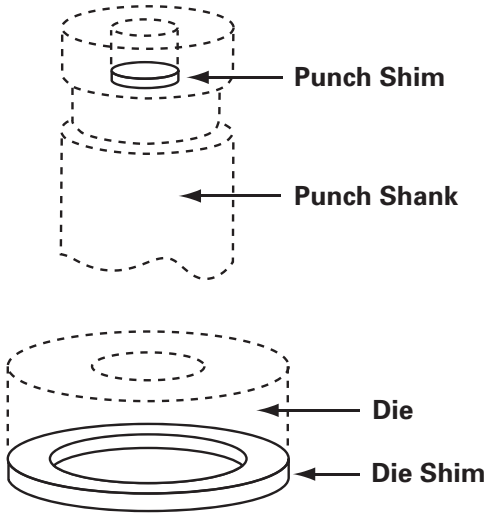


When tooling is used in an automated punching system, it is important to maintain a uniform punch length to assure constant penetration into the die. Too little penetration may cause partially punched material or pulled slugs, while too much penetration results in a longer press cycle time and unnecessary punch wear.

Punches should be measured and properly shimmed after sharpening to maintain proper length. The Whitney Punch Setting Gauge consists of a pedestal base, punch setting block, set plug and a micrometer. If a standard height gauge is available, it is only necessary to purchase the punch setting block and set plug.

Punch Setting Gauge (complete)	0050-10950-00000
Punch Setting Block and Set Plug	0050-10930-00000

Punch and Die Shims



After repeated sharpening it is necessary to shim tools to restore the original height. Shortened tools result in insufficient punch penetration and may cause slug pulling. When shimming tools, care must be taken not to exceed the original tool height. Excessive tool penetration causes rapid tool wear.

Perforating applications may cause severe bowing of the material. Shimming the die above the die adapter will create a back bend effect and reduce part distortion.

Whitney offers packages of shims made especially for restoring punches and dies to their original specifications.

Punch Shims

O.D.	Thickness	Part Number	Quantity
5/16"*	.030"	0050-08640 PACKS	100
3/8"**	.030"	0050-17650 PACKS	100

*36TC Tooling **44TC Tooling

Die Shims

O.D.	Thickness	Part Number	Quantity
1-1/4"	.010"	0050-10280 PACKS	25
1-1/4"	.030"	0050-10210 PACKS	25
2-1/8"	.010"	0050-10310 PACKS	25

Die Shims

O.D.	Thickness	Part Number	Quantity
2-1/8"	.030"	0050-10300 PACKS	25
2-3/4"	.010"	0050-11290 PACKS	20
2-3/4"	.030"	0050-10590 PACKS	20
3-3/4"	.010"	0050-10290 PACKS	10
3-3/4"	.030"	0050-11100 PACKS	10
4-3/4"	.010"	0050-11300 PACKS	10
4-3/4"	.030"	0050-11310 PACKS	10

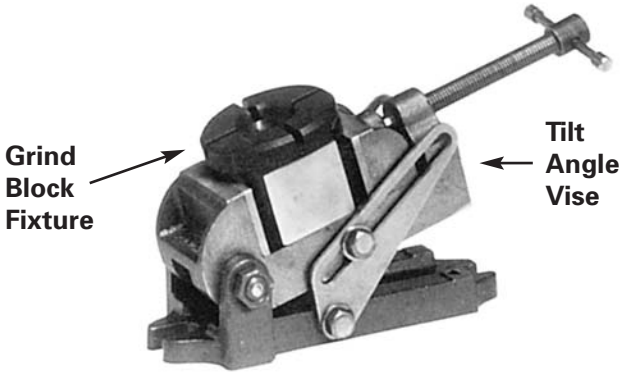
With Whitney's Online Ordering your order receives immediate attention—no need to wait for faxes to go through!

Adjustable Grinding Fixture

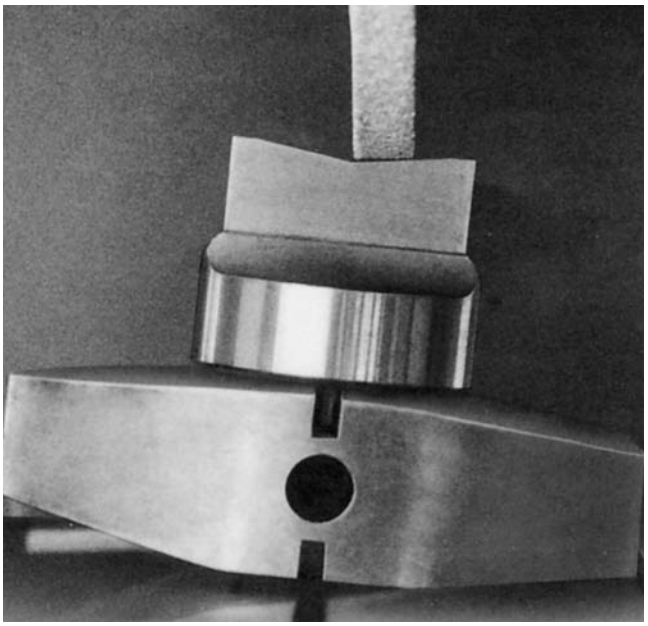
36TC™ Style punches can be easily resharpened with Whitney's Adjustable Grinding Fixture. Inverted and housetop shear punches, as well as flat faced, can be sharpened in this versatile accessory.

The fixture consists of an adjustable angle vise and a removable block that is designed to position and hold 36TC style punches in the correct position for grinding. When used in conjunction with a magnetic chuck on a surface grinder, accurate punch resharpening is greatly simpified.

The fixture adjusts for the correct amount of shear angle for the particular punch diameter. Grind Block Fixture and Tilt Angle Vise are purchased seperately.



Grind Block Fixture	0050-08500-00000
Tilt Angle Vise	0050-08810-00000



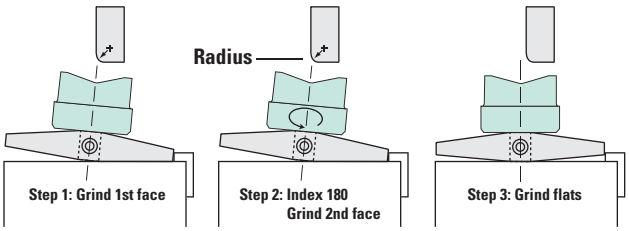
E-Z Grind Block

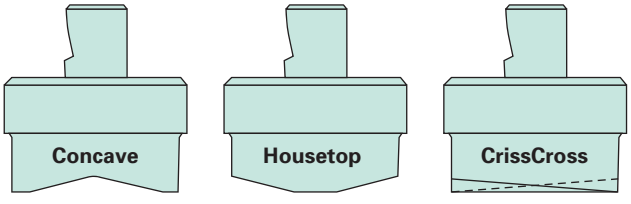
The E-Z Grind Block was specifically designed to position and hold Whitney 28XX™ style punches for sharpening. It accommodates shaped punches as well as round up to 5" diameter. It can be used in conjunction with the magnetic chuck of a small surface grinder.

The E-Z Block is simple to use and requires no special setup even when sharpening punches with concave or housetop shear. Maximum shear available is approximately 1/8". Flat faced punches can also be sharpened using the E-Z block as a positioning and holding device.

The four established grinding planes on the E-Z Block guarantee 100% repeatability. Metal removal is kept to a minimum, giving your tool added life.

E-Z Grind Block Part No.	0050-08080-00000





Aligning Tool Set

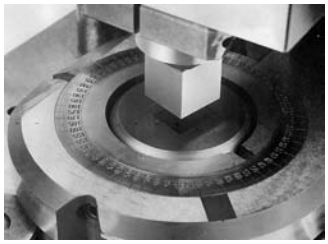
For machines that use 28XX™ style tooling

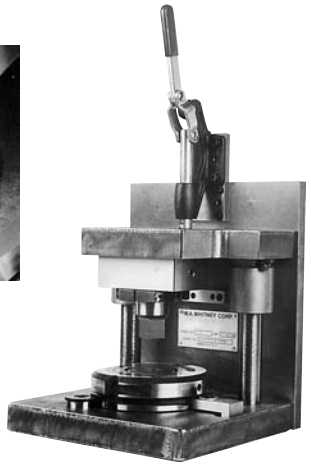
To assure long tool life and good hole quality, punches and dies must be accurately centered to one another. Quick, accurate tooling alignment is easily accomplished with this square punch and die combination.

The aligning die and die adapter are placed in the die shoe and the bolster assembly is loosened. The punch is slowly inched into the die and automatically centers the punch to the die. The bolster assembly is tightened down and the desired tooling may be installed in the press with the complete assurance that it will be accurately positioned.

Tool Part No.	8005-06630-01130
Die Part No.	8005-06630-01240

Tool Indexing Fixture*





The Whitney Manual Tool Indexing Fixture allows tools to be inserted and rotated at any angle for subsequent placement into the machine.

When shaped punches are used, it may be desirable to index the tool from the zero position to some other angle of rotation.

Whitney Manual Indexable Tool Setting Fixtures can be used on 645 ATC, 647 Plus, 647 Plus II, 647 ATC, 661 Series, 3400 Series, 3500 ATC, 3600 ATC, and 3700 Series presses to index full-bodied punches and their respective dies to any desired angle.

Machine Model Number	Die Adapter O.D.	Die O.D.	Max.** Punching Hole Size	Indexing Fixture Part No.	Indexing Die Adapter Part No.
647 Plus 647 Plus II	4-3/4"	2-1/8"	1.430"	642-306	829-679
645 ATC, 647 ATC, 661 Series, 3400 Series, 3500 ATC, 3600 ATC, 3700 Series	6-1/2"	2-3/4"	1.975"	642-300	642-305

* Shaped dies for use with this fixture must be ordered with die O.D. per table regardless of standard die O.D. (i.e. 1/2" square must be ordered on larger die O.D.)

** Largest dimension of any shaped tools.

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