PBT PN

APS

MATE® PRECISION TOOLING

RESPECT • SUPPORT • INSPIRE



American Precision Style

PRESS BRAKE TOOLING

Introducing
MAGLOCK™
TECHNOLOGY

FIVE DECADES OF GLOBAL EXCELLENCE

Founded in 1962, Mate is a world-class manufacturer of superior sheet metal fabrication products and solutions. We manufacture tooling for every major CNC punch press. In North America, we also offer a complete line of press brake tooling and laser consumables including CO2 and fiber. Mate products and services are available worldwide, fully supported by more than 80 dealers in every industrialized country.



Headquartered in Anoka, Minnesota, in a 300,000 sq. ft. (28,000m²) state-of-the-art facility.



WE RESPECT YOU PERSONAL CONNECTIONS

Mate does business with people, not companies. Our connection to you is personal. Mate's team of manufacturing and sheet metal professionals know what you go through. We know what it's like to compete for that next job, manage deadlines or even need a rescue. With Mate you have a partner that respects your knowledge and is dedicated to helping you succeed.



WE SUPPORT YOU YOUR GO-TO SOURCE

In your plant or on the phone. From our sales engineers and customer service, to our machinists and shipping department, Mate is pulling for YOU. Mate's in-field sales engineers know from experience what happens on the shop floor. They speak your language, fully capable of helping you improve processes and solve problems. Inside Mate, Customer Service makes quoting and ordering tooling fast and easy, guiding your order through our world class manufacturing systems to ensure you receive your product when you expect it.



WE INSPIRE YOU THINK BOLD, WE'VE GOT YOU COVERED

Whether it's on-site at your facility or in our Solution Center, Mate can inspire innovation by looking at new ways to use existing products, developing new products or creating specialty solutions that meet your specific requirements. Mate's team will assist you with a fast solution whether it's a hinge, a building façade or a completely new challenge. In addition, you're BACKED by our no-risk 100% customer satisfaction guarantee.

MATE'S MISSION AND PROMISE TO YOU:

To personally **respect, support** and **inspire** sheet metal professionals around the world with high-quality precision tooling and services.

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Catalog Key:

Material Type (MT)	Base Material	Base/Core Hardness	Wear Surfaces Induction Hardened	Depth of Induction Hardness	Application	Tonnage limits
▶	C45	20-24 HRC	56-60 HRC	3-4mm (0.118-0.158)	Most common tool profiles, high force capable	50 and greater tons/meter (17 and greater tons/ft)
▶	C45	20-24 HRC	56-60 HRC	3-4mm (0.118-0.158)	Tool profiles having thinner or taller cross sections	35 to 70 tons/meter (12 to 24 tons/ft)
▶	42 CrMo4	20-24 HRC	56-60 HRC	3-4mm (0.118-0.158)	Tool profiles having thin cross sections	15 to 60 tons/meter (5 to 20 tons/ft)

HOW TO READ A MATE® PART NUMBER

Example: **012.345S**

The numerical component identifies the tool profile.
The character component is used to identify the length of the tool.

The character component code is:

▬▬▶	S	18 - Standard	S lengths are 18"(457.2)
▬▬▶	T	12	T lengths are 12"(304.8)
▬▶	P	8	P lengths are 8"(203.2)
▬▬▶	F	Sectioned	F is a fraction or sectioned set
▬▶	V	Variable	V is variable length specified by the user

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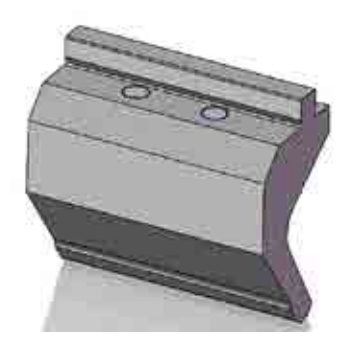
MATE® MAGLOCK™ magnetic safety system

https://www.youtube.com/user/mateprecisiontooling

INTRODUCING MAGLOCK™ — AN INDUSTRY FIRST!

Mate's groundbreaking American Precision Style punches with the Maglock™ Magnetic Safety System use permanently flush mounted magnets to attach and seat the punch into the punch holder. Utilizing extensive research, development and testing, each punch is configured with the proper quantity and position of magnets along the punch shoulder so the "up-force" safely and securely attaches the punch to the punch holder. To ensure that the magnetic field does not magnetize the surrounding punch and causes no magnetic effect on the sheet metal, the rare earth nickel clad magnets direct a strong but short field of attraction upward from the punch shoulder surface to create a safe and secure attachment.

FEATURES AND BENEFITS OF USING MAGLOCK™ TECHNOLOGY



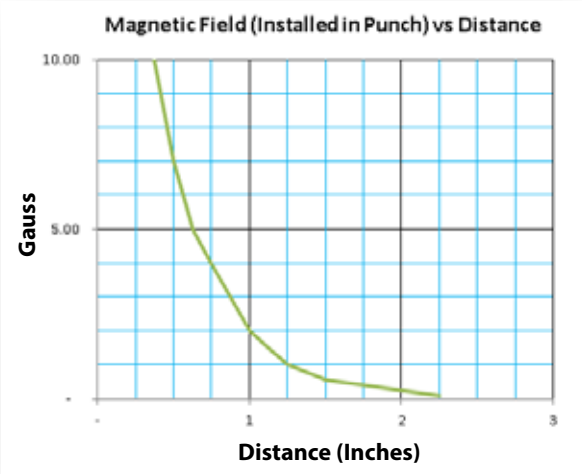
EASY. RELIABLE. LONG LASTING. SAFE. The seating of the punch is essential for the safe operation of a brake. The installation of a punch with Maglock technology always results in the shoulder seated firmly to the holder. The "up-force" of 2.5 to 3 times the weight of the punch leaves no separation between the surfaces. The Maglock magnets "up-force" continues to work indefinitely when used properly. While Maglock makes seating the punch easy and safe, the holder clamping system must be engaged when a brake is in operation. Maglock does not claim to be, and is not intended to be, a replacement of the holder clamping system.

NON-MECHANICAL Maglock technology is non-mechanical so there are no mechanical parts to damage. Punches that have mechanical designs (buttons, springs, pins and so forth) become unsafe to use if the mechanism is damaged or missing. Maglock works safely all the time, every time.

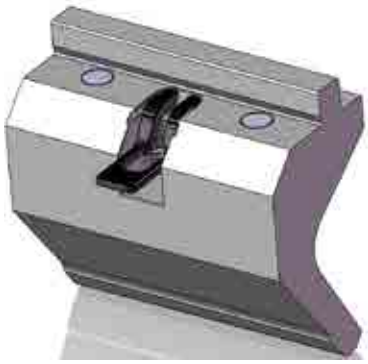
ADDED SAFETY The use of Mate punches with Maglock offers additional safety if electrical, hydraulic or pneumatic power to the brake is cut off or damaged. The magnetic attraction functions safely regardless of the status of the brake's power.

MAGNETIC FIELD DROP-OFF

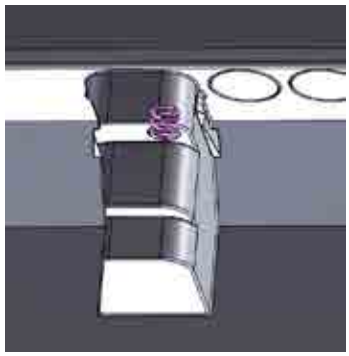
Maglock™ Technology rare earth magnets are safe when used as directed. These Sintered Neodymium-Iron-Boron (NdFeB) permanent magnets are exempt from transportation restrictions CFR2011 Title 49 Vol 2 Sec 173.21 as well as in compliance with UN2807, IATA PI 953 and the European Union's Restrictions of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive of 2002/95/EC and 2011/65/EU (RoHS2).



OPTIONAL LEVER Mate punches with Maglock are available in any length between ½" and 18". In lengths that are greater than 4", the design includes a lever that facilitates the punch removal process by causing a slight separation to occur between the punch and the holder when depressed. The lever is designed so that it can be removed and installed as needed. This feature is helpful in cases where a return bend on the part may have interference with the lever. The Maglock connection to the holder is independent of the lever thus the tool is always safely seated.







REVERSIBLE/SYMMETRICAL The symmetrical design of the punch tang profiles enable the punch to be reversible, to be installed facing forward or backward, since all punch tang profiles are symmetrical. Mate punches have a center line that extends from the center of the tang to the center of the punch tip. Mate dies have a center line that extends from the center of the V opening to the center of the die spud. The center line configuration enables the punch or die to be reversed easily.

BALANCED POWER The Maglock connection is strong yet balanced so that lateral positional adjustments to the punch (shifts left or right) are easy. Mate punches with Maglock are safer than mechanical designs for lateral movement, especially when a holder has a small gap or uneven step between holder clamps that can cause a mechanical design to bump or dislodge.

COMPATIBLE WITH A VARIETY OF HOLDER SYSTEMS

Mate punches with Maglock are designed with a .500" wide tang and can be used in any holder system that receives a .500" tang. It does not matter if the holder system is designed for mechanically configured tools or tools with hooks. This enables Mate punches with Maglock to be the tooling of choice across a wide variety of existing holder systems.

MATE® MAGLOCK™ magnetic safety system

PATENTED AND TRADEMARKED Maglock™ designs are patented and the Maglock™ name is trademarked. (Patent Pending.)

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FEATURES AND BENEFITS

LENGTH REFERENCE TABLE																		
LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)

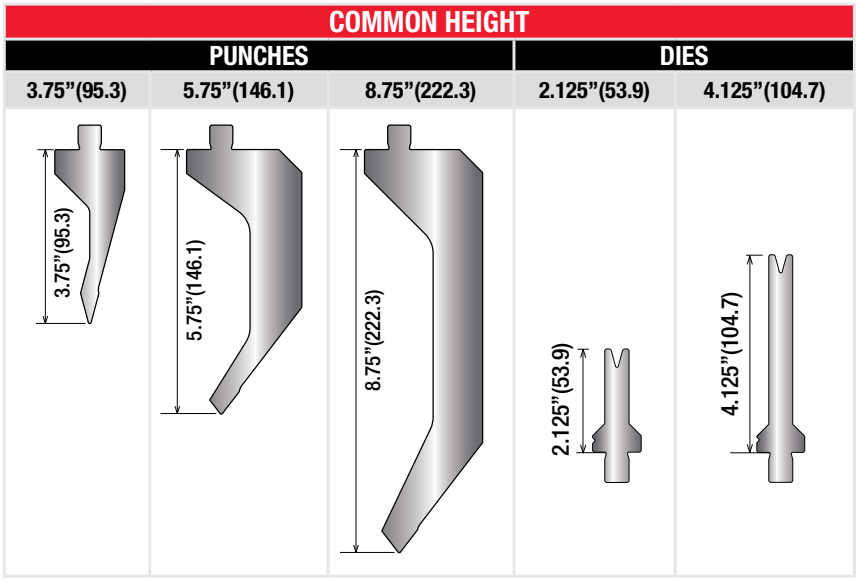
DESCRIPTION	PART NUMBER	
*Variable	028.000V	CUSTOMER SPECIFIED LENGTH
18"	028.000S	
12"	028.000T	
8"	028.000P	
Fractioned	028.000F	

Fraction set includes one each of 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4" horn left; 4" horn right. Total length=15.875"

BUY BY THE INCH — ANOTHER INDUSTRY FIRST

Order tooling to the length required by your part design as if it were a standard length in the catalog because…it is. Your required length is all you need, so don't pay for more. Buy any catalog punch or die in the specific length you want knowing that the price is by the inch.

COMMON HEIGHT Mate punches and dies are produced so that all standard profiles have a uniform and consistent height. Why is this important? Operator safety is at its highest when the brake is configured with laser or optical safety systems, which require common height tooling. (Close Proximity Point of Operation Safeguarding.) Product designers are more efficient and accurate when using uniform standards including common height tooling. Machine programming is simplified when using uniform standards including common height tooling.



INDUCTION HARDENING Induction hardening is the optimal method used with tool steels that are suited for the production of bending tools. Why is this important? Mate press brake tooling is induction hardened to 56-60 HRC on wear surfaces to a depth of .110"-.160" (3-4mm) to assure wear resistance while the body or core of the tool is 28-32 HRC to provide stability and support to the tool profile.

PRECISION HARDENED AND GROUND Mate products are produced from tool steels and with heat treatment processes that have been refined and proven for more than 30 years. The induction hardening process yields the best tool performance and tool life because it produces a deep change to the base material which supports the critical working surface. Critical working surfaces are precision ground to exacting tolerances which make high quality, predictability and repeatability possible.

MODIFIED STANDARD PUNCH RADIUS

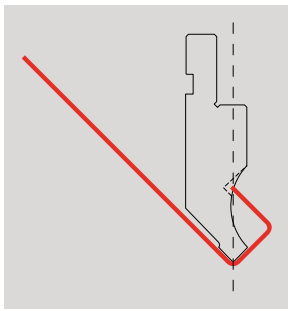
Punch radius geometry can be modified to your request (within physical limits of the specific punch). The best results occur when the change can be accommodated while maintaining the common height parameters of the standard product line.

MODIFIED STANDARD PUNCH ANGLE

Punch angle geometry can be modified to your request (within physical limits of the specific punch). The best results occur when the change can be accommodated while maintaining the common height parameters of the standard product line.

RELIEFS/DEEP RETURN FLANGE

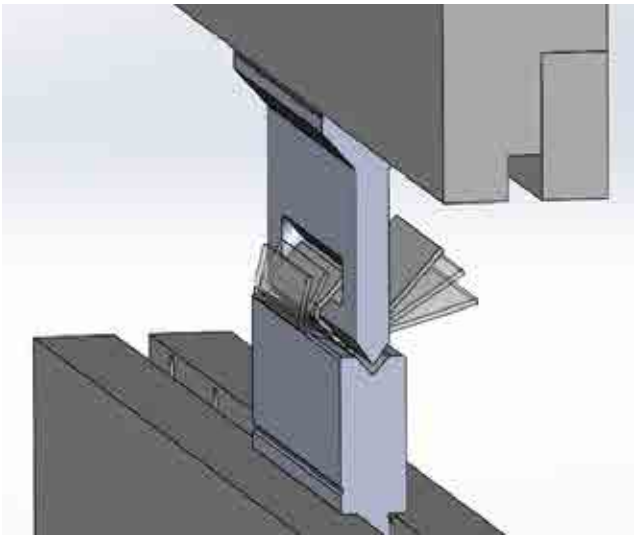
Punches can be specially modified to accommodate long return flanges. A notch or relief can be cut into the punch body in cases where the long return flange would otherwise collide with the punch body. Each application is reviewed before approval.

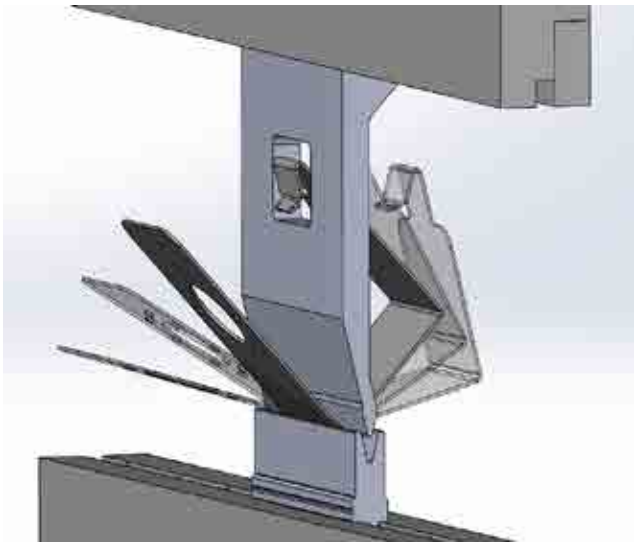




OPTIONAL WINDOW

Punches can be specially modified to accommodate long return flanges. A window can be cut into the punch body in cases where the long return flange would otherwise collide with the punch body. Each application is reviewed before approval.



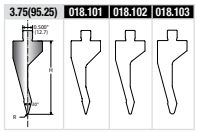


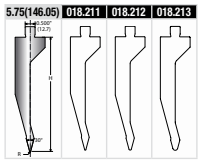
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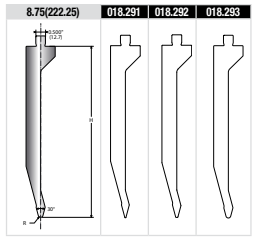
PUNCH PROFILES

3.75(95.25)	5.75(146.05)	8.75(222.25)

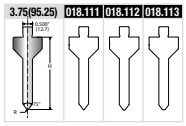
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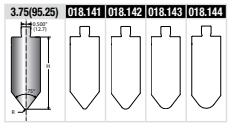


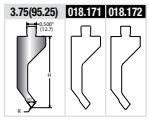


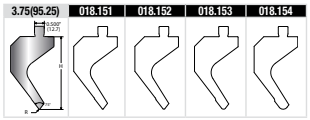


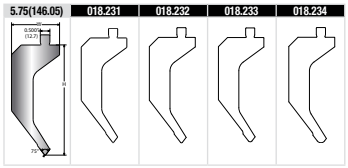
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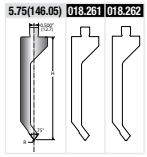


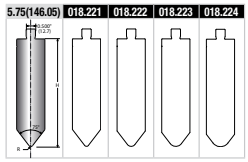


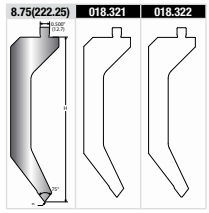




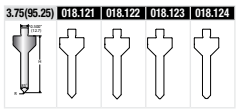


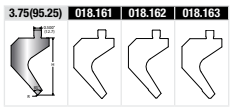


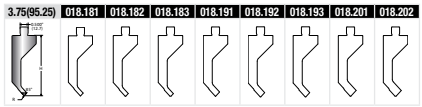


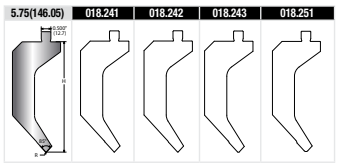


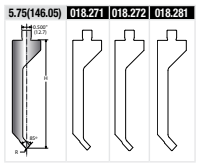
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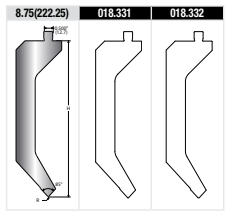




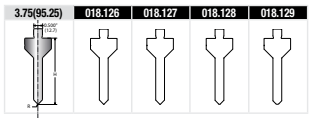


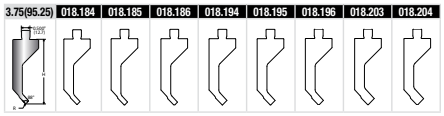


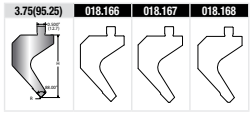


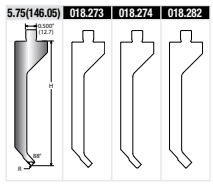


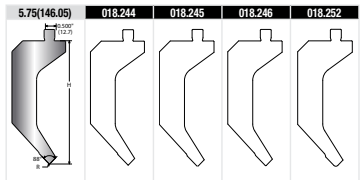
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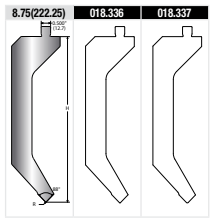




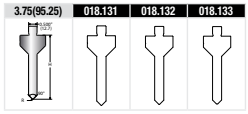


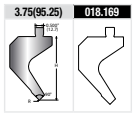


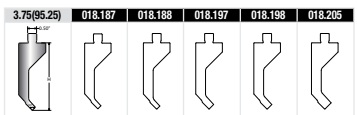


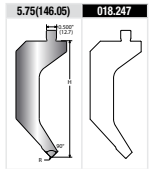


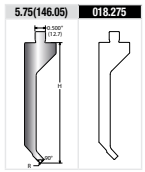
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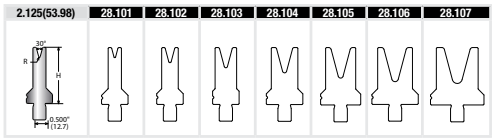
mate.com/aps-files

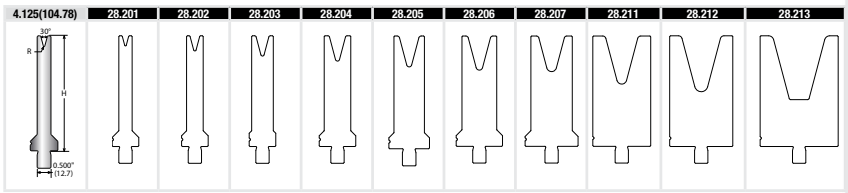
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DIE PROFILES

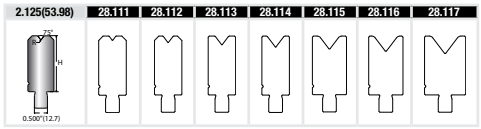
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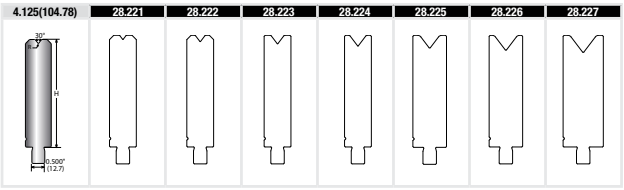
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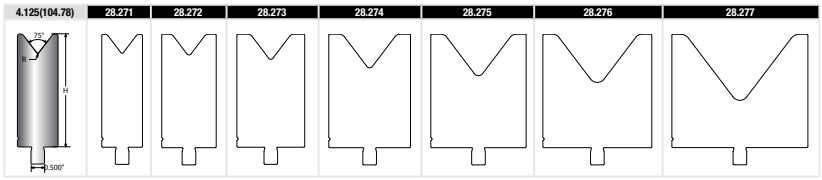




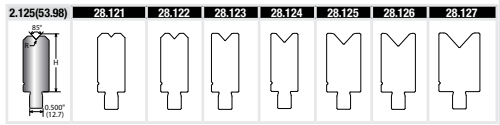
75º Page 22

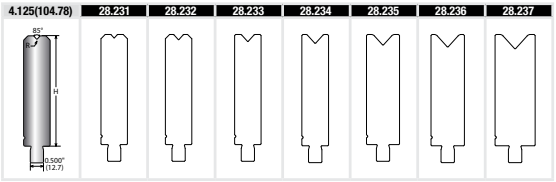


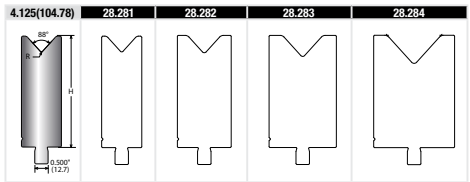




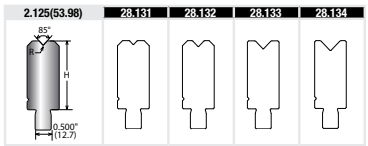
85º Page 23

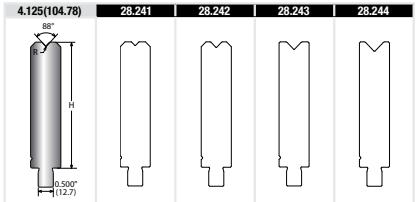




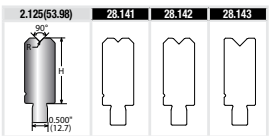


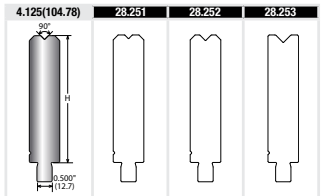
88º Page 24





90º Page 24





Link to detail DXF and PDF profile files of images on this page.

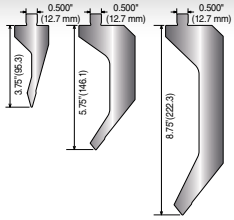
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[Dimensions in Inches (mm)]. Images are proportionate but not to scale.

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PUNCH OVERVIEW

Mate punches are manufactured to a common height of either 3.75"(95.3mm), 5.75"(146.1mm), or 8.75"(222.3mm) measured from point to shoulder. Common height punches are suited for brakes using laser or optical safety systems but can be used in all brakes.



***NEW** – Match the tool length with your part design. For example, if you need tooling that is 12.34" long, you can order this exact measurement and buy by the inch.*

LENGTH REFERENCE TABLE

LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)

DESCRIPTION	PART NUMBER	
*Variable	028.000V	CUSTOMER SPECIFIED LENGTH
18"	028.000S	
12"	028.000T	
8"	028.000P	
Fractioned	028.000F	

Fraction set includes one each of 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4" horn left; 4" horn right. Total length=15.875"

PROFILE REFERENCE TABLE - POINT RADIUS

Page Number	Angle	Acute			Arrow	Block		Gooseneck		Sash		
		Punch Height			Punch Height	Punch Height		Punch Height		Punch Height		
		Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)	Inches(mm)
		3.75(95.25)	5.75(146.05)	8.75(222.25)	3.75(95.25)	3.75(95.25)	5.75(146.05)	3.75(95.25)	5.75(146.05)	3.75(95.25)	5.75(146.05)	8.75(222.25)
		Point Radius										
11	30°	0.031(0.79)	0.031(0.79)	0.031(0.79)	—	—	—	—	—	—	—	—
11	30°	0.063(1.60)	0.063(1.60)	0.063(1.60)	—	—	—	—	—	—	—	—
11	30°	0.125(3.18)	0.125(3.18)	0.125(3.18)	—	—	—	—	—	—	—	—
12-13	75°	—	—	—	0.031(0.79)	0.125(3.18)	0.125(3.18)	0.031(0.79)	0.031(0.79)	0.031(0.79)	0.031(0.79)	0.031(0.79)
12-13	75°	—	—	—	0.063(1.60)	0.25(6.35)	0.25(6.35)	0.063(1.60)	0.063(1.60)	0.063(1.60)	0.063(1.60)	0.063(1.60)
12-13	75°	—	—	—	0.125(3.18)	0.375(9.53)	0.375(9.53)	0.125(3.18)	0.125(3.18)	—	—	—
12-13	75°	—	—	—	—	0.5(12.70)	0.5(12.70)	0.25(6.35)	0.25(6.35)	—	—	—
14-15	85°	—	—	—	0.016(0.41)	—	—	—	0.016(0.41)	0.016(0.41)	—	—
14-15	85°	—	—	—	0.031(0.79)	—	—	0.031(0.79)	0.031(0.79)	0.031(0.79)	0.031(0.79)	0.031(0.79)
14-15	85°	—	—	—	0.063(1.60)	—	—	0.063(1.60)	0.063(1.60)	0.063(1.60)	0.063(1.60)	0.063(1.60)
14-15	85°	—	—	—	0.125(3.18)	—	—	0.125(3.18)	0.125(3.18)	—	—	—
16-17	88°	—	—	—	0.016(0.41)	—	—	—	0.016(0.41)	0.016(0.41)	—	—
16-17	88°	—	—	—	0.031(0.79)	—	—	0.031(0.79)	0.031(0.79)	0.031(0.79)	0.031(0.79)	0.031(0.79)
16-17	88°	—	—	—	0.063(1.60)	—	—	0.063(1.60)	0.063(1.60)	0.063(1.60)	0.063(1.60)	0.063(1.60)
16-17	88°	—	—	—	0.125(3.18)	—	—	0.125(3.18)	0.125(3.18)	—	—	—
18	90°	—	—	—	0.016(0.41)	—	—	—	—	0.016(0.41)	—	—
18	90°	—	—	—	0.031(0.79)	—	—	0.031(0.79)	0.031(0.79)	0.031(0.79)	0.031(0.79)	—
18	90°	—	—	—	0.063(1.60)	—	—	—	—	—	—	—

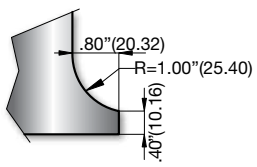
MAGLOCK™ STANDARD



MAGLOCK™ LEVER CONFIGURATION

TOOL LENGTH	LEVERS	WEIGHT (LBS)	UP FORCE
.500-4.000	0	1-10	25-30
4.001-5.000	1	11-20	40-50
5.001-18.000	2	20-30	60-70
		30-35	80-90

HORN GEOMETRY



Mate Maglock™ Technology uses Sintered Neodymium-Iron-Boron (NdFeB) Permanent Magnets that are exempt from transportation restrictions CFR2011 Title 49 Vol 2 Sec 173.21 as well as in compliance with UN2807, IATA PI 953 and the European Union's Restrictions of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive of 2002/95/EC and 2011/65/EU (RoHS2).

* Note: Ordering lengths of less than 1" must be verified and approved. Please contact a Mate representative.

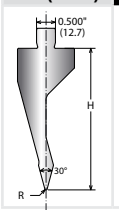
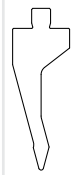
Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. *See page 8 for link.*

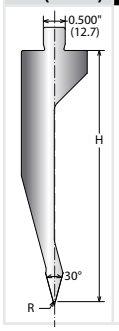
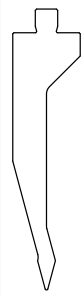
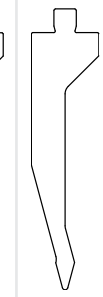
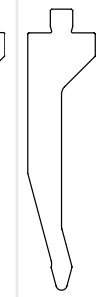
The Maglock system does not replace standard press brake clamping systems. Punches must be securely clamped in place prior to press operation.

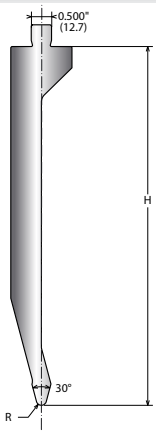
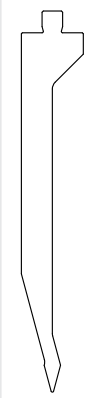
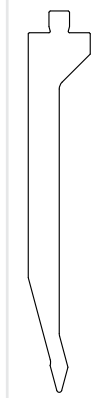
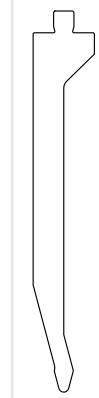
ACUTE

ACUTE PUNCHES - 30°

Profiles

3.75(95.25)	018.101	018.102	018.103
			

5.75(146.05)	018.211	018.212	018.213
			

8.75(222.25)	018.291	018.292	018.293
			

Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.101	30°	X			0.031	(0.79)	na		0.8	29	85	▶					
018.102	30°	X			0.063	(1.60)	na		0.8	29	85	▶					
018.103	30°	X			0.125	(3.18)	na		0.8	29	85	▶					
018.211	30°		X		0.031	(0.79)	na		1.2	29	85	▶					
018.212	30°		X		0.063	(1.60)	na		1.2	29	85	▶					
018.213	30°		X		0.125	(3.18)	na		1.3	29	85	▶					
018.291	30°			X	0.031	(0.79)	na		1.9	29	85	▶					
018.292	30°			X	0.063	(1.60)	na		1.9	29	85	▶					
018.293	30°			X	0.125	(3.18)	na		2.0	29	85	▶					

MAGLOCK™ PUNCH LEVERS AND COIL SPRINGS

Profiles

MATE02493	SPR33822	MATE02494	SPR33830
			

Part Number	Description	US$ Price
MATE02493	Lever	
SPR33822	Spring for MATE02493	
MATE02494	Lever	
SPR33830	Spring for MATE02494	

LENGTH REFERENCE TABLE

LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)

DESCRIPTION	PART NUMBER	
*Variable	028.000V	CUSTOMER SPECIFIED LENGTH
18"	028.000S	
12"	028.000T	
8"	028.000P	
Fractioned	028.000F	

Fraction set includes one each of 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4" horn left; 4" horn right. Total length=15.875"

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. See page 8 for link.

30°

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

The Maglock system does not replace standard press brake clamping systems. Punches must be securely clamped in place prior to press operation.

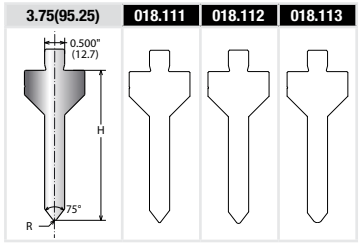
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PUNCH DETAIL - 75° AMERICAN PRECISION STYLE

ARROW

ARROW PUNCHES - 75°

Profiles



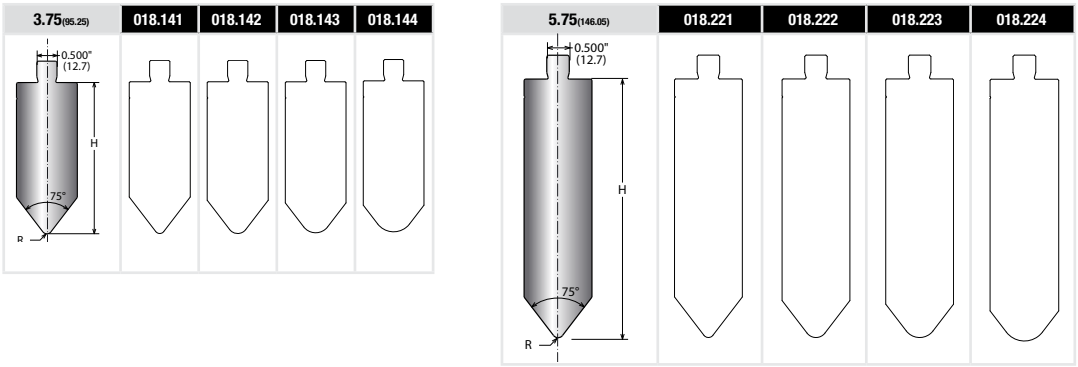
Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.111	75°	X			0.031	(0.79)	na		0.8	34	100	▶					
018.112	75°	X			0.063	(1.60)	na		0.8	34	100	▶					
018.113	75°	X			0.125	(3.18)	na		0.8	34	100	▶					

BLOCK

BLOCK PUNCHES - 75°

Profiles



Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.141	75°	X			0.125	(3.18)	na		1.5	34	100	▶					
018.142	75°	X			0.250	(6.35)	na		1.5	34	100	▶					
018.143	75°	X			0.375	(9.53)	na		1.5	34	100	▶					
018.144	75°	X			0.500	(12.70)	na		1.6	34	100	▶					
*14" max length for part numbers below																14"*	
018.221	75°		X		0.125	(3.18)	na		2.3	34	100	▶					
018.222	75°		X		0.250	(6.35)	na		2.4	34	100	▶					
018.223	75°		X		0.375	(9.53)	na		2.4	34	100	▶					
018.224	75°		X		0.500	(12.70)	na		2.4	34	100	▶					

LENGTH REFERENCE TABLE

LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)

DESCRIPTION	PART NUMBER	
*Variable	028.000V	CUSTOMER SPECIFIED LENGTH
18"	028.000S	
12"	028.000T	
8"	028.000P	
Fractioned	028.000F	

Fraction set includes one each of 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4" horn left; 4" horn right. Total length=15.875"

75°

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. See page 8 for link.

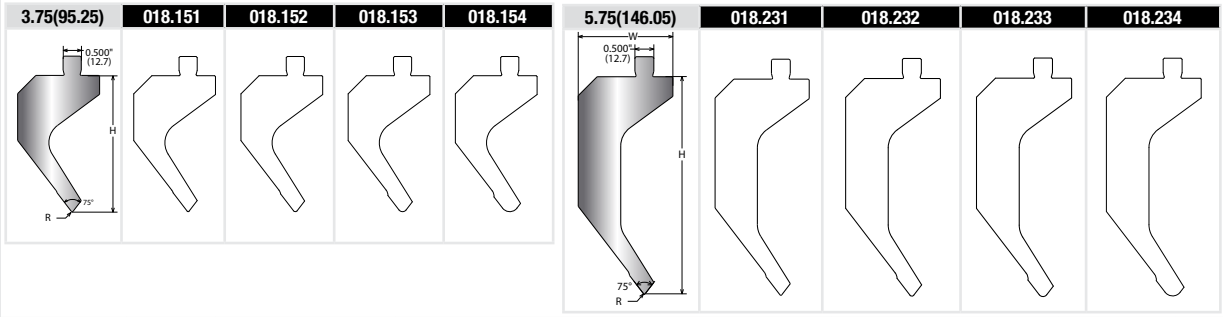
The Maglock system does not replace standard press brake clamping systems. Punches must be securely clamped in place prior to press operation.

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

GOOSENECK

GOOSENECK PUNCHES - 75°

Profiles



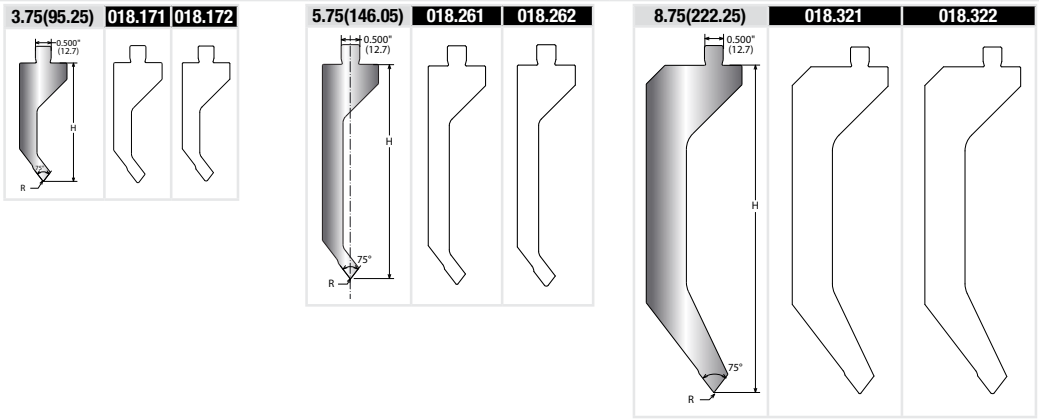
Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.151	75°	X			0.031	(0.79)	0.438	(11.13)	1.2	17	50	▶					
018.152	75°	X			0.063	(1.60)	0.438	(11.13)	1.2	17	50	▶					
018.153	75°	X			0.125	(3.18)	0.438	(11.13)	1.2	17	50	▶					
018.154	75°	X			0.250	(6.35)	0.438	(11.13)	1.2	17	50	▶					
018.231	75°		X		0.031	(0.79)	0.438	(11.13)	1.9	17	50	▶					
018.232	75°		X		0.063	(1.60)	0.438	(11.13)	1.9	17	50	▶					
018.233	75°		X		0.125	(3.18)	0.438	(11.13)	1.9	17	50	▶					
018.234	75°		X		0.250	(6.35)	0.438	(11.13)	2.0	17	50	▶					

SASH

SASH PUNCHES - 75°

Profiles



Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.171	75°	X			0.031	(0.79)	0.375	(9.53)	0.9	17	50	▶					
018.172	75°	X			0.063	(1.60)	0.375	(9.53)	0.9	17	50	▶					
018.261	75°		X		0.031	(0.79)	0.375	(9.53)	1.2	17	50	▶					
018.262	75°		X		0.063	(1.60)	0.375	(9.53)	1.2	17	50	▶					
018.321	75°			X	0.031	(0.79)	0.609	(15.47)	3.1	17	50	▶					
018.322	75°			X	0.063	(1.60)	0.609	(15.47)	3.1	17	50	▶					

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. See page 8 for link.

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

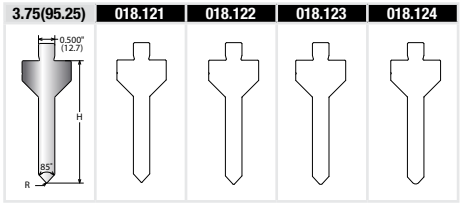
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PUNCH DETAIL - 85° AMERICAN PRECISION STYLE

ARROW PUNCHES - 85°

Profiles



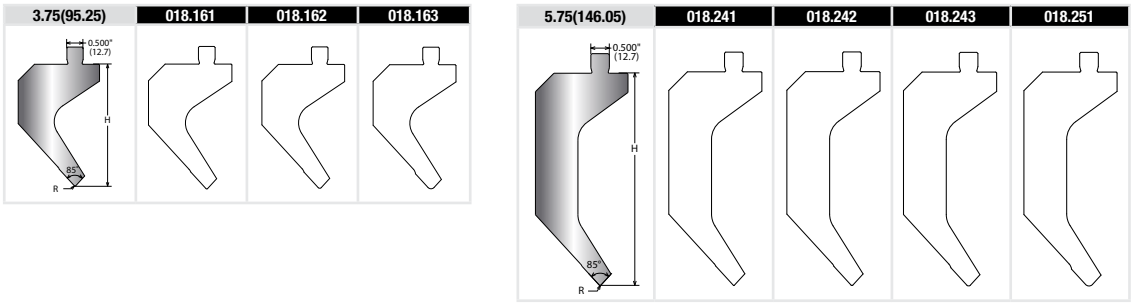
Description

ARROW

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.121	85°	X			0.016	(0.41)	na		0.8	34	100	▶					
018.122	85°	X			0.031	(0.79)	na		0.8	34	100	▶					
018.123	85°	X			0.063	(1.60)	na		0.8	34	100	▶					
018.124	85°	X			0.125	(3.18)	na		0.8	34	100	▶					

GOOSENECK PUNCHES - 85°

Profiles



Description

GOOSENECK

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.161	85°	X			0.031	(0.79)	0.438	(11.13)	1.4	29	85	▶					
018.162	85°	X			0.063	(1.60)	0.438	(11.13)	1.4	29	85	▶					
018.163	85°	X			0.125	(3.18)	0.438	(11.13)	1.4	29	85	▶					
018.241	85°		X		0.016	(0.41)	0.438	(11.13)	1.8	29	85	▶					
018.242	85°		X		0.031	(0.79)	0.438	(11.13)	1.8	29	85	▶					
018.243	85°		X		0.063	(1.60)	0.438	(11.13)	1.8	29	85	▶					
018.251	85°		X		0.125	(3.18)	0.438	(11.13)	1.8	29	85	▶					

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. See page 8 for link.

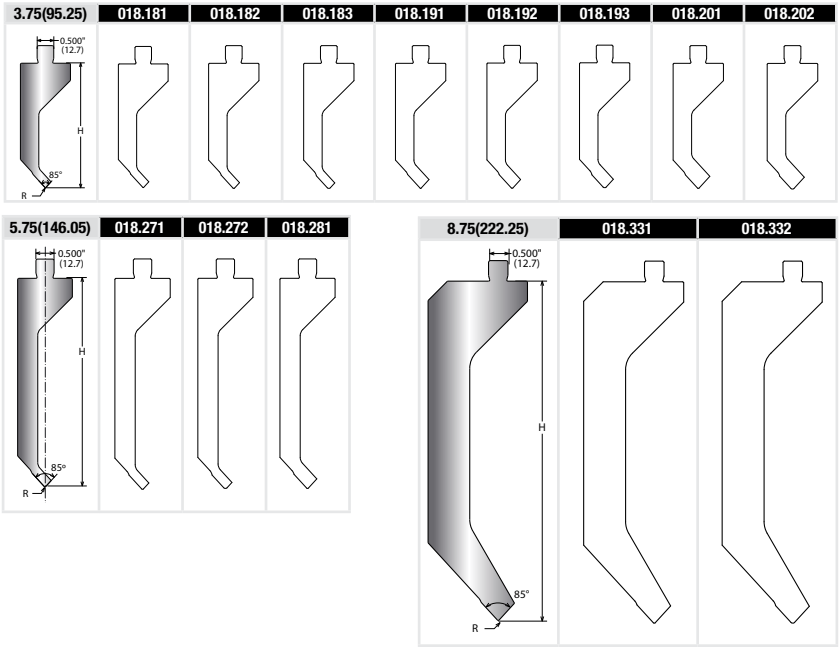
The Maglock system does not replace standard press brake clamping systems. Punches must be securely clamped in place prior to press operation.

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

SASH

SASH PUNCHES - 85°

Profiles



Description

Part Number	Angle	Height			Radius		Tip Flat		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.181	85°	X			0.016	(0.41)	0.250	(6.35)	0.9	11	32	▶					
018.182	85°	X			0.031	(0.79)	0.250	(6.35)	0.9	11	32	▶					
018.183	85°	X			0.063	(1.60)	0.250	(6.35)	0.9	11	32	▶					
018.191	85°	X			0.016	(0.41)	0.375	(9.53)	0.9	18	55	▶					
018.192	85°	X			0.031	(0.79)	0.375	(9.53)	0.9	18	55	▶					
018.193	85°	X			0.063	(1.60)	0.375	(9.53)	0.9	18	55	▶					
018.201	85°	X			0.031	(0.79)	0.500	(12.7)	0.9	30	90	▶					
018.202	85°	X			0.063	(1.60)	0.500	(12.7)	0.9	30	90	▶					
018.271	85°		X		0.031	(0.79)	0.250	(6.35)	1.2	11	32	▶					
018.272	85°		X		0.063	(1.60)	0.250	(6.35)	1.2	11	32	▶					
018.281	85°		X		0.031	(0.79)	0.375	(9.53)	1.2	18	55	▶					
018.331	85°			X	0.031	(0.79)	0.609	(15.47)	3.2	17	50	▶					
018.332	85°			X	0.063	(1.60)	0.609	(15.47)	3.2	17	50	▶					

LENGTH REFERENCE TABLE

LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)

DESCRIPTION	PART NUMBER	
*Variable	028.000V	CUSTOMER SPECIFIED LENGTH
18"	028.000S	
12"	028.000T	
8"	028.000P	
Fractioned	028.000F	

Fraction set includes one each of 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4" horn left; 4" horn right. Total length=15.875"

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. See page 8 for link.

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

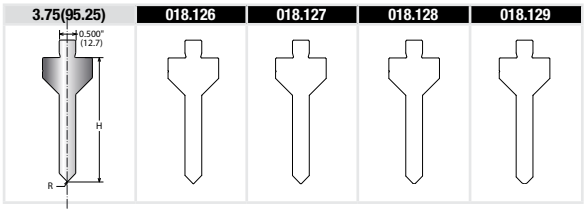
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PUNCH DETAIL - 88° AMERICAN PRECISION STYLE

ARROW PUNCHES - 88°

Profiles



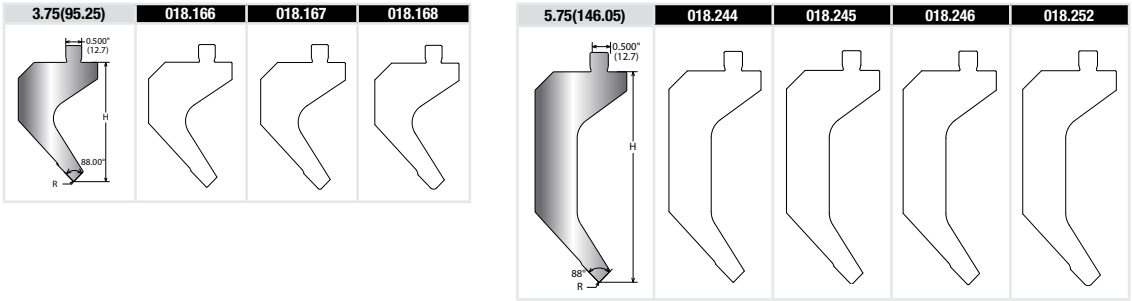
Description

ARROW

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.126	88°	X			0.016	(0.41)	na		0.8	34	100	▶					
018.127	88°	X			0.031	(0.79)	na		0.8	34	100	▶					
018.128	88°	X			0.063	(1.60)	na		0.8	34	100	▶					
018.129	88°	X			0.125	(3.18)	na		0.8	34	100	▶					

GOOSENECK PUNCHES - 88°

Profiles



Description

GOOSENECK

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.166	88°	X			0.031	(0.79)	0.438	(11.13)	1.4	29	85	▶					
018.167	88°	X			0.063	(1.60)	0.438	(11.13)	1.4	29	85	▶					
018.168	88°	X			0.125	(3.18)	0.438	(11.13)	1.4	29	85	▶					
018.244	88°		X		0.016	(0.41)	0.438	(11.13)	2.1	29	85	▶					
018.245	88°		X		0.031	(0.79)	0.438	(11.13)	2.1	29	85	▶					
018.246	88°		X		0.063	(1.60)	0.438	(11.13)	2.1	29	85	▶					
018.252	88°		X		0.125	(3.18)	0.438	(11.13)	2.1	29	85	▶					

88°

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. See page 8 for link.

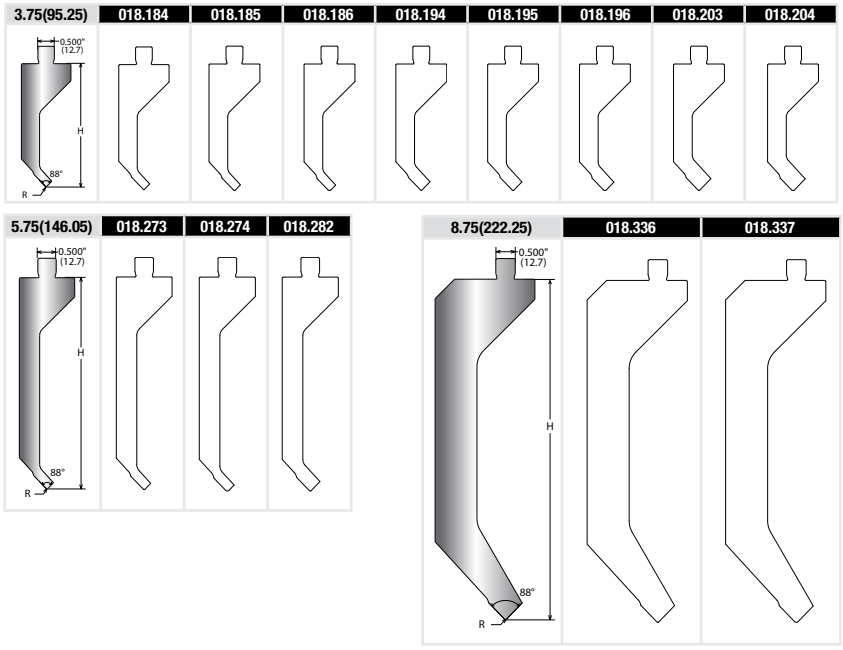
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[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

SASH

SASH PUNCHES - 88°

Profiles



Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.184	88°	X			0.016	(0.41)	0.250	(6.35)	0.9	11	32	▶					
018.185	88°	X			0.031	(0.79)	0.250	(6.35)	0.9	11	32	▶					
018.186	88°	X			0.063	(1.60)	0.250	(6.35)	0.9	11	32	▶					
018.194	88°	X			0.016	(0.41)	0.375	(9.53)	0.9	18	55	▶					
018.195	88°	X			0.031	(0.79)	0.375	(9.53)	0.9	18	55	▶					
018.196	88°	X			0.063	(1.60)	0.375	(9.53)	0.9	18	55	▶					
018.203	88°	X			0.031	(0.79)	0.500	(12.7)	0.9	30	90	▶					
018.204	88°	X			0.063	(1.60)	0.500	(12.7)	0.9	30	90	▶					
018.273	88°		X		0.031	(0.79)	0.250	(6.35)	1.2	11	32	▶					
018.274	88°		X		0.063	(1.60)	0.250	(6.35)	1.2	11	32	▶					
018.282	88°		X		0.031	(0.79)	0.375	(9.53)	1.2	18	55	▶					
018.336	88°			X	0.031	(0.79)	0.609	(15.47)	3.2	17	50	▶					
018.337	88°			X	0.063	(1.60)	0.609	(15.47)	3.2	17	50	▶					

LENGTH REFERENCE TABLE

LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)

DESCRIPTION	PART NUMBER	
*Variable	028.000V	CUSTOMER SPECIFIED LENGTH
18"	028.000S	
12"	028.000T	
8"	028.000P	
Fractioned	028.000F	

Fraction set includes one each of 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4" horn left; 4" horn right. Total length=15.875"

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. See page 8 for link.

88°

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

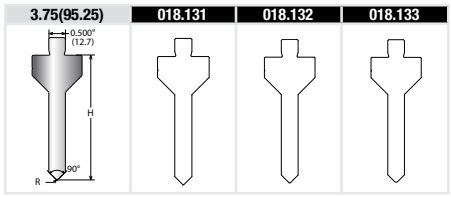
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PUNCH DETAIL - 90° AMERICAN PRECISION STYLE

ARROW PUNCHES - 90°

Profiles

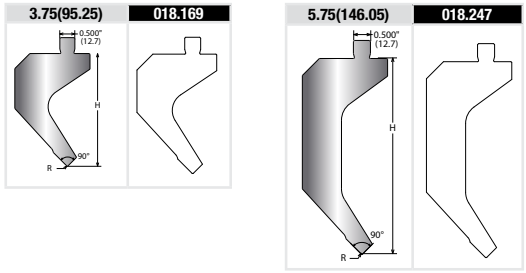


Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.131	90°	X			0.016	(0.41)	na		0.8	34	100	▶					
018.132	90°	X			0.031	(0.79)	na		0.8	34	100	▶					
018.133	90°	X			0.063	(1.60)	na		0.8	34	100	▶					

GOOSENECK PUNCHES - 90°

Profiles

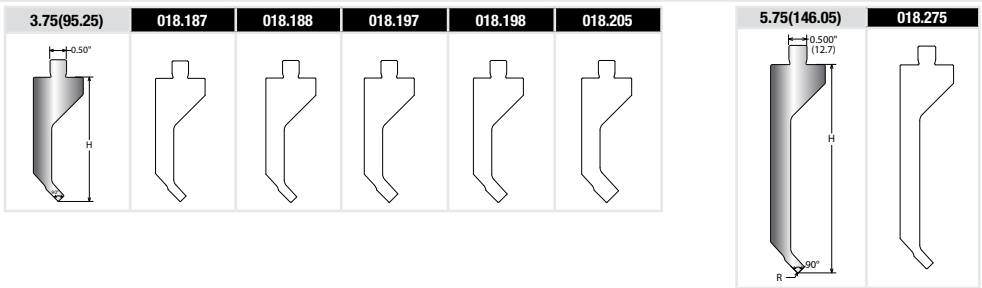


Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.169	90°	X			0.031	(0.79)	0.438	(11.13)	1.4	29	85	▶					
018.247	90°		X		0.031	(0.79)	0.438	(11.13)	1.8	29	85	▶					

SASH PUNCHES - 90°

Profiles



Description

Part Number	Angle	Height			Radius		Tip Width		Weight per Inch (lbs)	Tons/ft	Tons/mt	MT	US$ Price				
		Inches(mm)	Inches(mm)	Inches(mm)									Per Inch	8"	12"	18"	Set
		3.75(95.25)	5.75(146.05)	8.75(222.25)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
018.187	90°	X			0.016	(0.41)	0.250	(6.35)	0.9	11	32	▶					
018.188	90°	X			0.031	(0.79)	0.250	(6.35)	0.9	11	32	▶					
018.197	90°	X			0.016	(0.41)	0.375	(9.53)	0.9	18	55	▶					
018.198	90°	X			0.031	(0.79)	0.375	(9.53)	0.9	18	55	▶					
018.205	90°	X			0.031	(0.79)	0.500	(12.7)	0.9	30	90	▶					
018.275	90°		X		0.031	(0.79)	0.250	(6.35)	1.2	11	32	▶					

90°

Punches made with Maglock™ Technology. Punch gridline files and DXF files are available for download. *See page 8 for link.*

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[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

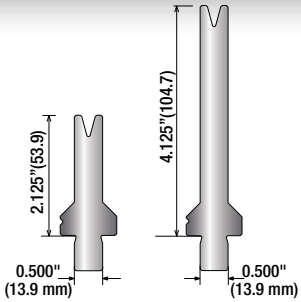
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MATE02506	36
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DIE OVERVIEW AMERICAN PRECISION STYLE

Mate dies are manufactured to a common height of either 2.125" (54.0mm) or 4.125" (104.8mm) measured from base to shoulder. Common height dies are suited for brakes using laser or optical safety systems but can be used in all brakes.



***NEW** – Match the tool length with your part design. For example, if you need tooling that is 12.34" long, you can order this exact measurement and buy by the inch.*

LENGTH REFERENCE TABLE

LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)
DESCRIPTION / PART NUMBER																		
*Variable 028.000V	CUSTOMER SPECIFIED LENGTH																	
18" 028.000S																		
12" 028.000T																		
8" 028.000P																		
Fractioned 028.000F																		

(F) Fraction set includes one each of: 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4"; 4". Total length=15.875"

STANDARD 1 V DIE REFERENCE TABLE

Mate dies are manufactured to a common height of either 2.125" (54.0mm) or 4.125" (104.8mm) measured from base to shoulder. Common height dies are suited for brakes using laser or optical safety systems but can be used in all brakes.

Angle	Height		V Opening						
	2.125(54.0)	4.125(104.8)							
30°	X	—	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	0.750(19.0)	0.875(22.2)	1.000(25.4)
75°	X	—	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	0.750(19.0)	0.875(22.2)	1.000(25.4)
85°	X	—	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	0.750(19.0)	0.875(22.2)	1.000(25.4)
88°	X	—	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	—	—	—
90°	X	—	0.250(6.4)	0.375(9.5)	0.500(12.7)	—	—	—	—
30°	—	X	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	0.750(19.0)	0.875(22.2)	1.000(25.4)
75°	—	X	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	0.750(19.0)	0.875(22.2)	1.000(25.4)
85°	—	X	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	0.750(19.0)	0.875(22.2)	1.000(25.4)
88°	—	X	0.250(6.4)	0.375(9.5)	0.500(12.7)	0.625(15.9)	—	—	—
90°	—	X	0.250(6.4)	0.375(9.5)	0.500(12.7)	—	—	—	—

LARGE 1 V DIE REFERENCE TABLE

30°	—	X	—	1.250(31.8)	1.500(38.1)	2.000(50.8)	—	—	—
75°	—	X	1.125(28.6)	1.250(31.8)	1.500(38.1)	2.000(50.8)	2.500(50.8)	3.000(76.2)	4.000(101.6)
85°	—	X	1.125(28.6)	1.250(31.8)	1.500(38.1)	2.000(50.8)	—	—	—

ANGLE/RADIUS REFERENCE TABLE

Page	Angle	Shoulder Radius													
21	30°	—	.047(1.2)	.062(1.6)	—	.094(2.4)	.118(3.0)	.138(3.5)	—	—	.197(5.0)	—	—	—	—
22	75°	.031(.8)	.047(1.2)	.062(1.6)	.078(2.0)	—	—	—	.156(4.0)	.188(4.8)	—	.219(5.6)	.25(6.4)	.281(7.1)	.374(9.5)
23	85°	.031(.8)	.047(1.2)	.062(1.6)	.078(2.0)	—	—	—	.156(4.0)	.188(4.8)	—	.219(5.6)	—	—	—
24	88°	.031(.8)	.047(1.2)	.062(1.6)	.078(2.0)	—	—	—	—	—	—	—	—	—	—
24	90°	.031(.8)	.047(1.2)	.062(1.6)	—	—	—	—	—	—	—	—	—	—	—

* Note: Ordering lengths of less than 1" must be verified and approved.
Please contact a Mate representative.

Die DXF files are available for download. See page 9 for link.

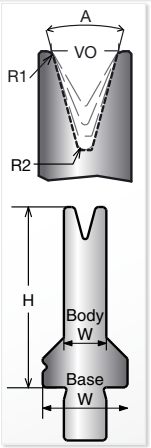
[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

DIE DETAIL 30° AMERICAN PRECISION STYLE

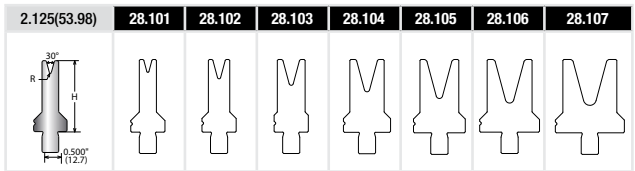
ACUTE

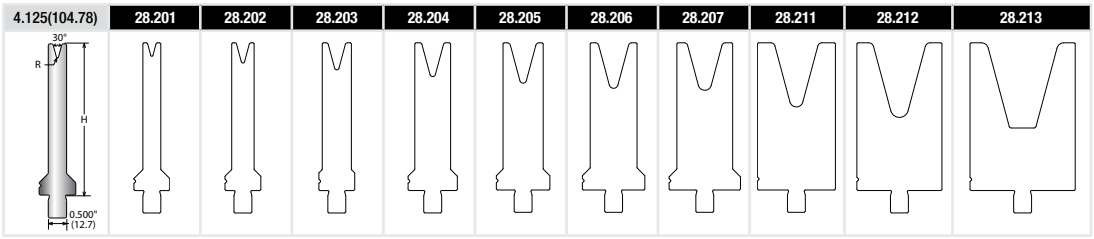
ACUTE DIES - 30°

Key



Profiles





Description

Part Number	Angle	Height		V Opening		Radius 1		Radius 2		Body Width		Base Width		Weight Per Inch (lbs)	Tons/ ft	Tons/ mt	MT	US$ Price				
		Inches(mm)	Inches(mm)															Per Inch	8"	12"	18	Set
		2.125(53.98)	4.125(104.78)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
028.101	30°	X		0.250	(6.35)	0.047	(1.19)	0.031	(0.79)	0.500	(12.70)	1.000	(25.40)	0.4	14	40	▶					
028.102	30°	X		0.375	(9.53)	0.047	(1.19)	0.047	(1.19)	0.625	(15.88)	1.000	(25.40)	0.5	14	40	▶					
028.103	30°	X		0.500	(12.70)	0.063	(1.60)	0.063	(1.60)	0.813	(20.65)	1.000	(25.40)	0.5	17	50	▶					
028.104	30°	X		0.625	(15.88)	0.063	(1.60)	0.078	(1.98)	1.000	(25.40)	1.375	(34.93)	0.6	19	55	▶					
028.105	30°	X		0.750	(19.05)	0.094	(2.39)	0.094	(2.39)	1.125	(28.58)	1.500	(38.10)	0.7	19	55	▶					
028.106	30°	X		0.875	(22.23)	0.094	(2.39)	0.125	(3.18)	1.313	(33.35)	1.750	(44.45)	0.7	22	65	▶					
028.107	30°	X		1.000	(25.40)	0.094	(2.39)	0.188	(4.78)	1.563	(39.70)	2.000	(50.80)	0.8	24	70	▶					
028.201	30°		X	0.250	(6.35)	0.047	(1.19)	0.031	(0.79)	0.500	(12.70)	1.000	(25.40)	0.7	14	40	▶					
028.202	30°		X	0.375	(9.53)	0.047	(1.19)	0.047	(1.19)	0.625	(15.88)	1.000	(25.40)	0.8	14	40	▶					
028.203	30°		X	0.500	(12.70)	0.063	(1.60)	0.063	(1.60)	0.813	(20.65)	1.000	(25.40)	1.0	17	50	▶					
028.204	30°		X	0.625	(15.88)	0.063	(1.60)	0.078	(1.98)	1.000	(25.40)	1.375	(34.93)	1.2	19	55	▶					
028.205	30°		X	0.750	(19.05)	0.094	(2.39)	0.094	(2.39)	1.125	(28.58)	1.500	(38.10)	1.3	19	55	▶					
028.206	30°		X	0.875	(22.23)	0.094	(2.39)	0.125	(3.18)	1.313	(33.35)	1.750	(44.45)	1.5	22	65	▶					
028.207	30°		X	1.000	(25.40)	0.094	(2.39)	0.187	(4.75)	1.563	(39.70)	2.000	(50.80)	1.7	24	70	▶					
028.211	30°		X	1.250	(31.75)	0.118	(3.00)	0.187	(4.75)	2.187	(55.55)	2.187	(55.55)	2.2	29	85	▶					
028.212	30°		X	1.500	(38.10)	0.138	(3.51)	0.250	(6.35)	2.375	(60.33)	2.375	(60.33)	2.3	29	85	▶					
028.213	30°		X	2.000	(50.80)	0.197	(5.00)	0.630	(16.00)	2.937	(74.60)	2.937	(74.60)	2.6	29	85	▶					

LENGTH REFERENCE TABLE

LENGTH IN INCHES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mm	(25.4)	(50.8)	(76.2)	(101.6)	(127.0)	(152.4)	(177.8)	(203.2)	(228.6)	(254.0)	(279.4)	(304.8)	(330.2)	(355.6)	(381.0)	(406.4)	(431.8)	(457.2)

DESCRIPTION	PART NUMBER	
*Variable	028.000V	CUSTOMER SPECIFIED LENGTH
18"	028.000S	
12"	028.000T	
8"	028.000P	
Fractioned	028.000F	

Fraction set includes one each of 1/2"; 5/8"; 3/4"; 1"; 2"; 3"; 4"; 4". Total length=15.875"

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

Die DXF files are available for download. See page 9 for link.

LIT01186 Rev C2 PN 2018

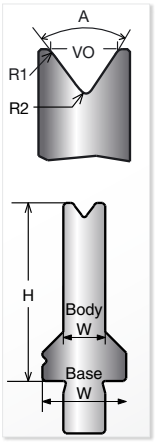
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DIE DETAIL - 75° AMERICAN PRECISION STYLE

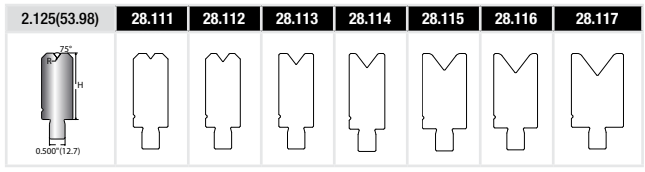
STANDARD

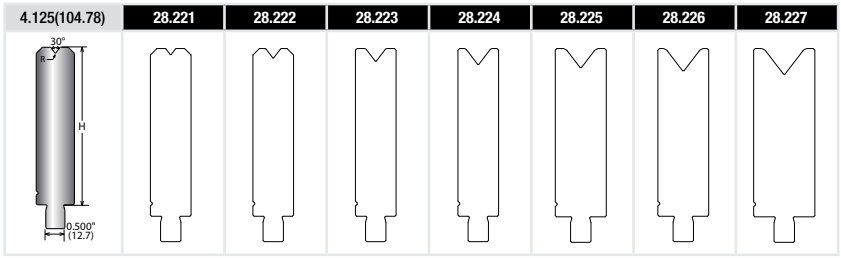
STANDARD DIES - 75°

Key



Profiles





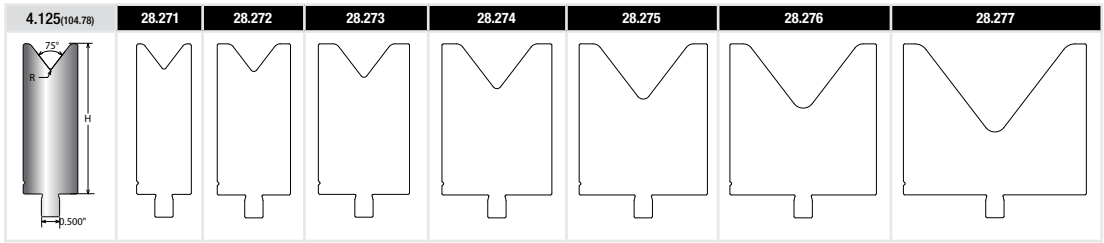
Description

Part Number	Angle	Height Inches(mm) 2.125(53.98)	Height Inches(mm) 4.125(104.78)	V Opening Inches	V Opening (mm)	Radius 1 Inches	Radius 1 (mm)	Radius 2 Inches	Radius 2 (mm)	Body Width Inches	Body Width (mm)	Base Width Inches	Base Width (mm)	Weight Per Inch (lbs)	Tons/ ft	Tons/ mt	MT	US$ Price Per Inch (V)	8" (P)	12 (T)	18" (S)	Set (F)
028.111	75°	X		0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.112	75°	X		0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.113	75°	X		0.500	(12.70)	0.063	(1.60)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.114	75°	X		0.625	(15.88)	0.078	(1.98)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.115	75°	X		0.750	(19.05)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	0.8	34	100	▶					
028.116	75°	X		0.875	(22.23)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	0.8	34	100	▶					
028.117	75°	X		1.000	(25.40)	0.156	(3.96)	0.031	(0.79)	1.500	(38.10)	1.500	(38.10)	0.9	34	100	▶					
028.221	75°		X	0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.222	75°		X	0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.223	75°		X	0.500	(12.70)	0.063	(1.60)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.224	75°		X	0.625	(15.88)	0.078	(1.98)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.225	75°		X	0.750	(19.05)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	1.5	34	100	▶					
028.226	75°		X	0.875	(22.23)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	1.5	34	100	▶					
028.227	75°		X	1.000	(25.40)	0.156	(3.96)	0.031	(0.79)	1.500	(38.10)	1.500	(38.10)	1.7	34	100	▶					

LARGE V

LARGE V DIES - 75°

Profiles



Description

Part Number	Angle	Height Inches(mm) 2.125(53.98)	Height Inches(mm) 4.125(104.78)	V Opening Inches	V Opening (mm)	Radius 1 Inches	Radius 1 (mm)	Radius 2 Inches	Radius 2 (mm)	Body Width Inches	Body Width (mm)	Base Width Inches	Base Width (mm)	Weight Per Inch (lbs)	Tons/ ft	Tons/ mt	MT	US$ Price Per Inch (V)	8" (P)	12 (T)	18" (S)	Set (F)
028.271	75°		X	1.125	(28.58)	0.156	(3.96)	0.062	(1.57)	1.500	(38.10)	1.500	(38.10)	1.7	34	100	▶					
028.272	75°		X	1.250	(31.75)	0.188	(4.78)	0.094	(2.39)	2.000	(50.80)	2.000	(50.80)	2.3	34	100	▶					
028.273	75°		X	1.500	(38.10)	0.188	(4.78)	0.094	(2.39)	2.500	(63.50)	2.500	(63.50)	2.8	34	100	▶					
028.274	75°		X	2.000	(50.80)	0.219	(5.56)	0.125	(3.18)	3.000	(76.20)	3.000	(76.20)	3.2	34	100	▶					
028.275	75°		X	2.500	(63.50)	0.250	(6.35)	0.188	(4.78)	3.500	(88.90)	3.500	(88.90)	3.6	50	150	▶					
028.276	75°		X	3.000	(76.20)	0.281	(7.14)	0.313	(7.95)	4.000	(101.60)	4.000	(101.60)	3.9	50	150	▶					
028.277	75°		X	4.000	(101.60)	0.375	(9.53)	0.313	(7.95)	5.000	(127.00)	5.000	(127.00)	4.4	50	150	▶					

Die DXF files are available for download. See page 9 for link.

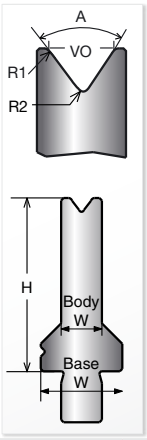
[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

DIE DETAIL - 85° AMERICAN PRECISION STYLE

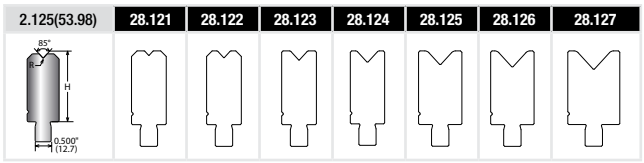
STANDARD DIES - 85°

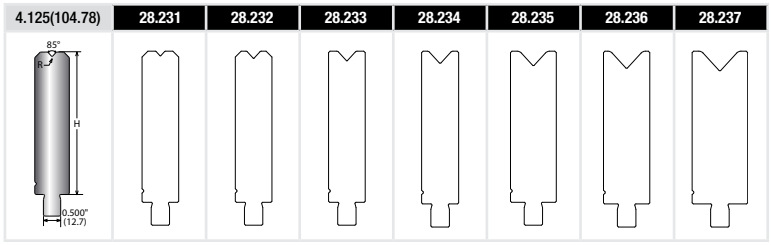
STANDARD

Key



Profiles





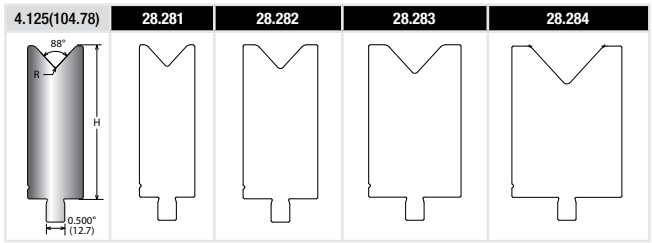
Description

Part Number	Angle	Height		V Opening		Radius 1		Radius 2		Body Width		Base Width		Weight Per Inch (lbs)	Tons/ ft	Tons/ mt	MT	US$ Price				
		Inches(mm)	Inches(mm)															Per Inch	8"	12"	18"	Set
		2.125(53.98)	4.125(104.78)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)					(V)	(P)	(T)	(S)	(F)
028.121	85°	X	—	0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.122	85°	X	—	0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.123	85°	X	—	0.500	(12.70)	0.062	(1.57)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.124	85°	X	—	0.625	(15.88)	0.078	(1.98)	0.031	(0.79)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.125	85°	X	—	0.750	(19.05)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	0.8	34	100	▶					
028.126	85°	X	—	0.875	(22.23)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	0.8	34	100	▶					
028.127	85°	X	—	1.000	(25.40)	0.156	(3.96)	0.031	(0.79)	1.500	(38.10)	1.500	(38.10)	0.9	34	100	▶					
028.231	85°	—	X	0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.232	85°	—	X	0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.233	85°	—	X	0.500	(12.70)	0.062	(1.57)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.234	85°	—	X	0.625	(15.88)	0.078	(1.98)	0.031	(0.79)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.235	85°	—	X	0.750	(19.05)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	1.5	34	100	▶					
028.236	85°	—	X	0.875	(22.23)	0.156	(3.96)	0.031	(0.79)	1.250	(31.75)	1.250	(31.75)	1.5	34	100	▶					
028.237	85°	—	X	1.000	(25.40)	0.156	(3.96)	0.031	(0.79)	1.500	(38.10)	1.500	(38.10)	1.8	34	100	▶					

LARGE V DIES - 85°

LARGE V

Profiles



Description

Part Number	Angle	Height		V Opening		Radius 1		Radius 2		Body Width		Base Width		Weight Per Inch (lbs)	Tons/ ft	Tons/ mt	MT	US$ Price				
		Inches(mm)	Inches(mm)															Inch	8"	12	18"	Set
		2.125(53.98)	4.125(104.78)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)					(lbs)	(P)	(T)	(S)	(F)
028.281	85°		X	1.125	(28.58)	0.156	(3.96)	0.063	(1.60)	1.500	(38.10)	1.500	(38.10)	1.7	34	100	▶					
028.282	85°		X	1.250	(31.75)	0.188	(4.78)	0.094	(2.39)	2.000	(50.80)	2.000	(50.80)	2.3	34	100	▶					
028.283	85°		X	1.500	(38.10)	0.188	(4.78)	0.094	(2.39)	2.500	(63.50)	2.500	(63.50)	2.8	34	100	▶					
028.284	85°		X	2.000	(50.80)	0.219	(5.56)	0.125	(3.18)	3.000	(76.20)	3.000	(76.20)	3.3	34	100	▶					

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

Die DXF files are available for download. See page 9 for link.

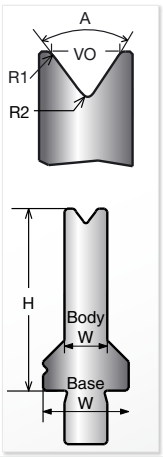
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88° 90° DIE DETAIL - 88° AND 90° AMERICAN PRECISION STYLE

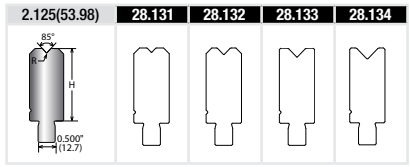
STANDARD

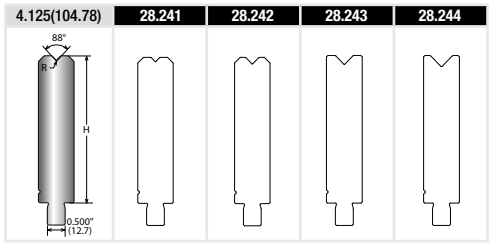
STANDARD DIES - 88°

Key



Profiles





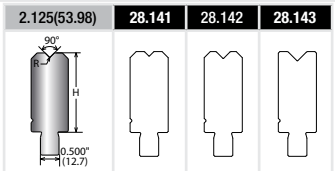
Description

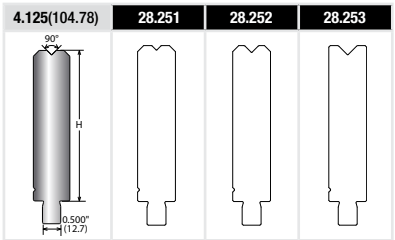
Part Number	Angle	Height Inches(mm) 2.125(53.98)	Height Inches(mm) 4.125(104.78)	V Opening Inches	V Opening (mm)	Radius 1 Inches	Radius 1 (mm)	Radius 2 Inches	Radius 2 (mm)	Body Width Inches	Body Width (mm)	Base Width Inches	Base Width (mm)	Weight Per Inch (lbs)	Tons/ ft	Tons/ mt	MT	US$ Price Per Inch (V)	8" (P)	12 (T)	18" (S)	Set (F)
028.131	88°	X		0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.132	88°	X		0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.133	88°	X		0.500	(12.70)	0.062	(1.57)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.134	88°	X		0.625	(15.88)	0.078	(1.98)	0.031	(0.79)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.241	88°		X	0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.242	88°		X	0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.243	88°		X	0.500	(12.70)	0.062	(1.57)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.244	88°		X	0.625	(15.88)	0.078	(1.98)	0.031	(0.79)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					

STANDARD

STANDARD DIES - 90°

Profiles





Description

Part Number	Angle	Height Inches(mm) 2.125(53.98)	Height Inches(mm) 4.125(104.78)	V Opening Inches	V Opening (mm)	Radius 1 Inches	Radius 1 (mm)	Radius 2 Inches	Radius 2 (mm)	Body Width Inches	Body Width (mm)	Base Width Inches	Base Width (mm)	Weightt Per Inch (lbs)	Tons/ ft	Tons/ mt	MT	US$ Price Per Inch (V)	8" (P)	12 (T)	18" (S)	Set (F)
028.141	90°	X		0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.142	90°	X		0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.143	90°	X		0.500	(12.70)	0.062	(1.57)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	0.7	34	100	▶					
028.251	90°		X	0.250	(6.35)	0.031	(0.79)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.252	90°		X	0.375	(9.53)	0.047	(1.19)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					
028.253	90°		X	0.500	(12.70)	0.062	(1.57)	0.016	(0.41)	1.000	(25.40)	1.000	(25.40)	1.2	34	100	▶					

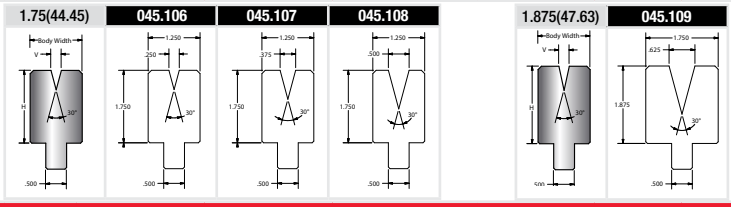
Die DXF files are available for download. See page 9 for link.

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

URETHANE DIES - SOLID

URETHANE DIES - 30° ACUTE

Profiles

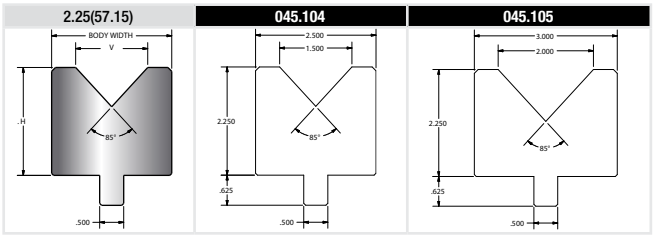


Description

Part Number	Angle	Height		V Opening		Body Width		US$ Price	
		Inches(mm)	Inches(mm)					4 ft	8 ft
		1.75(44.45)	1.875(47.63)	Inches	(mm)	Inches	(mm)	(M)	(S)
045.106	30°	X	—	0.250	(6.35)	1.250	(31.75)		
045.107	30°	X	—	0.375	(9.53)	1.250	(31.75)		
045.108	30°	X	—	0.500	(12.70)	1.250	(31.75)		
045.109	30°		X	0.625	(15.88)	1.750	(44.45)		

URETHANE DIES - 85°

Profiles

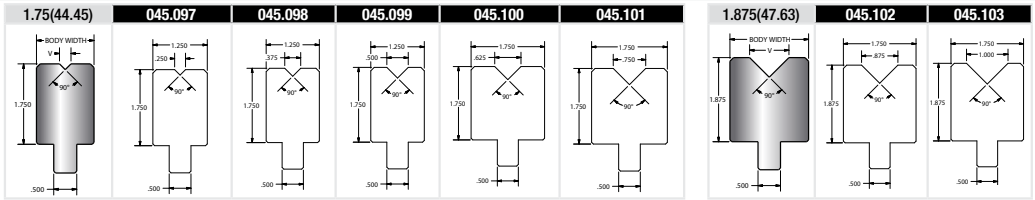


Description

Part Number	Angle	Height		V Opening		Body Width		US$ Price	
		Inches(mm)	Inches(mm)					4 ft	8 ft
		1.75(44.45)	2.25(57.15)	Inches	(mm)	Inches	(mm)	(M)	(S)
045.104	85°	—	X	1.500	(38.10)	3.000	(76.20)		na
045.105	85°	—	X	2.000	(50.80)	3.000	(76.20)		na

URETHANE DIES - 90°

Profiles



Description

Part Number	Angle	Height		V Opening		Body Width		US$ Price	
		Inches(mm)	Inches(mm)					4 ft	8 ft
		1.75(44.45)	1.875(47.63)	Inches	(mm)	Inches	(mm)	(M)	(S)
045.097	90°	X	—	0.250	(6.35)	1.250	(31.75)		
045.098	90°	X	—	0.375	(9.53)	1.250	(31.75)		
045.099	90°	X	—	0.500	(12.70)	1.250	(31.75)		
045.100	90°	X	—	0.625	(15.88)	1.750	(44.45)		
045.101	90°	X	—	0.750	(19.05)	1.750	(44.45)		
045.102	90°	—	X	0.875	(22.23)	1.750	(44.45)		
045.103	90°	—	X	1.000	(25.40)	1.750	(44.45)		

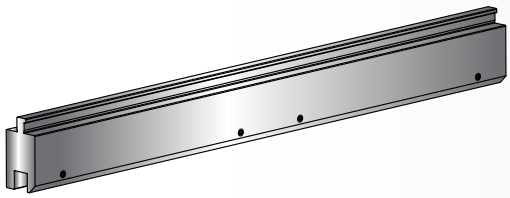
[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

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Z OFFSET TOOL HOLDERS AMERICAN PRECISION STYLE

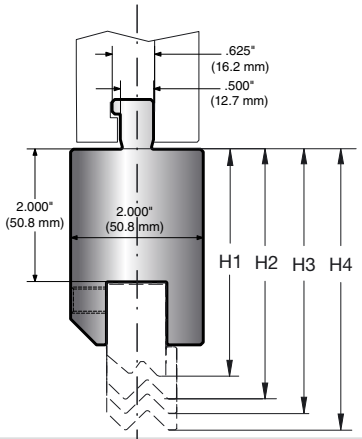
TOP HOLDER

Profile



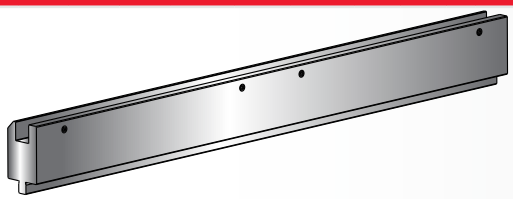
Description

Part Number	H1		H2		H3		H4		Tons/ ft	Tons/ mt	MT	Price	
	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)				16.34"(415mm) (M)	32.87"(835mm) (S)
028.501	3.417"	(86.80)	3.772"	(95.80)	4.000"	(101.60)	4.250"	(108.00)	34	100	▶		



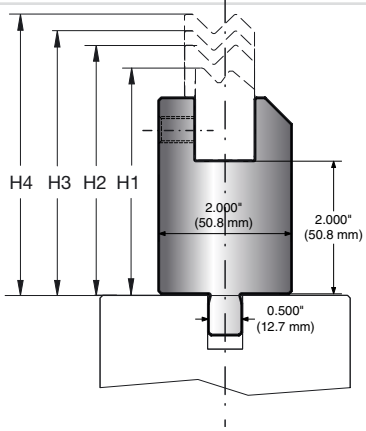
BOTTOM HOLDER

Profile

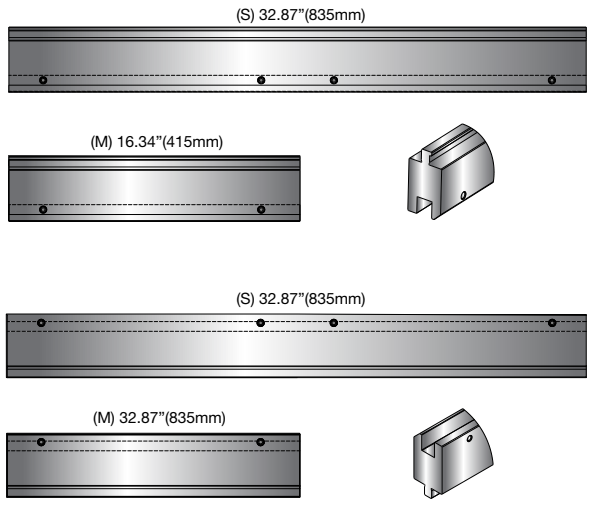


Description

Part Number	H1		H2		H3		H4		Tons/ ft	Tons/ mt	MT	Price	
	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)				16.34"(415mm) (M)	32.87"(835mm) (S)
028.502	3.417"	(86.80)	3.772"	(95.80)	4.000"	(101.60)	4.250"	(108.00)	34	100	▶		

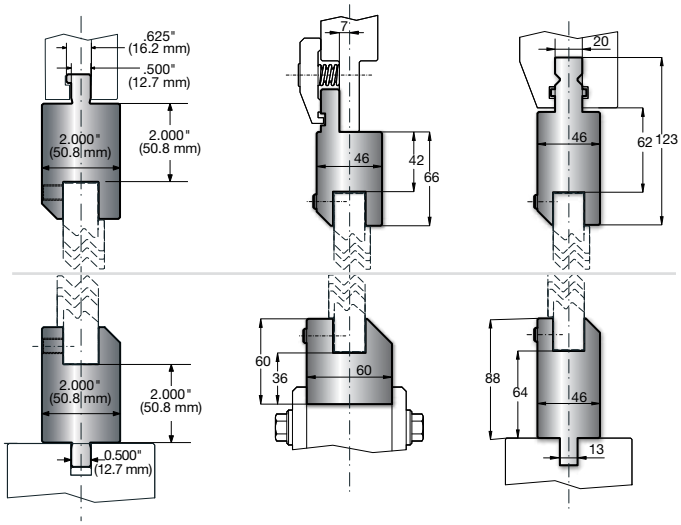


ASSEMBLY SCHEME



COMPATIBLE HOLDER SYSTEMS

American Precision Style | European Precision Style | Wila Trumpf Style



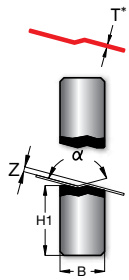
[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

Z OFFSET TOOL INSERTS AMERICAN PRECISION STYLE

Z-OFFSET

Description

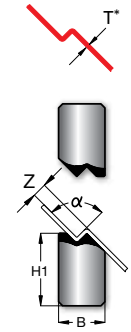
Part Number Inches	Part Number Metric	α	Z		Material Thickness (T)		H1		H2		B		W		Tons/ ft	Tons/ mt	MT	Price	
			inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)				16.34"(415mm) (M)	32.87"(835mm) (S)
	040.510	160°	0.039"	(1.00)	0.039"	(1.00)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.515	160°	0.059"	(1.50)	0.047"	(1.20)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.520	150°	0.079"	(2.00)	0.059"	(1.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.525	140°	0.098"	(2.50)	0.059"	(1.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		

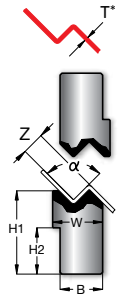


Z-OFFSET 90°

Description

Part Number Inches	Part Number Metric	α	Z		Material Thickness (T)		H1		H2		B		W		Tons/ft	Tons/ mt	MT	Price	
			inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)				16.34"(415mm) (M)	32.87"(835mm) (S)
	040.511	90°	0.039"	(1.00)	0.020"	(0.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.516	90°	0.059"	(1.50)	0.020"	(0.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.521	90°	0.079"	(2.00)	0.020"	(0.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.526	90°	0.098"	(2.50)	0.031"	(0.80)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.530	90°	0.118"	(3.00)	0.039"	(1.00)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
028.511		90°	0.125"	(3.18)	0.039"	(1.00)	2.000"	(50.80)			0.906"	(23.00)			34	100	▶		
	040.535	90°	0.138"	(3.50)	0.039"	(1.00)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.540	90°	0.157"	(4.00)	0.047"	(1.20)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.545	90°	0.177"	(4.50)	0.047"	(1.20)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.550	90°	0.197"	(5.00)	0.059"	(1.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.555	90°	0.217"	(5.50)	0.059"	(1.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.560	90°	0.236"	(6.00)	0.059"	(1.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
028.512		90°	0.250"	(6.35)	0.059"	(1.50)	2.000"	(50.80)			0.906"	(23.00)			34	100	▶		
	040.565	90°	0.256"	(6.50)	0.059"	(1.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.570	90°	0.276"	(7.00)	0.059"	(1.50)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.575	90°	0.295"	(7.50)	0.063"	(1.60)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.580	90°	0.315"	(8.00)	0.063"	(1.60)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
	040.590	90°	0.354"	(9.00)	0.079"	(2.00)	1.772"	(45.00)	0.984"	(25.00)	0.906"	(23.00)	1.063"	(27.00)	34	100	▶		
028.513		90°	0.375"	(9.53)	0.079"	(2.00)	2.000"	(50.80)	0.984"	(25.00)	0.906"	(23.00)	1.063"	(27.00)	34	100	▶		
	040.610	90°	0.394"	(10.00)	0.079"	(2.00)	1.772"	(45.00)	0.984"	(25.00)	0.906"	(23.00)	1.063"	(27.00)	34	100	▶		
	040.611	90°	0.433"	(11.00)	0.079"	(2.00)	1.772"	(45.00)	0.984"	(25.00)	0.906"	(23.00)	1.063"	(27.00)	34	100	▶		
	040.612	90°	0.472"	(12.00)	0.079"	(2.00)	1.772"	(45.00)	0.984"	(25.00)	0.906"	(23.00)	1.063"	(27.00)	34	100	▶		
028.514		90°	0.500"	(12.70)	0.098"	(2.50)	2.000"	(50.80)	0.984"	(25.00)	0.906"	(23.00)	1.260"	(32.00)	34	100	▶		
	040.613	90°	0.512"	(13.00)	0.098"	(2.50)	1.772"	(45.00)	0.984"	(25.00)	0.906"	(23.00)	1.260"	(32.00)	34	100	▶		
	040.614	90°	0.551"	(14.00)	0.098"	(2.50)	1.772"	(45.00)	0.984"	(25.00)	0.906"	(23.00)	1.260"	(32.00)	34	100	▶		
	040.615	90°	0.591"	(15.00)	0.118"	(3.00)	1.772"	(45.00)	0.984"	(25.00)	0.906"	(23.00)	1.260"	(32.00)	34	100	▶		
028.515		90°	0.625"	(15.88)	0.125"	(3.18)	2.250"	(57.20)	0.984"	(25.00)	0.906"	(23.00)	1.496"	(38.00)	34	100	▶		
028.516		90°	0.750"	(19.05)	0.125"	(3.18)	2.250"	(57.20)	0.984"	(25.00)	0.906"	(23.00)	1.772"	(45.00)	34	100	▶		

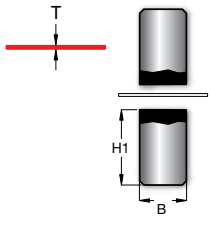




FLAT

Description

Part Number Inches	Part Number Metric	α	Z		Max. Material Thickness		H1		H2		B		W		Tons/ ft	Tons/ mt	MT	Price	
			inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)				16.34"(415mm) (M)	32.87"(835mm) (S)
	040.500	FLAT			0.079"	(2.00)	1.417"	(36.00)			0.906"	(23.00)			34	100	▶		
028.510		FLAT			0.079"	(2.00)	2.000"	(50.80)			0.906"	(23.00)			34	100	▶		



[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

Inserts can be used in Mate American Precision Tooling, European Precisions Tooling, and Wila Trumpf Style tooling holders.

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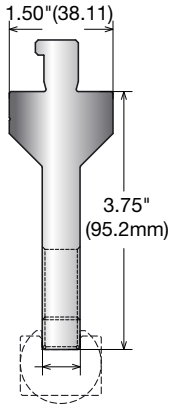
RADIUS/FLAT INSERT HOLDERS AMERICAN PRECISION STYLE

RADIUS INSERT HOLDERS

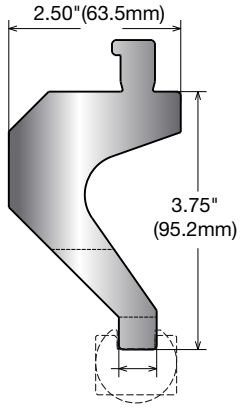
Description

Part Number	H		W		Tons/ ft	Tons/ mt	MT	Price	
	inch	(mm)	inch	(mm)				16.34"(415mm) (M)	32.87"(835mm) (S)
018.500	3.75"	(95.25)	1.50"	(38.1)	34	100	▶		
018.505	3.75"	(95.25)	2.50"	(63.5)	17	50	▶		

018.500

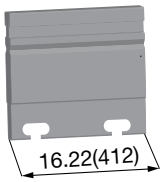


018.505

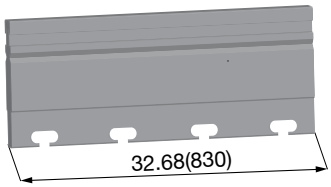


RADIUS/FLAT INSERT HOLDERS

HOLDER LENGTH - (M)

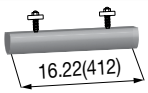


HOLDER LENGTH - (S)

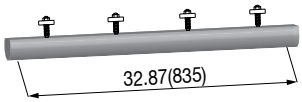


RADIUS/FLAT INSERTS

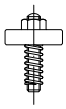
HALF LENGTH - (M)



STANDARD LENGTH - (S)

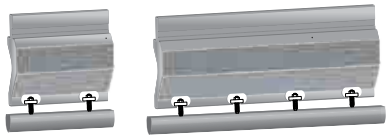


BOLT ASSEMBLY



40.002

ASSEMBLY SCHEME



Radius/flat insert sold with bolt assembly.

DIE SELECTION GUIDE

(Assumes air bending):

1) **Select the V opening:**
Calculate 2 times the punch radius plus 2 times the material thickness.
For example, a punch radius of .375" and .078" material = (2x.375")+(2x.078")=.906" V opening.
When the exact V opening is not available, use the next nearest larger die.

2) **Select the V angle:**
It is recommended that the die V angle be smaller than the desired bend angle.

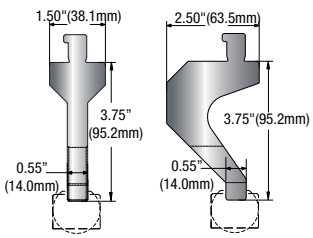
For example, to achieve a 90 degree bend, use a V angle less than 90 degrees such as a 60 degree, 45 degree or even a 30 degree.

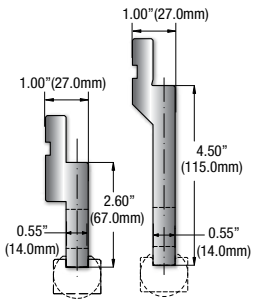
If the result should be a 60 degree bend, use a die with a 45 degree or even a 30 degree angle.

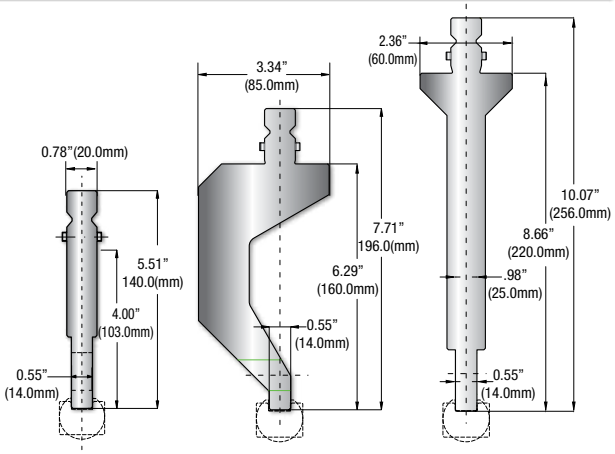
If the result should be a 45 degree bend, use a die with a 30 degree angle.

Note that in general the material springback will be slightly greater using a radius punch than a standard punch.

COMPATIBLE HOLDERS



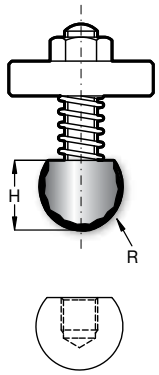




RADIUS/FLAT INSERTS

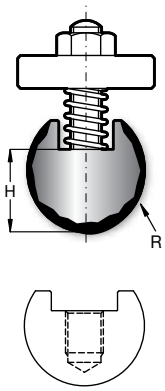
RADIUS INSERTS

Description								
Part Number Inch	Part Number (mm)	R		H		MT	US$ Price	
		Inches	(mm)	Inches	(mm)		16.87(415mm) (M)	32.87(835mm) (S)
	011.300	0.276	(7.00)	0.453	(11.50)	▶		
	011.301	0.295	(7.50)	0.453	(11.50)	▶		
	011.302	0.315	(8.00)	0.512	(13.00)	▶		
	011.303	0.354	(9.00)	0.630	(16.00)	▶		
018.511		0.375	(9.53)	0.625	(15.88)	▶		
	011.304	0.394	(10.00)	0.630	(16.00)	▶		
	011.305	0.433	(11.00)	0.630	(16.00)	▶		
	011.306	0.453	(11.50)	0.748	(19.00)	▶		
	011.307	0.472	(12.00)	0.787	(20.00)	▶		



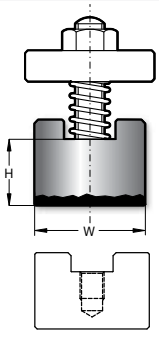
RADIUS INSERTS

Description								
Part Number Inch	Part Number (mm)	R		H		MT	US$ Price	
		Inches	(mm)	Inches	(mm)		16.87(415mm) (M)	32.87(835mm) (S)
	011.308	0.492	(12.50)	1.772	(45.00)	▶		
018.512		0.500	(12.70)	0.625	(15.88)	▶		
	011.309	0.512	(13.00)	1.850	(47.00)	▶		
	011.310	0.551	(14.00)	1.890	(48.00)	▶		
	011.311	0.591	(15.00)	1.929	(49.00)	▶		
018.513		0.625	(15.88)	0.875	(22.23)	▶		
	011.312	0.630	(16.00)	2.008	(51.00)	▶		
	011.313	0.669	(17.00)	2.047	(52.00)	▶		
	011.314	0.689	(17.50)	2.087	(53.00)	▶		
	011.315	0.748	(19.00)	2.126	(54.00)	▶		
018.514		0.750	(19.05)	1.000	(25.40)	▶		
	011.316	0.787	(20.00)	2.205	(56.00)	▶		
018.515		0.875	(22.23)	1.000	(25.40)	▶		
	011.317	0.886	(22.50)	2.283	(58.00)	▶		
	011.318	0.984	(25.00)	2.323	(59.00)	▶		
018.516		1.000	(25.40)	1.000	(25.40)	▶		
	011.319	1.083	(27.50)	2.402	(61.00)	▶		
	011.320	1.181	(30.00)	2.441	(62.00)	▶		
	011.321	1.378	(35.00)	2.480	(63.00)	▶		
018.517		1.500	(38.10)	1.750	(44.45)	▶		
	011.322	1.575	(40.00)	2.559	(65.00)	▶		
	011.323	1.772	(45.00)	2.598	(66.00)	▶		
	011.324	1.969	(50.00)	2.638	(67.00)	▶		
018.518		2.000	(50.80)	2.125	(53.98)	▶		



FLAT INSERTS

Description								
Part Number Inch	Part Number (mm)	W		H		MT	US$ Price	
		Inches	(mm)	Inches	(mm)		16.87(415mm) (M)	32.87(835mm) (S)
	010.325	1.181	(30.00)	0.669	(17.00)	▶		
018.510		1.500	(38.10)	0.750	(19.05)	▶		



[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

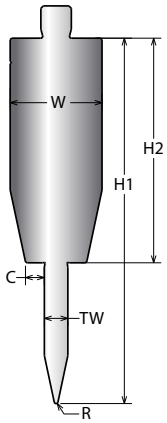
Inserts can be used in Mate American Precision Tooling, European Precisions Tooling, and Wila Trumpf Style tooling holders.

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HEMMING PUNCH

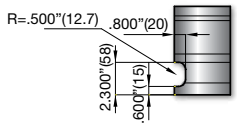
Description

Part Number	Angle	Height (H1)		Height (H2)		Tip Width		Radius		Body Width (W)		C Width		Weight per inch lbs	Tons/ ft	Tons/ mt	MT	US$ Price				
		Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)					Per (V)	8 (P)	12 (T)	18 (S)	Set (F)
018.400	24°	6.000"	(152.40)	3.688"	(93.68)	0.386"	(9.80)	0.031"	(0.80)	1.500"	(38.10)	0.307"	(7.80)	1.8			▶					
Acute bend															15	46						
Planishing															29	85						



MATE® MAGLOCK™ magnetic safety system

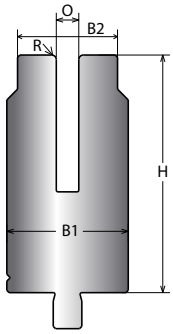
HORNS SCHEME STANDARD SECTIONING



HEMMING DIE

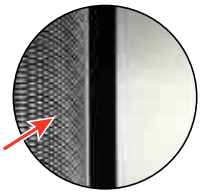
Description

Part Number	Angle	Height		O		Radius		Body Width (B1)		Body Width (B2)		Weight per inch lbs	Tons/ ft	Tons/ mt	MT	US$ Price				
		Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)					Per (V)	8 (P)	12 (T)	18 (S)	Set (F)
028.400		4.125"	(104.78)	0.394"	(10.00)	0.039"	(1.00)	2.125"	(53.98)	1.750"	(44.45)	2.2			▶					
Acute bend													15	46						
Planishing													29	85						



Close-up view of top of hemming die

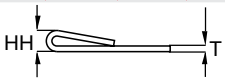
Knurled edge to prevent movement



HEMMING TONNAGE GUIDE

Assumes 60,000psi Tensile Material (Mild Steel)

TEAR DROP HEM

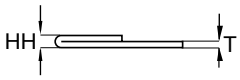


Material Thickness	Material Thickness	Tear Drop Hem Height	Tear Drop Hem Height	Metric Tons Force Per Meter	US Tons Force Per Ft
T (inch)	T (mm)	HH (inch)	HH (mm)	tons/meter	tons/ft
0.036	0.9	0.131	3.3	14	5
0.048	1.2	0.138	3.5	19	6
0.060	1.5	0.181	4.6	23	8
0.075	1.9	0.217	5.5	29	10
0.090	2.3	0.241	6.1	46	15
0.105	2.7	0.289	7.3	67	23
0.118	3.0	0.315	8.0	80	27

T (mm)	T (inch)	HH (mm)	HH (inch)	tons/meter	tons/ft
0.6	0.024	3.0	0.118	9	3
0.8	0.031	3.2	0.126	12	4
1.0	0.039	3.5	0.138	15	5
1.3	0.049	3.8	0.150	17	6
1.5	0.059	4.6	0.181	22	7
2.0	0.079	5.5	0.217	30	10
2.5	0.098	6.5	0.256	55	18
3.0	0.118	8.0	0.315	80	27

For Stainless Steel multiply force by 2 for approximate tonnage

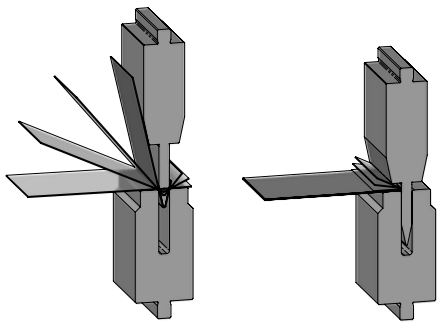
FLAT HEM



Material Thickness	Material Thickness	Tear Drop Hem Height	Tear Drop Hem Height	Metric Tons Force Per	US Tons Force Per Ft
T (inch)	T (mm)	HH (inch)	HH (mm)	tons/	tons/ft
0.036	0.9	0.072	1.8	37	12
0.048	1.2	0.096	2.4	49	16
0.060	1.5	0.120	3.0	61	20
0.075	1.9	0.150	3.8	77	26
0.090	2.3	0.180	4.6	92	31

T (mm)	T (inch)	HH (mm)	HH (inch)	tons/	tons/ft
0.6	0.024	1.2	0.047	23	8
0.8	0.031	1.6	0.063	32	11
1.0	0.039	2.0	0.079	40	13
1.3	0.049	2.5	0.098	50	17
1.5	0.059	3.0	0.118	63	21
2.0	0.079	4.0	0.157	80	27

For Stainless Steel multiply force by 2 for approximate tonnage



[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

ANTI-SCRATCH POLYURETHANE FILM

- Excellent protection against die marks and scratches.
- Economical solution for mar-free bending pre-finished, pre-polished stainless steel, brass, aluminum or pre-painted metal.
- Help protect your dies. Quick setup, universal, saves time and money.

WHITE ANTI-SCRATCH POLYURETHANE FILM

- Standard performance
- White
- Extruded



100 FEET **45.001**

Thickness= 0.015 inches
Width= 4 inches
Length= 100 feet

100 FEET **45.002**

Thickness= 0.015 inches
Width= 6 inches
Length= 100 feet

100 FEET **45.003**

Thickness= 0.030 inches
Width= 4 inches
Length= 100 feet

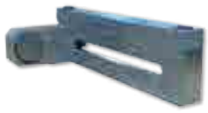
100 FEET **45.004**

Thickness= 0.030 inches
Width= 6 inches
Length= 100 feet

MAGNETIC POLYURETHANE FILM HOLDER

40.850

MAGNETIC ATTACHMENT







STANDARD POLYURETHANE FILM HOLDER - MECHANICAL

40.800

RAIL ATTACHMENT





SQUARING

For use with long, narrow bends

REFERENCE SQUARES STANDARD

40.660





REFERENCE SQUARES ADJUSTABLE

40.700





ANGLE

For use with angled bends

40.750



40.740

Left



40.745

Right



[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

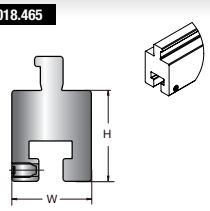
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EXTENSIONS AND ADAPTERS

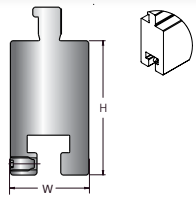
AMERICAN PRECISION STYLE PUNCH EXTENSIONS

Profile

018.465

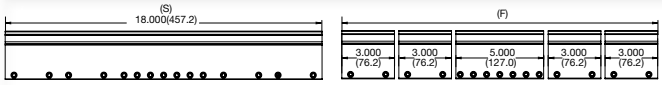


018.470



Description

Part Number	Height		Width		Tons/ ft	Tons/ mt	MT	US$ Price	
	Inches	(mm)	Inches	(mm)				(S)	(F)
								18"(457.2)	Set*
018.465	2.00	50.8	1.75	44.5	34	100	▶		
018.470	3.00	76.2	1.75	44.5	34	100	▶		

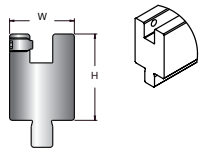


*(F) Fraction set includes one each of: 3"; 3"; 3"; 3"; 5". Total Length=17"

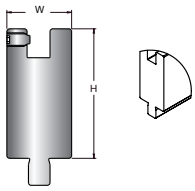
AMERICAN PRECISION STYLE DIE EXTENSIONS

Profile

028.465

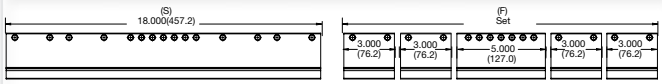


028.470



Description

Part Number	Height		Width		Tons/ ft	Tons/ mt	MT	US$ Price	
	Inches	(mm)	Inches	(mm)				(S)	(F)
								18"(457.2)	Set*
028.465	2.00	50.8	1.5	38.1	34	100	▶		
028.470	3.00	76.2	1.5	38.1	34	100	▶		

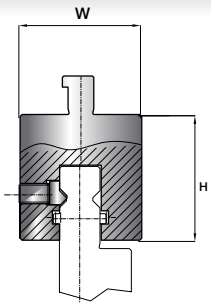


*(F) Fraction set includes one each of: 3"; 3"; 3"; 3"; 5". Total Length=17"

AMERICAN PRECISION STYLE TO WILA TRUMPF STYLE PUNCH

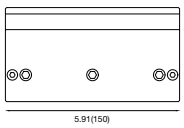
Profile

050.960



Description

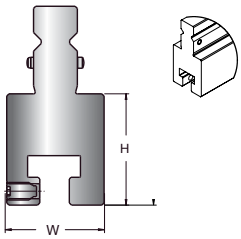
Part Number	Height		Length		Tons/ ft	Tons/ mt	MT	US$ Price
	Inches	(mm)	Inches	(mm)				5.91"(150)
050.960	2.44	62	2.36	60	34	100	▶	



WILA TRUMPF STYLE TO AMERICAN PRECISION STYLE PUNCH

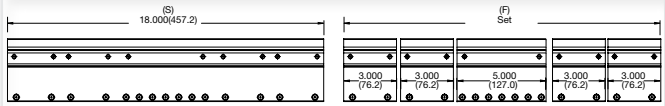
Profile

018.460



Description

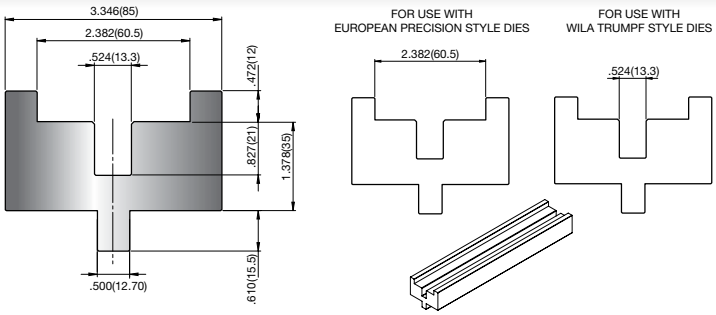
Part Number	Height		Width		Tons/ ft	Tons/ mt	MT	US$ Price	
	Inches	(mm)	Inches	(mm)				(S)	(F)
								18"(457.2)	Set*
018.460	2.00	50.8	1.750	44.5	34	100	▶		



*(F) Fraction set includes one each of: 3"; 3"; 3"; 3"; 5". Total Length=17"

DIE ADAPTERS/COMBINATION

Profile



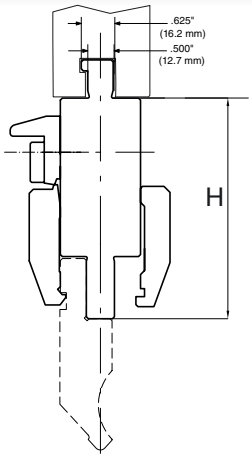
Description

Part Number	Tons/ ft	Tons/ mt	MT	US$ Price	
				(M)	(S)
				16.339(415.0)	32.874(835.0)
060.980	30	100	▶		

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

AMERICAN PRECISION STYLE REVERSIBLE SWING® CLAMP ADAPTER

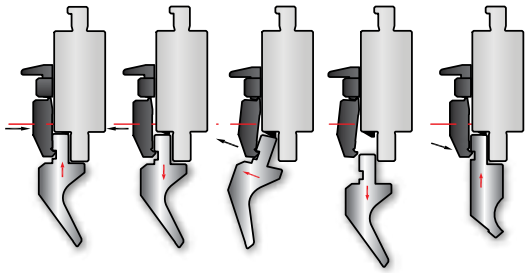
Profile



Description

Part Number	Height Inches(mm)	Length Inches(mm)	Tons/ft	Tons/mt	MT	US$ Price
050.955	4.33(110)	5.91(150)	34	100	▶	

OPERATION ILLUSTRATION



Front facing has quick install and release Swing mechanism.
Rear facing manual has manual tightening.

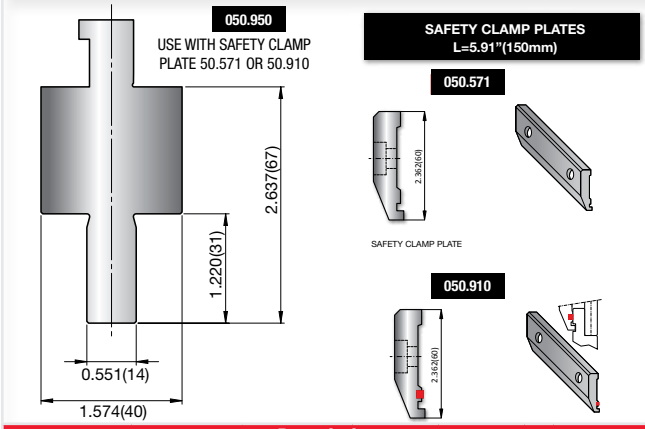
Designed for use with European Precision Style punches.

CLAMP QUANTITY GUIDE		
LENGTH	LENGTH	QUANTITY
3ft	1000mm	5
7ft	2100mm	10
10ft	3100mm	15
13ft	4100mm	20

General guideline 5 clamps per 3 feet (1000mm).

AMERICAN PRECISION STYLE TO EUROPEAN STYLE PUNCH ADAPTER

Profile



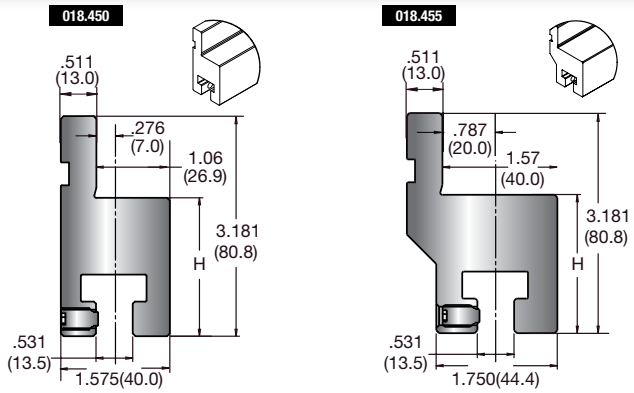
Description

Part Number	Height Inches(mm)	Length Inches(mm)	Tons/ft	Tons/mt	MT	US$ Price
050.950	2.637(67.0)	5.91(150)	34	100	▶	
050.571	2.632(66.9)	5.91(150)	NA	NA	▶	
050.910	2.632(66.9)	5.91(150)	NA	NA	▶	

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

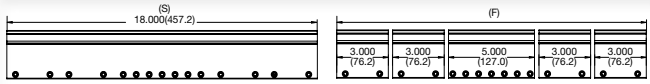
EUROPEAN PRECISION STYLE TO AMERICAN PRECISION STYLE PUNCH ADAPTER

Profile



Description

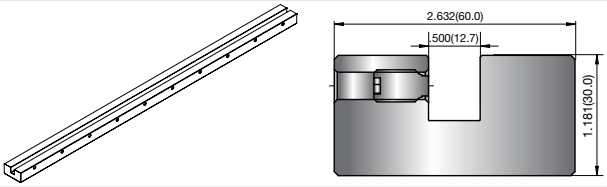
Part Number	Height Inches	Height (mm)	Width Inches	Width (mm)	Tons/ ft	Tons/ mt	MT	US$ Price (S) 18"(457.2)	US$ Price (F) Set*
018.450	2.00	50.8	.276	7	34	100	▶		
018.455	2.00	50.8	.787	20	34	100	▶		



**(F) Fraction set includes one each of: 3"; 3"; 3"; 3"; 5". Total Length=17"*

DIE ADAPTER EUROPEAN PRECISION STYLE TO AMERICAN PRECISION STYLE ADAPTER

Profile



Description

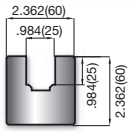
Part Number	Tons/ ft	Tons/ mt	MT	US$ Price (M)	US$ Price (S)
				19.638(500.0)	39.37(1000.0)
028.475	34	100	▶		

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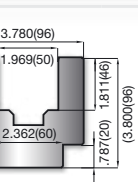
POLYURETHANE HOLDERS AND POLYURETHANE

For use with thin and delicate materials. *All holders include 2 end caps.*

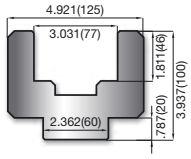
EUROPEAN PRECISION STYLE URETHANE HOLDERS



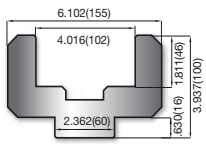
Part Number	Length	US$ Price
20.271	16.338(415mm) 32.87(835mm)	



Part Number	Length	US$ Price
20.272	16.338(415mm) 32.87(835mm)	

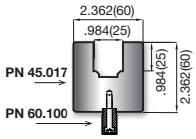


Part Number	Length	US$ Price
20.273	16.338(415mm) 32.87(835mm)	

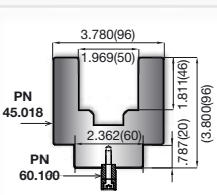


Part Number	Length	US$ Price
20.274	16.338(415mm) 32.87(835mm)	

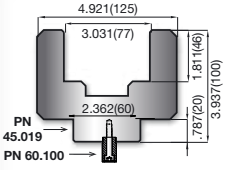
WILA TRUMPF STYLE URETHANE HOLDERS



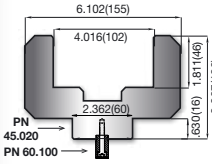
Part Number	Length	US$ Price
45.021 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	



Part Number	Length	US$ Price
45.022 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	

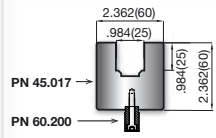


Part Number	Length	US$ Price
45.023 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	

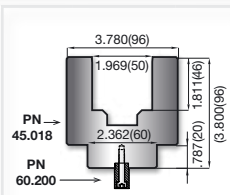


Part Number	Length	US$ Price
45.024 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	

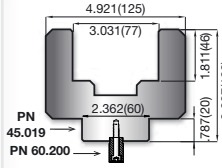
AMERICAN STYLE URETHANE HOLDERS



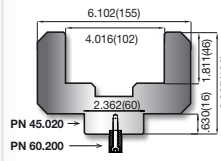
Part Number	Length	US$ Price
45.025 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	



Part Number	Length	US$ Price
45.026 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	



Part Number	Length	US$ Price
45.027 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	

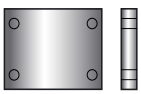


Part Number	Length	US$ Price
45.028 SET ASSEMBLY	16.338(415mm) 32.87(835mm)	

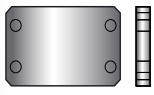
END CAPS



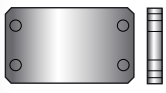
Part Number	US$ Price
20.902	



Part Number	US$ Price
20.904	



Part Number	US$ Price
20.906	

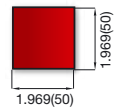


Part Number	US$ Price
20.908	

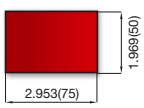
URETHANE



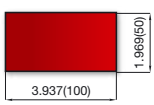
Part Number	Length	US$ Price
45.011	16.338(415mm) 32.87(835mm)	



Part Number	Length	US$ Price
45.010	16.338(415mm) 32.87(835mm)	

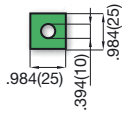


Part Number	Length	US$ Price
45.009	16.338(415mm) 32.87(835mm)	

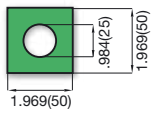


Part Number	Length	US$ Price
45.008	16.338(415mm) 32.87(835mm)	

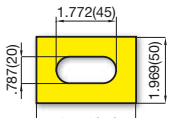
URETHANE WITH HOLE



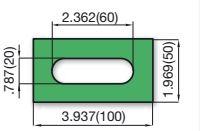
Part Number	Length	US$ Price
45.015	16.338(415mm) 32.87(835mm)	



Part Number	Length	US$ Price
45.014	16.338(415mm) 32.87(835mm)	



Part Number	Length	US$ Price
45.013	16.338(415mm) 32.87(835mm)	



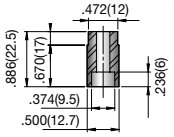
Part Number	Length	US$ Price
45.012	16.338(415mm) 32.87(835mm)	

CAP SCREW



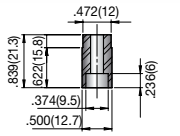
Part Number	US$ Price
BHC00006	$1.00
BHC00007	$1.00

WILA TRUMPF STYLE BAR INSERT



Part Number	Length	US$ Price
60.100	16.142(410mm) 32.677(830mm)	

AMERICAN STYLE BAR INSERT



Part Number	Length	US$ Price
60.200	16.142(410mm) 32.677(830mm)	

90A	Red	25% deflection	Mild steel
80A	Green	35% deflection	Aluminum
60A	Yellow	40% deflection	CU & Alum



[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

NOTES

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Store Your Press Brake Tooling with These Heavy Duty Cabinets

Increase your efficiency and protect your press brake tooling with Mate press brake tooling cabinets and change-over carts. Made in the USA exclusively for Mate, these press brake tooling cabinets and carts feature robotically MIG-welded 14-, 16- and 18-gauge construction for strength and durability.

Mate tooling cabinets use exclusive 1-ata-Time™ drawer lock system that provides best-in-class safety, preventing cabinet and cart tip-over. The standard integrated retainer top keeps items from falling off the cabinet.



Press Brake Cabinets

Tooling Style	European	Amada Fixed Height	Wila Trumpf Style					American
Drawer Configuration	5 Drawers	5 Drawers	4 Drawers	6 Drawers	4 Drawers	3 Drawers	4 Drawers	4 Drawers
Capacity	2 for dies, 3 for punches	2 for dies, 3 for punches	3 for dies, 1 for punches	4 for dies, 2 for punches	3 for dies, 1 for punches	1 for dies, 2 for punches	2 for dies, 2 for punches	2 for dies, 2 for punches
Max. Number of Tools	16 full-length dies	20 full-length dies	33 full-length dies	44 full-length dies	33 full-length dies	11 full-length dies	22 full-length dies	22 full-length dies
	33 full-length punches	33 full-length punches	11 full-length punches	22 full-length punches	11 full-length punches	22 full-length punches	22 full-length punches	22 full-length punches
DRAWER SPECIFICATIONS								
3" (76mm) Deep Drawer, 200lb (90kg) Capacity	2	2	—	4	1	—	2	—
Maximum Die Height	3.0" (76mm)	3.0" (76mm)	—	2.25"(57mm)	2.25"(57mm)	—	2.25"(57mm)	—
7" (177mm) Deep Drawer, 400lb (181kg) Capacity	3	3	4	2	2	1	—	4
Maximum Die Height	N/A	N/A	5.75" (146mm)	5.75" (146mm)	5.75" (146mm)	5.75" (146mm)	N/A	2.25"(57mm)
Maximum Punch Height	5.187" (132mm)	5.187" (132mm)	6.50" (165mm)	6.50" (165mm)	N/A	N/A	N/A	9.215"(234mm)
10" (254mm) Deep Drawer, 400lb (181kg) Capacity)	—	—	—	—	1	2	2	—
Maximum Punch Height	—	—	—	—	10.0" (254mm)	10.0" (254mm)	10.0" (254mm)	—
CABINET DIMENSIONS:								
Width	39.0" (990,5mm)	39.0" (990,5mm)	39.0" (990,5mm)	39.0" (990,5mm)	39.0" (990,5mm)	39.0" (990,5mm)	39.0" (990,5mm)	39.0" (990,5mm)
Depth	27.5" (698,5mm)	27.5" (698,5mm)	27.5" (698,5mm)	27.5" (698,5mm)	27.5" (698,5mm)	27.5" (698,5mm)	27.5" (698,5mm)	27.5" (698,5mm)
Height	40.25" (1022,0mm)	40.25" (1022,0mm)	40.25" (1022,0mm)	40.25" (1022,0mm)	40.25" (1022,0mm)	40.25" (1022,0mm)	40.25" (1022,0mm)	40.25" (1022,0mm)
Shipping Weight	500 lbs. (227 kg)	500 lbs. (227 kg)	470 lbs. (213 kg)	550 lbs. (249 kg)	470 lbs. (213 kg)	435 lbs. (197 kg)	455 lbs. (206 kg)	445 lbs. (202 kg)

Style	Part Number	US$ Price	Part Number	US$ Price	Part Number	US$ Price	Part Number	US$ Price	Part Number	US$ Price	Part Number	US$ Price	Part Number	US$ Price	Part Number	US$ Price
Fork Lift Base	MATE02500		MATE02502		MATE02504		MATE02505		MATE02506		MATE02507		MATE02508		MATE02509	
Mobile Base	MATE02501		MATE02503													

Accessories (For Cabinets Only)	Part Number	US$ Price
Maple Top	MATE02427	
Stainless Steel Top	MATE02512	

Shorten Setups and Protect Tooling with These Heavy Duty Carts

Mate Press Brake Change-Over Carts help shorten setups and increase machine uptime. The carts feature capacity for 54 linear feet of punches and dies. Its patented design helps protect tooling from damage during transport and handling. The carts include a 3-inch deep drawer for necessary instruments and other supplies, 4 heavy duty 6-inch diameter casters (900 pound capacity each), 2 rigid and 2 with brakes, allow for easy movement about the work area.

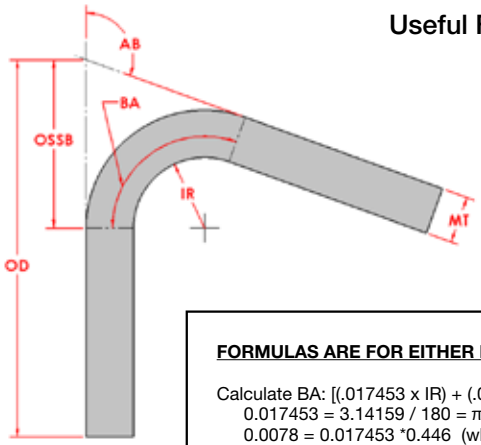


Press Brake Change-Over Carts						
Tooling Style	**American Precision Style**		**European Precision Style**		**Wila Trumpf Style**	
Cart Capacity	54 linear feet (1371 linear mm)		54 linear feet (1371 linear mm)		54 linear feet (1371 linear mm)	
Cart Dimensions:						
Width	39.0" (990,5mm)		39.0" (990,5mm)		39.0" (990,5mm)	
Depth	27.0" (685,8mm)		27.0" (685,8mm)		27.0" (685,8mm)	
Height	38.0" (965mm)		38.0" (965mm)		38.0" (965mm)	
Shipping Weight	275 lbs. (124,7 kg)		275 lbs. (124,7 kg)		275 lbs. (124,7 kg)	
	Part Number	US$ Price	Part Number	US$ Price	Part Number	US$ Price
	MATE02527		MATE02510		MATE02511	

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REFERENCE FORMULAS

Useful Formulas



Acronyms:

IR	=	Inside Radius
MT	=	Material Thickness
AB	=	Angle of Bend
OD	=	Outside flange Dimension
BA	=	Bend Allowance
BD	=	Bend Deduction
OSSB	=	Out-Side Set Back
VO	=	V-Opening

FORMULAS ARE FOR EITHER IMPERIAL OR METRIC

Calculate BA: [(.017453 x IR) + (.0078 x MT)] x AB = BA
0.017453 = 3.14159 / 180 = π/180 degrees
0.0078 = 0.017453 *0.446 (where 0.446 represents the k factor)

Calculate OSSB of bends other than 90˚:
[Tangent (AB/2)] x (IR + MT) = OSSB
(At 90 degrees IR + MT = OSSB)

Convert BA to BD: (2 x OSSB) – BA = BD

Convert metric tons per meter to US tons per foot:
Metric tons per meter x 0.336 = US tons per foot

Convert US tons per foot to metric tons per meter:
US tons per foot x 2.976 = metric tons per meter

Convert mm to inches: mm x .03937 = inches

Convert inches to mm: inches x 25.4 = mm

Convert kN to metric tons: 1kN=0.102
Covert kN to US tons: 1kN=0.112

Predict IR for air bending:
Aluminum: VO x .14 = IR, Mild steel: VO x .16 = IR, Stainless: VO x .21 = IR

Calculate minimum IR when air bending: .63 x MT = Minimum natural IR

Calculate minimum OD flange limit of a die: VO x .707 = minimum OD flange

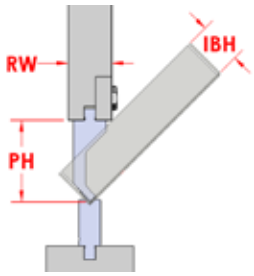
To calculate approximate tonnage for aluminum, use mild steel tonnage times 0.5
To calculate approximate tonnage for stainless steel, use mild steel tonnage times 1.5

CALCULATE IMPERIAL VALUES

Calculate required US tonnage per foot for mild steel:
[575 × (MT^2)] / VO = US tons per foot (Based on 60,000 psi tensile)

CALCULATE METRIC VALUES

Calculate required metric tonnage per meter:
(2 x MT^2 x 43) / (1.4 x VO) (Based on 43kg/mm^2 tensile)



Formulas are for either imperial or metric

Acronyms:

PH	=	Punch Height
IBH	=	Inside Box Height
RW	=	Ram Width

DEEP BOX FORMULAS

Calculate Deep box limit of a punch:
[(PH - (RW x .563)] x .707 = maximum IBH

Calculate the minimum punch height for a box:
(IBH / .707) + (RW x .563) = minimum PH

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

INCH TO METRIC/METRIC TO INCH REFERENCE

CONVERSION CHART

mm	inch
0.01mm	0.0004
0.02mm	0.0008
0.03mm	0.0012
0.04mm	0.0016
0.05mm	0.0020
0.06mm	0.0024
0.07mm	0.0028
0.08mm	0.0031
0.09mm	0.0035
0.10mm	0.0039
0.25mm	0.0098
0.50mm	0.0197
0.75mm	0.0295
1.00mm	0.0394
1.50mm	0.0591
2.00mm	0.0787
2.50mm	0.0984
3.00mm	0.1181
3.50mm	0.1378
4.00mm	0.1575
4.50mm	0.1772
5.00mm	0.1969
6.00mm	0.2362
7.00mm	0.2756
8.00mm	0.3150
9.00mm	0.3543
10.00mm	0.3937
11.00mm	0.4331
12.00mm	0.4724
13.00mm	0.5118
14.00mm	0.5512
15.00mm	0.5906
16.00mm	0.6299
17.00mm	0.6693
18.00mm	0.7087
19.00mm	0.7480
20.00mm	0.7874
21.00mm	0.8268
22.00mm	0.8661
23.00mm	0.9055
24.00mm	0.9449
25.00mm	0.9843
26.00mm	1.0236
27.00mm	1.0630
28.00mm	1.1024
29.00mm	1.1417
30.00mm	1.1811
31.00mm	1.2205
32.00mm	1.2598
33.00mm	1.2992
34.00mm	1.3386
35.00mm	1.3780
36.00mm	1.4173
37.00mm	1.4567
38.00mm	1.4961
39.00mm	1.5354
40.00mm	1.5748
50.00mm	1.9685
60.00mm	2.3622
65.00mm	2.5591
70.00mm	2.7559
75.00mm	2.9528
80.00mm	3.1496
90.00mm	3.5433
100.00mm	3.9370

inch	inch	mm
	0.0001	0.003mm
	0.0010	0.03mm
	0.0020	0.05mm
	0.0030	0.08mm
	0.0040	0.10mm
	0.0050	0.13mm
1/128	0.0078	0.20mm
	0.0100	0.25mm
	0.0120	0.30mm
	0.0150	0.38mm
1/64	0.0156	0.40mm
	0.0300	0.76mm
1/32	0.0313	0.79mm
3/64	0.0469	1.19mm
	0.0600	1.52mm
1/16	0.0625	1.59mm
5/64	0.0781	1.98mm
	0.0900	2.29mm
3/32	0.0938	2.38mm
7/64	0.1094	2.78mm
	0.1200	3.05mm
1/8	0.1250	3.18mm
9/64	0.1406	3.57mm
5/32	0.1563	3.97mm
3/16	0.1875	4.76mm
7/32	0.2188	5.56mm
1/4	0.2500	6.35mm
9/32	0.2813	7.14mm
5/16	0.3125	7.94mm
3/8	0.3750	9.53mm
7/16	0.4375	11.11mm
1/2	0.5000	12.70mm
9/16	0.5625	14.29mm
5/8	0.6250	15.88mm
3/4	0.7500	19.05mm
7/8	0.8750	22.23mm
1	1.0000	25.40mm
1 1/8	1.1250	28.58mm
1 1/4	1.2500	31.75mm
1 1/2	1.5000	38.10mm
1 3/4	1.7500	44.45mm
2	2.0000	50.80mm
2 1/4	2.2500	57.15mm
2 1/2	2.5000	63.50mm
2 3/4	2.7500	69.85mm
3	3.0000	76.20mm
3 1/2	3.5000	88.90mm
4	4.0000	101.60mm
4 1/2	4.5000	114.30mm
5	5.0000	127.00mm
5 1/2	5.5000	139.70mm
6	6.0000	152.40mm
12	12.0000	304.80mm

inch	mm
0.0001	0.003mm
0.0010	0.025mm
0.0100	0.254mm
0.1000	2.54mm
1.0000	25.40mm

mm	inch
0.01mm	0.0004
0.10mm	0.0039
1.00mm	0.0394

mm	inch	feet
1000mm	39.4	3.3
1050mm	41.3	3.4
1250mm	49.2	4.1
1500mm	59.1	4.9
2000mm	78.7	6.6
2050mm	80.7	6.7
2500mm	98.4	8.2
3000mm	118.1	9.8
3050mm	120.1	10.0
3500mm	137.8	11.5
4000mm	157.5	13.1
4050mm	159.4	13.3
4500mm	177.2	14.8
5000mm	196.9	16.4

feet	inch	mm
1 ft	12 inch	305mm
2 ft	24 inch	610mm
3 ft	36 inch	914mm
4 ft	48 inch	1219mm
5 ft	60 inch	1524mm
6 ft	72 inch	1829mm
7 ft	84 inch	2134mm
8 ft	96 inch	2438mm
9 ft	108 inch	2743mm
10 ft	120 inch	3048mm
11 ft	132 inch	3353mm
12 ft	144 inch	3658mm

MATE PRECISION TOOLING

metal gauges	gauge size	aluminum & brass	mild steel	stainless steel
	8GA	.129(3.28)	.164(4.17)	.172(4.37)
	9GA	.114(2.90)	.150(3.81)	.156(3.96)
	10GA	.102(2.59)	.135(3.43)	.141(3.58)
	11GA	.091(2.31)	.120(3.05)	.125(3.18)
	12GA	.081(2.06)	.105(2.67)	.109(2.77)
	13GA	.072(1.83)	.090(2.29)	.094(2.39)
	14GA	.064(1.63)	.075(1.91)	.078(1.98)
	16GA	.051(1.30)	.060(1.52)	.063(1.60)
	18GA	.040(1.02)	.048(1.22)	.050(1.27)
	20GA	.032(0.81)	.036(0.91)	.038(0.97)
	22GA	.025(0.64)	.030(0.76)	.031(0.79)
	24GA	.020(0.51)	.024(0.61)	.025(0.64)
	26GA	.016(0.41)	.018(0.46)	.019(0.48)
	28GA	.013(0.33)	.015(0.38)	.016(0.41)

[Dimensions in Inches (mm)].
Images are proportionate but not to scale.

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AIR BENDING FORCE CHARTS

INCH DIE V OPENING AND INCH MATERIAL THICKNESS

INCH/INCH

AIR BENDING FORCE CHART

INCH VO AND INCH MATERIAL THICKNESS VALUES, INCH TONNAGE VALUES (US SHORT TONS)

Force Values are calculated using mild steel having tensile strength of 60,000 psi forming to a 90° angle (apporximately 42 kg/mm²)

Gauge	Decimal Inch	0.250	0.375	0.500	0.625	0.750	0.875	1.000	1.250	1.500	2.000	2.500	3.000	4.000	V Opening (VO) Inch
		0.177	0.265	0.354	0.442	0.530	0.619	0.707	0.884	1.061	1.414	1.768	2.121	2.828	Minimum Flange
		0.039	0.059	0.078	0.098	0.117	0.137	0.156	0.195	0.234	0.312	0.390	0.468	0.624	Inside Radius (IR) inch
20	0.036	3.0	2.0												
18	0.048	5.3	3.6	2.7											
16	0.060		5.6	4.2	3.4										
14	0.075		8.7	6.5	5.2	4.4				US Tons Per Foot					
13	0.090			9.4	7.5	6.3	5.4								
12	0.105			13	10	8.5	7.3	6.4							
11	0.120				13	11	9.5	8.3	6.7						
10	0.135					14	12	11	8.4	7.0					
9	0.150					17	15	13	10	8.7					
3/16	0.188						23	20	16	14	10				
1/4	0.250						41	36	29	24	18	14			
5/16	0.313							56	45	38	28	23	19		
3/8	0.375									54	41	32	27	20	
1/2	0.500										72	58	48	36	
5/8	0.625											90	75	56	
3/4	0.750												108	81	
1	1.000													144	

Formulas:

US Tons Per Foot	MT^2x575/VO	Where MT=Material Thickness in inches; VO=V Opening in inches
Minimum Flange	VOx.707	Where VO=V Opening; .707=√2/2
Inside Radius (IR)	VOx.156	Where VO=V Opening

Note: Table assumes mild steel. When bending other materials, use a force adjustment. Aluminum = 50% Mild Steel = 100% Stainless Steel = 150%
All results are to be used as guidelines, not absolute values.

METRIC DIE V OPENING AND METRIC MATERIAL THICKNESS

METRIC/METRIC

AIR BENDING FORCE CHART

METRIC VO AND METRIC MATERIAL THICKNESS VALUES (METRIC TONNAGE VALUES)

Force Values are calculated using mild steel having tensile strength of 42 kg/mm² forming to a 90° angle (apporximately 60,000 psi)

Material	6	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200	250	V Opening (VO) mm
	4	6	7	8	11	14	18	23	28	35	45	57	71	88	113	141	177	Minimum Flange (MF) mm
	0.9	1.2	1.6	1.9	2.5	3.1	3.9	5.0	6.2	7.8	9.8	12.5	15.6	19.5	25.0	31.2	39.0	Inside Radius (IR) mm
0.5	3																	
0.6	4	3																
0.8	6	5	4															
1.0	10	8	6	5							Metric Tons Per Meter							
1.2	14	11	9	7	5													
1.5		17	14	11	8	7												
2.0			24	20	15	12	10											
2.5				31	24	19	15	12										
3.0					34	27	22	17	14									
4.0						48	39	30	24	19								
5.0							60	47	38	30	24							
6.0								68	54	43	34	27						
8.0									96	77	61	48	39					
10.0										121	96	75	60	48				
12.0											138	108	87	69	54			
15.0												169	136	108	85	68		
20.0													241	193	151	121	96	

Formulas:

Metric Tons Per Meter	$(MT^2x2xR)/(1.4xVO)$	Where MT=Material Thickness; R=Sheet Resistance; VO=V Opening (VO in mm /25.4)
Minimum Flange (MF)	VOx.707	Where VO=V Opening; .707=√2/2
Inside Radius (IR) inch	VOx1/.156	Where VO=V Opening

Note: Table assumes mild steel. When bending other materials, use a force adjustment. Aluminum = 50% Mild Steel = 100% Stainless Steel = 150%
All results are to be used as guidelines, not absolute values.

AIR BENDING FORCE CHARTS

METRIC DIE V OPENING AND INCH MATERIAL THICKNESS

METRIC/INCH

AIR BENDING FORCE CHART

METRIC VO AND INCH MATERIAL THICKNESS VALUES, INCH TONNAGE VALUES (US SHORT TONS)

Force Values are calculated using mild steel having tensile strength of 60,000 psi forming to a 90° angle (apporximately 42 kg/mm²)

Material Thickness mm	Gauge	Decimal Inch	6	8	10	12	16	20	25	32	40	50	63	80	100	V Opening (VO) mm
			4	6	7	8	11	14	18	23	28	35	45	57	71	Minimum Flange (MF) mm
			0.9	1.2	1.5	1.9	2.5	3.1	3.9	5.0	6.2	7.8	9.8	12.5	15.6	Inside Radius (IR) mm
			0.236	0.315	0.394	0.472	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	V Opening (VO) inch
			0.167	0.223	0.278	0.334	0.445	0.557	0.696	0.891	1.114	1.392	1.754	2.227	2.784	Minimum Flange (MF) inch
			0.037	0.049	0.061	0.074	0.098	0.123	0.154	0.197	0.246	0.307	0.387	0.491	0.614	Inside Radius (IR) inch
0.9	20	0.036	3.2	2.4												
1.2	18	0.048	5.7	4.3	3.4											
1.5	16	0.060		6.6	5.3	4.4										
1.9	14	0.075		10	8.3	6.9	5.2				US Tons Per Foot					
2.3	13	0.090			12	9.9	7.4	6.0								
2.7	12	0.105			16	14	10	8.1	6.5							
3.0	11	0.120				18	13	11	8.5	6.6						
3.4	10	0.135					17	13	11	8.4	6.7					
3.8	9	0.150					21	17	13	10	8.3					
4.8	3/16	0.188						26	21	16	13	10				
6.4	1/4	0.250							37	29	23	18	15			
8.0	5/16	0.313								45	36	29	23	18		
9.5	3/8	0.375									51	41	33	26	21	
12.7	1/2	0.500										73	58	46	37	
15.9	5/8	0.625											91	71	57	
19.1	3/4	0.750												103	82	
25.4	1	1.000													146	

Formulas:

US Tons Per Foot	$MT^2 x 575/VO$	Where MT=Material Thickness in inches; VO=V Opening in inches (VO in mm /25.4)
Minimum Flange	VOx.707	Where VO=V Opening; .707=√2/2
Inside Radius (IR)	VOx.156	Where VO=V Opening
Minimum Flange	VOx.707	Where VO=V Opening; .707=√2/2
Inside Radius (IR)	VOx.156	Where VO=V Opening

Note: Table assumes mild steel. When bending other materials, use a force adjustment. Aluminum = 50% Mild Steel = 100% Stainless Steel = 150%
All results are to be used as guidelines, not absolute values.

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SOLUTION GALLERY



SOLUTION GALLERY



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MATE PRECISION TOOLING GLOBAL COVERAGE

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