

# NC TURRET PUNCH PRESS HIGH PERFORMANCE TOOLING

High Quality & Technology For The Future  
**CONIC**  
Since 1976

## MURATA TYPE TOOLING



**JAPAN QUALITY**



# COMPANY GUIDANCE

## ABOUT US

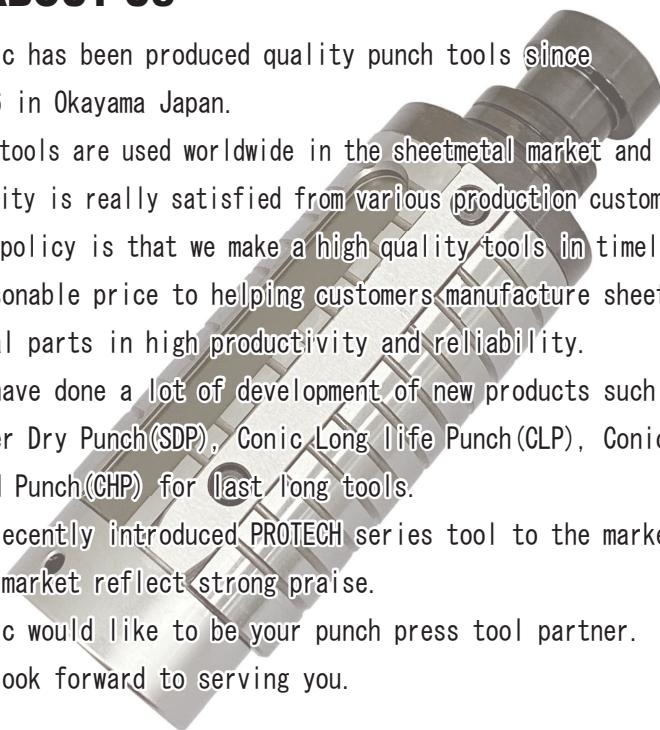
Conic has been produced quality punch tools since 1976 in Okayama Japan.

Our tools are used worldwide in the sheetmetal market and that quality is really satisfied from various production customers. Our policy is that we make a high quality tools in timely, in reasonable price to helping customers manufacture sheet metal parts in high productivity and reliability.

We have done a lot of development of new products such as Super Dry Punch(SDP), Conic Long life Punch(CLP), Conic Hard Punch(CHP) for last long tools.

We recently introduced PROTECH series tool to the market and market reflect strong praise.

Conic would like to be your punch press tool partner. We look forward to serving you.



## QUALITY

### Certificate



### Okayama factory :

ISO 9001:2015 provide superior Quality Management System in 1998 Conic Corp, received IS09001 authorization, and it has been recognized as a very reliable company, both on the international front and Japan.

## COMPANY HISTORY

- 1976 Established.
- 1979 Tokyo Sales Office opened.
- 1985 Okayama Factory opened.
- 1990 "International Sheet Metal Symposium" held by the company.
- 1992 Tool information and order receiving office was opened.
- 1993 Osaka Branch opened in Higashi-Osaka city.
- 1993 Head Office moved into Okayama Factory.
- 1998 Okayama factory was registered under required operation of international quality management system "ISO-9001".
- 1999 "Super Dry Punch" newly developed and launched.
- 2000 Internet order and quote receiving system was opened.
- 2002 "Conic Hard Punch" newly developed and launched.
- 2009 PROTECH series tooling newly developed and launched.
- 2012 Thailand Factory opened.
- 2013 "Conic Long life Punch" newly developed and launched.
- 2018 The Representative office in Vietnam opened.



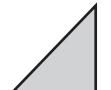
# SPECIFICATION OF CONIC TOOLING

## ■ Various Shapes

STANDARD SHAPES	WITH RADIUS CORNERS	CORNER ROUNDING
<ul style="list-style-type: none"> <li>■ ROUND (RO)</li> <li>■ OBOUND (OB)</li> </ul>  	<ul style="list-style-type: none"> <li>■ SQUARE (SQ)</li> <li>■ SINGLE D (SD)</li> </ul>  	<ul style="list-style-type: none"> <li>■ RECTANGLE (RE)</li> <li>■ DOUBLE D (DD)</li> </ul>  
	<ul style="list-style-type: none"> <li>■ SQUARE WITH RADIUS CORNERS</li> <li>■ RECTANGLE WITH RADIUS CORNERS</li> </ul>  	<ul style="list-style-type: none"> <li>■ CN-42</li> <li>■ CN-41</li> </ul>  

Note : Square and Rectangle punch corner has small radius (R0.2) for prevent crack of punch tip.

If it is not necessary, please inform us.

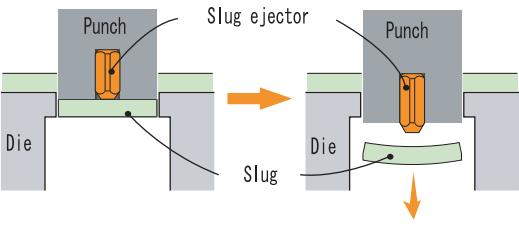
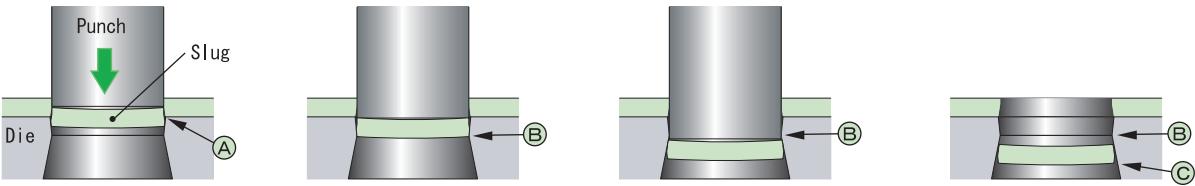
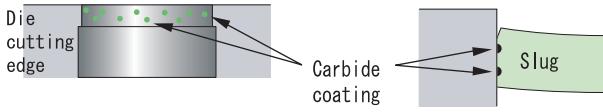
SPECIAL SHAPES (CLASS-1)	SPECIAL SHAPES (CLASS-2)
         	         

SPECIAL SHAPES (CLASS-3)	SPECIAL SHAPES (CLASS-4)
         	<p>More complicated figure</p> <p>When make order, please inform to us the center position of the tool.</p> <p>CONIC is possible to produce other than this form list, please contact us.</p>

## ■ Shear Angle Type For Punch

Roof Top Shear		To reduce tonnage and noise by added angle 2° (or 5°) at punch shear for over D station with free of charge.
Concave Shear		To prevent touch of punch and die when use as shearing punch tool. For over D station with free of charge. It is possible to cross Inverse Roof Shape shear angle when order square.
Inverse Roof Top Shear		To prevent touch of punch and die when use as shearing punch tool. (Need additional charge) It is possible to cross Inverse Roof Shape shear angle when order square.

## ■ Prevent Slug Pulling

PUNCH	<p>Slug Ejector</p> <p>Slug ejector push down the slug. It will be installed to over <math>\phi 4</math> for round and over 6 mm width shape tool as our standard. Please contact us, when punch thick material sheet or hard material with small punch diameter.</p> 
DIE	<p>Slug Catcher Die</p> <p>Standard shapes and special shapes have this function as standard. (Except : Blank type, less than 2mm width die for blank will be parts, punch with heel, die clearance is less than 0.1mm)</p> <p>① Material is cut off at [A] part. ② The slug is compressed in the process of punching at [B] part. ③ Drags the slug through the relief. ④ [B] part is narrower than [C] part so the slug cannot comes up.</p> 
DIE	<p>Depositron Process</p> <p>Put electrical super hard spot onto inside of die hole Except clearance 0.1mm Standard on die diameter <math>\phi 2 \sim \phi 4.5</math></p> 
DIE	<p>Straight with taper Die</p> <p>Use this specification standard on Blank tool, less than 2mm width die for blank will be parts, punch with heel die clearance is less than 0.1mm</p> 

# SPECIFICATION OF CONIC TOOLING

## ■ Conic Original Coating



Perfect tool for stainless steel !

## Super Dry Punch (SDP)

This is our best tool. Incredible durability and defeated the common sense that "Stainless is hard to process".

This tool is suitable for night time unattended operation and dry ( no oil lubrication on the sheet metal) condition punching. Super Dry Punch (SDP) is available with only the following shapes.

■ ROUND (RO) ■ SQUARE (SQ) ■ RECTANGLE (RE) ■ OBROUND (OB) ■ SQUARE with R RECTANGLE with R



(Less than R10)

Perfect tool for thick material!

## Heavy Duty Punch (HDP)

High performance for all purpose, especially for thick material.

Coating with excellent heat resistance.

The coating is difficult to peel off even with heat generated continuously. Special shapes are also available for this treatment.

Most efficient in long life and cost !

## Conic Long life Punch (CLP)

High performance for all purpose, especially for mild steel, galvanized steel with high corrosion resistance !

Special shapes are also available for this treatment.

Ultra cost performance tool for reasonable price !

## Conic Hard Punch (CHP)

Reasonable price and suitable for all purpose.

CHP shows high performance reducing adhesion and galling which is more likely to be caused by processing Aluminum and Coated steel sheet.

Total Performance	Punch type	Aptitude			
		Stainless steel (SUS)	Mild steel (SPCC)	Aluminum	Galvanized
	Super Dry Punch (SDP)	★★★★★★	★★★★★★	★★★★	★★★★
	Heavy Duty Punch (HDP)	★★★★★	★★★★★★	★★★★★★	★★★★★★★
	Conic Long life Punch (CLP)	★★★★	★★★★★★	★★★★★★	★★★★★★★
	Conic Hard Punch (CHP)	★★★	★★★★	★★★★★	★★★★★
	HSS	★★	★★★	★★★★	★★★★
	D2	★	★	★★	★

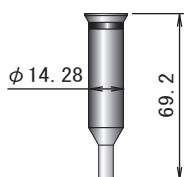
## VARIATION OF CONIC MURATA TYPE TOOL

## TOOLING STYLE 114

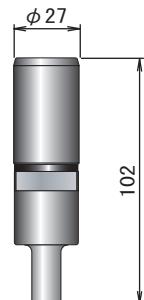
Use urethane stripper on this tools.

PUNCH

A



B

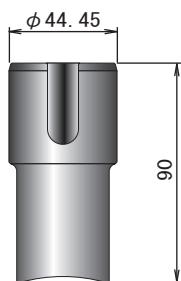


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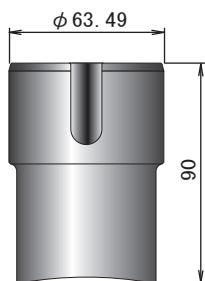


DIE

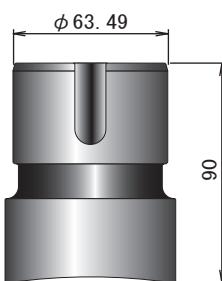
D



E

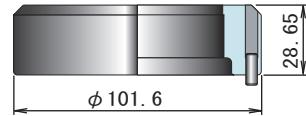
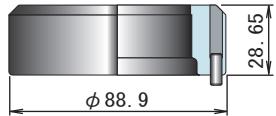
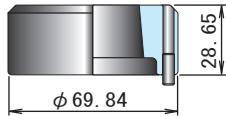


F



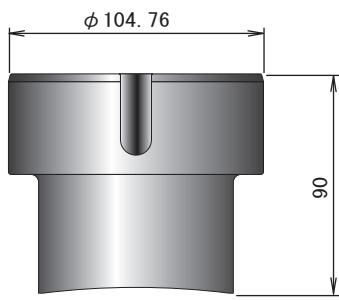
PUNCH

DIE

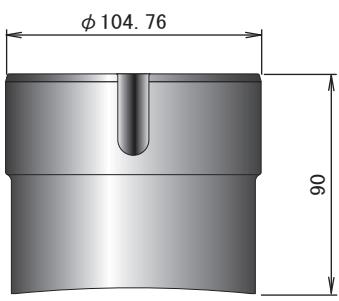


PUNCH

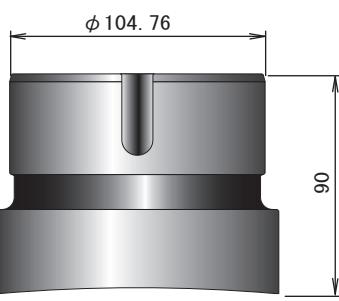
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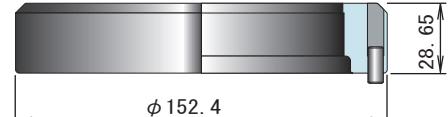
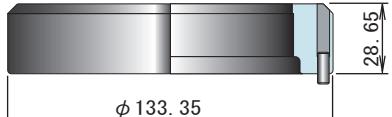
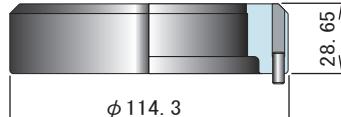
H



J



DIE



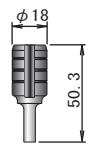
## VARIATION OF CONIC MURATA TYPE TOOL

## VULCAN TOOL

This tool uses metal stripper.

DIE STRIPPER PUNCH

X



A



B



C



D



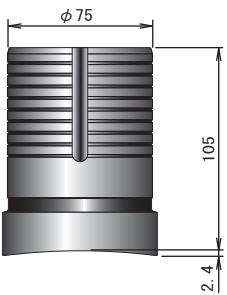
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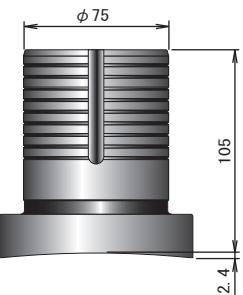
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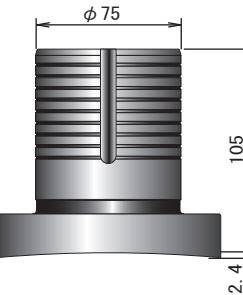
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H

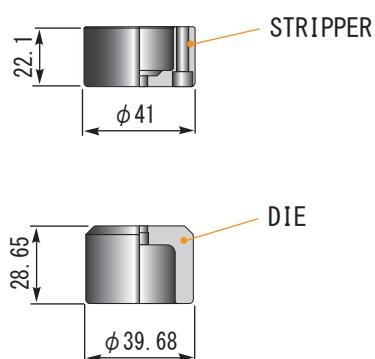
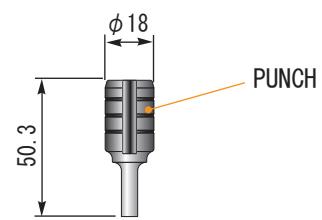
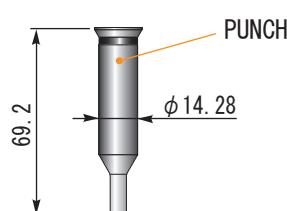
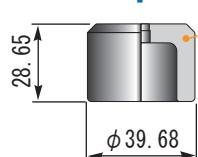
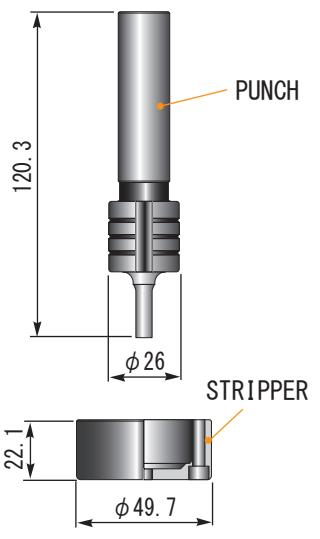
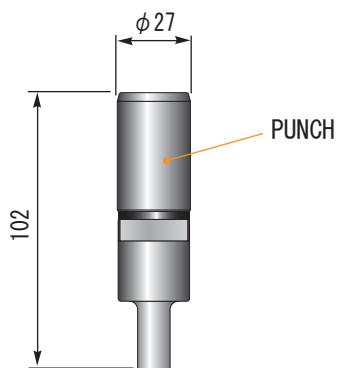
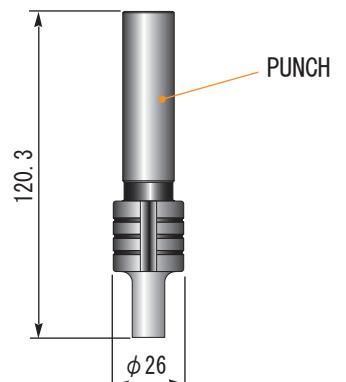
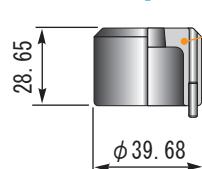


J



DIE STRIPPER PUNCH

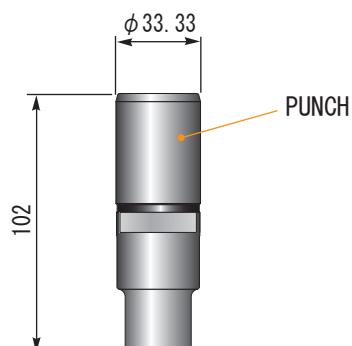
# X / A / B STATION TOOLING

**X****Diameters Up to 12.7mm****VULCAN TOOL****A****Diameters Up to 12.7mm****STYLE 114****VULCAN TOOL****B****Diameters 12.71mm ~ 25mm****STYLE 114****VULCAN TOOL****DIE**

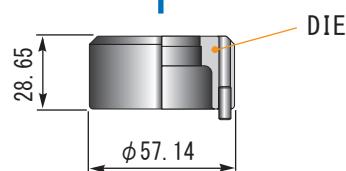
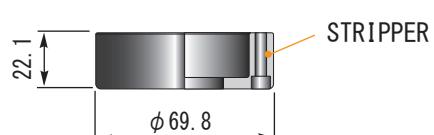
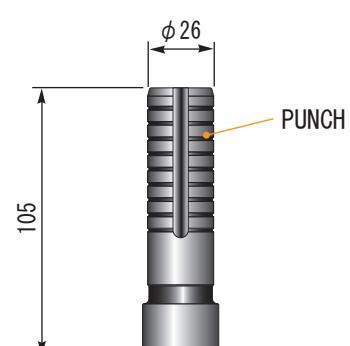
C

Diameters 25.01mm ~ 38mm

STYLE 114



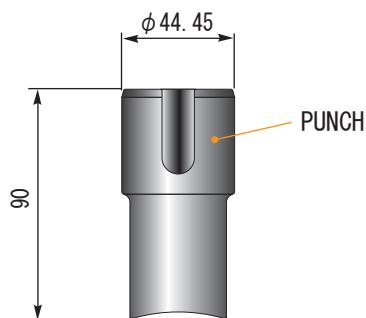
VULCAN TOOL



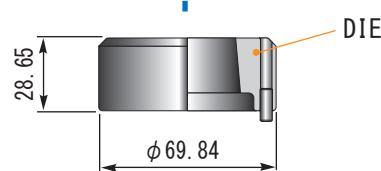
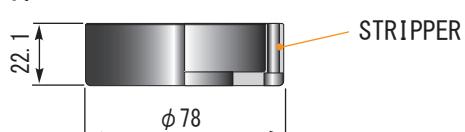
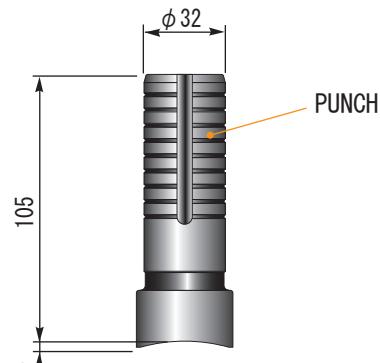
D

Diameters 38.01mm ~ 50mm

STYLE 114



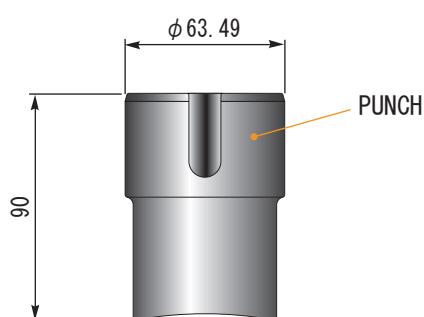
VULCAN TOOL



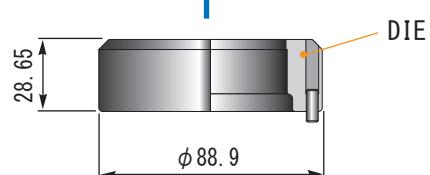
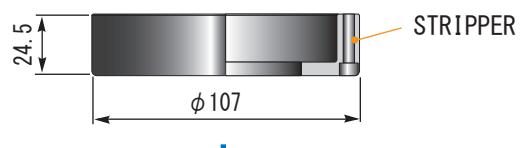
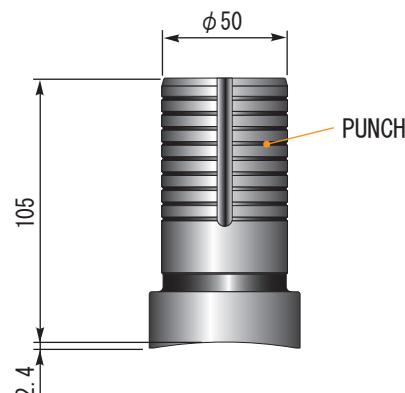
E

Diameters 50.01mm ~ 64mm

STYLE 114



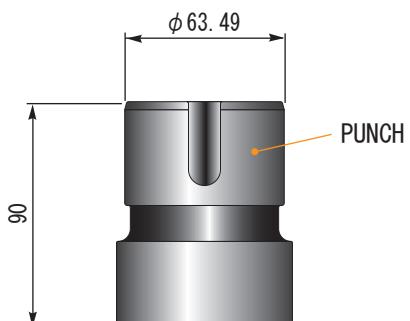
VULCAN TOOL



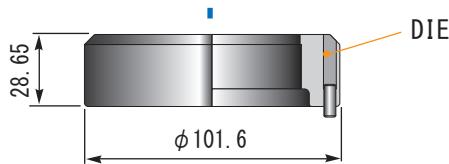
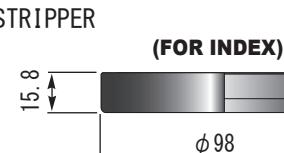
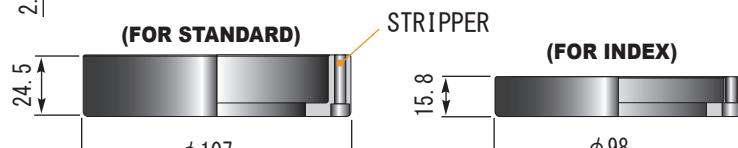
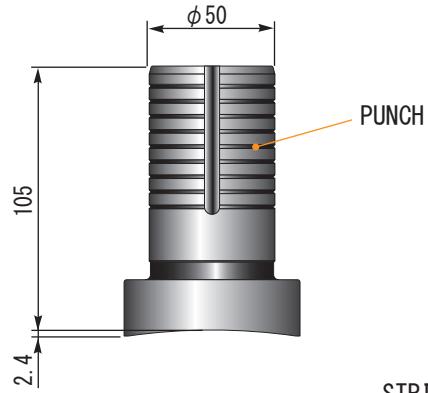
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Diameters 64.01mm ~ 75mm

STYLE 114



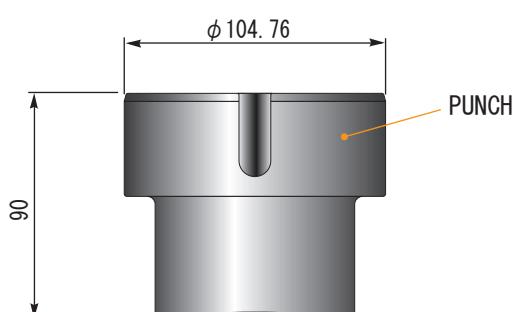
VULCAN TOOL



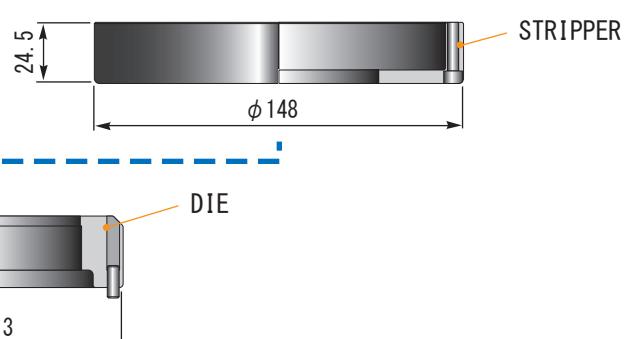
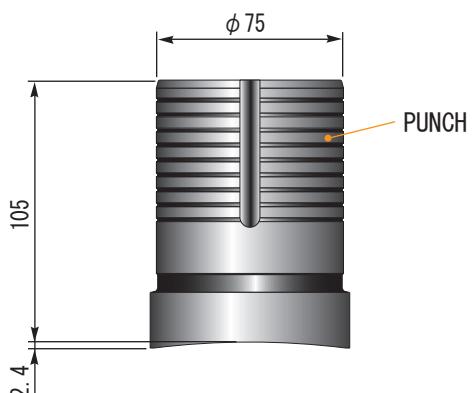
G

Diameters 75.01mm ~ 89mm

STYLE 114



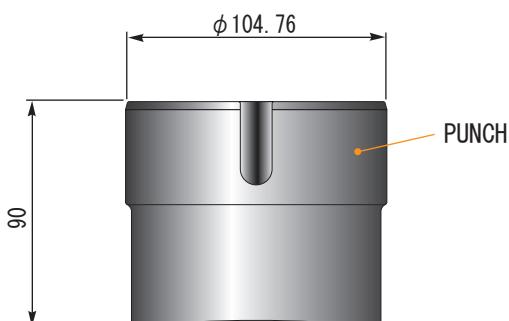
VULCAN TOOL



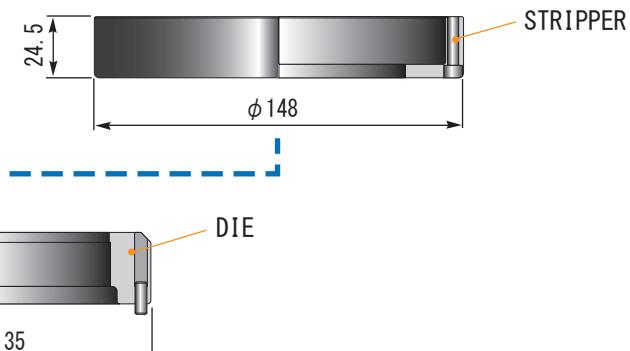
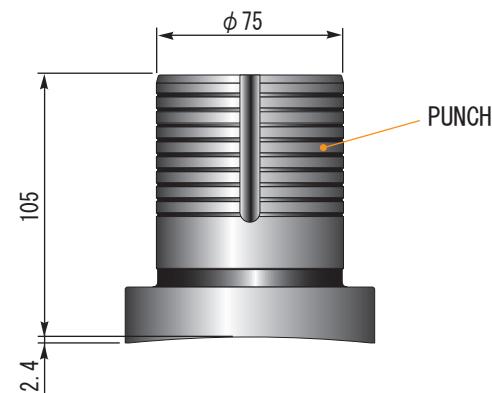
H

Diameters 89.01mm ~ 105mm

STYLE 114



VULCAN TOOL

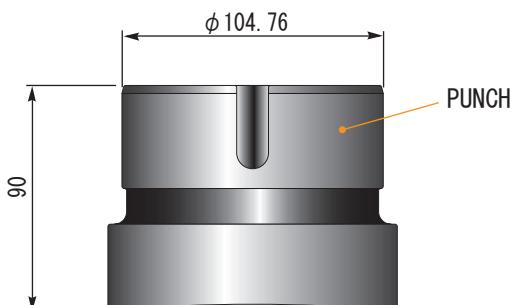


# J STATION TOOLING / HOLDER

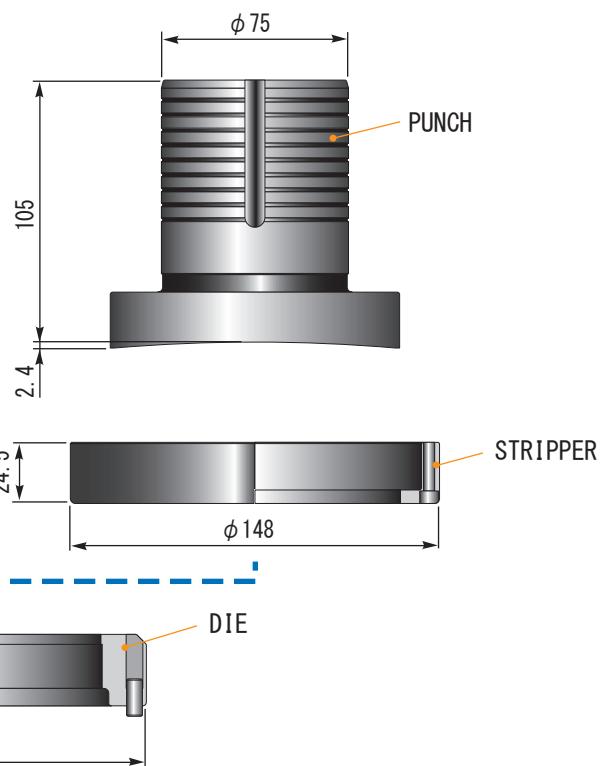
J

Diameters 105.01mm ~ 120mm

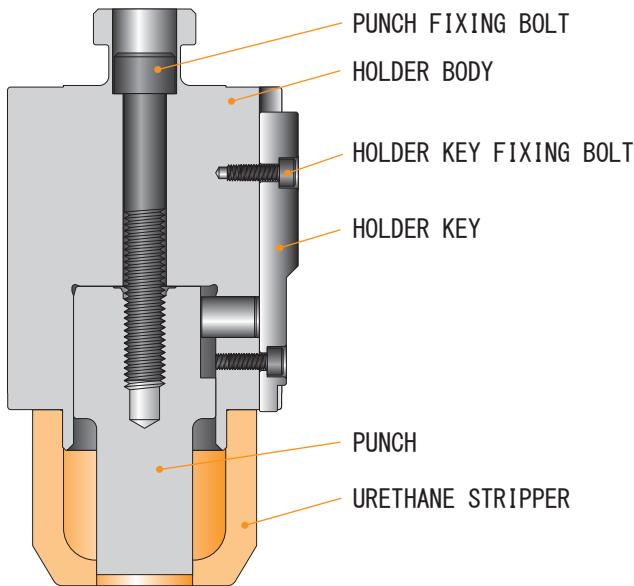
## STYLE 114



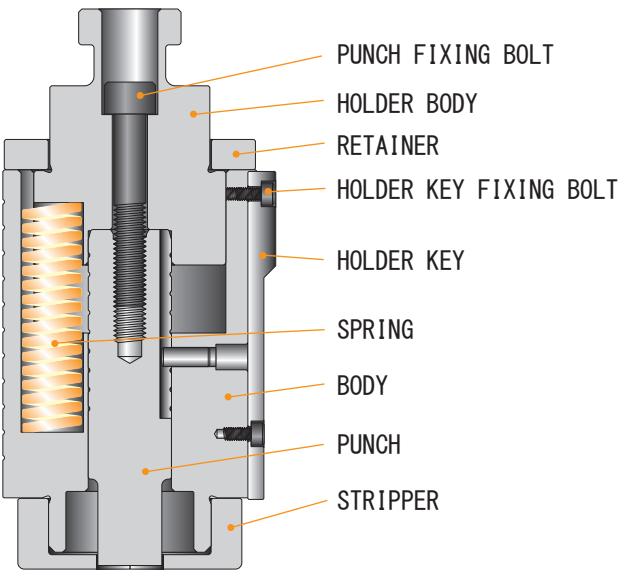
## VULCAN TOOL

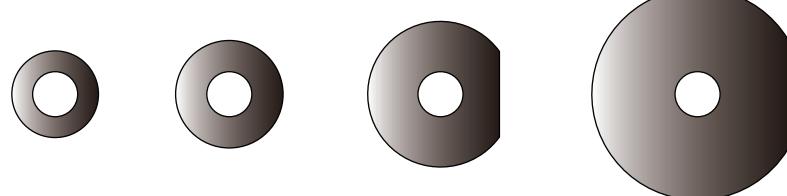


## TOOLING STYLE 114

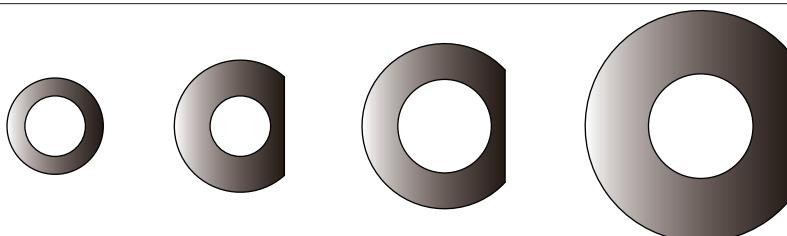


## VULCAN TOOL

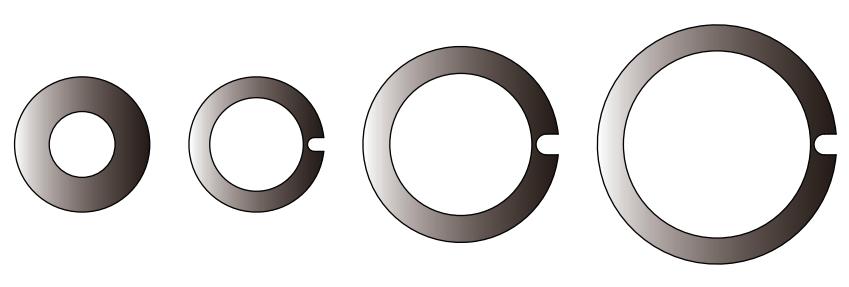


**PUNCH SHIM, DIE SHIMBRUSH DIE****PUNCH SHIM 114**

STATION
X
A, B
C
D
E, F
G, H, J

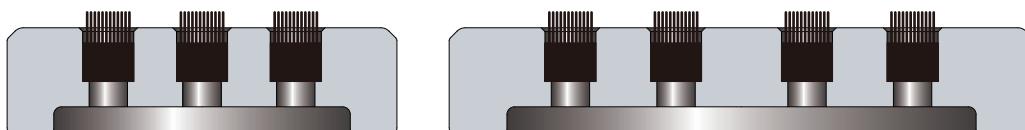
**PUNCH SHIM VULCAN**

STATION
X
A, B
C
D
E, F
G, H, J

**DIE SHIM**

STATION
X, A, B
C
D
E
F
G
H
J

Remark : Shim set = 0.5mm, 1.0mm x 2, 1.5mm, 2mm Total 5 pieces

**BRUSH DIE**

Placing these "Brush Die" into the vacant stations to avoid the damage of sheet metal.

STATION
X, A, B
C
D
E
F
G
H
J

## 114 PUNCH HOLDER



	STATION
PUNCH HOLDER	X
	A
	B
	C
	D
	E, F
	G
	H
	J
	INDEX D
	INDEX F

## VULCAN PUNCH HOLDER



	STATION
PUNCH HOLDER	X
	A, B
	C
	D
	E, F
	G, H, J
	INDEX D
	INDEX F

## 114 URETHANE STRIPPER

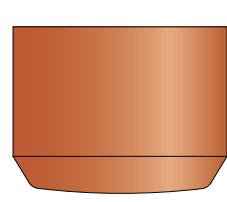
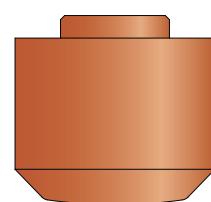
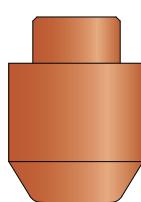
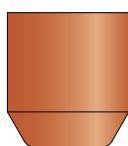
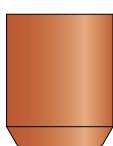
X

A

B

C

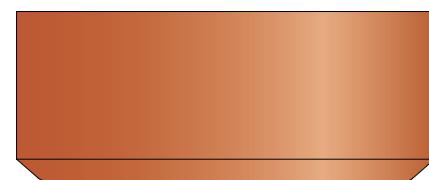
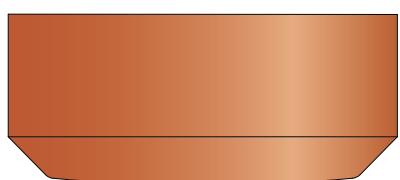
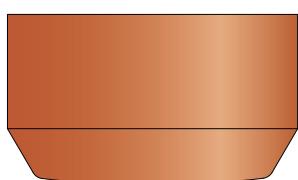
D



EF

GH

J



# INSTRUCTION MANUAL

## Caution when start to use Conic tools

Please use Conic punching tools as of when you get it from factory.

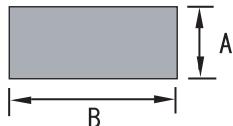
- Please use Conic tools as of when you get it from factory. Because, we apply special lubricant grease (MoS<sub>2</sub> with graphite) on slide area which is punch body and inside of guide. It is necessary to apply certain lubrication frequently while machine is running.
- When you get punch body as the tooling parts, we recommend to apply some lubricant grease (MoS<sub>2</sub> with graphite) to slide area of punch body and inside of guide before using that tool.

Conic recommend to use MoS<sub>2</sub> with graphite for tool slide area. Customer may purchase that from Conic tool order desk or distributors.

- Please clean not only tools but also turret tool holder and die holder when install tools to the machine. Sometimes metal dust may stay in the die holder and cause by incline set up of the die.
- When tools are not used in the turret, please take out and store in the tool cabinet to avoid getting rust and dust.
- If tool is dull and not make good performance, please regrind punch and die to use wet type grinder. After regrind clean the punch body slide area and apply good lubrication oil or grease to there.
- Please do not modify or apply additional machining to the punching tools by customer.
- If you have any other questions please contact tool order desk.

## Regarding Urethane Kicker

Most of the time, Conic put urethane kicker to the bottom area of punch body to avoid slug comes up depend on size and shape.



- Round shape; standard on size more than 4mm
- Shape type; standard on short size(A) is more than 6mm  
(We can put urethane kicker if (A) is more than 6mm if customer request.)
- Special shape; depend on actual size and shape.

## When use tools as blanking shapes

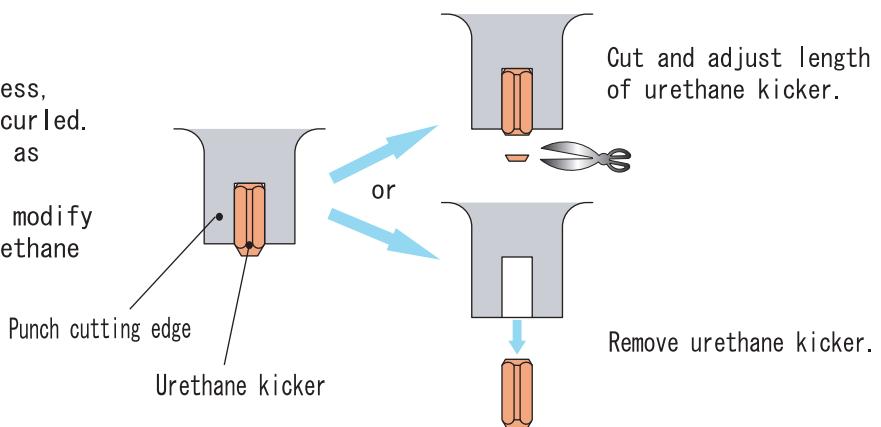
If punched blank is going to parts please read followings:

### [Specification]

We sometimes put urethane kicker even customer may use that tools as blanking shapes. Please make sure punching edges of the tools.

### [Note]

Depend upon material or material thickness, sometimes punched shape has damaged or curled. In such cases please test same material as production and check the result. Then, if result is not satisfied, please modify to cut the urethane kicker or remove urethane kicker itself.



# INSTRUCTION MANUAL

◆ Please use tools as suitable conditions.

Other than specified material or thickness tools maybe destroyed.

◆ Please adjust shut height before use.

- Make sure each punchpress shut height.
- **Conic set the shut height shorter for safety reason when ship out our tools.**

Please use this manual to put shims in to adjust shut height.

◆ If process is multi process type tool:

- Please make sure pre-hole size.
- Please make sure center position of the tools when make punching program.

■ How to adjust shut height for forming tools.

- 1) Height adjustment of forming tool is done by shims.
- 2) There are two ways to adjust height, one is using punch shims another is using die shims.
- 3) First punch without any shims then find the difference and required amount of shims.

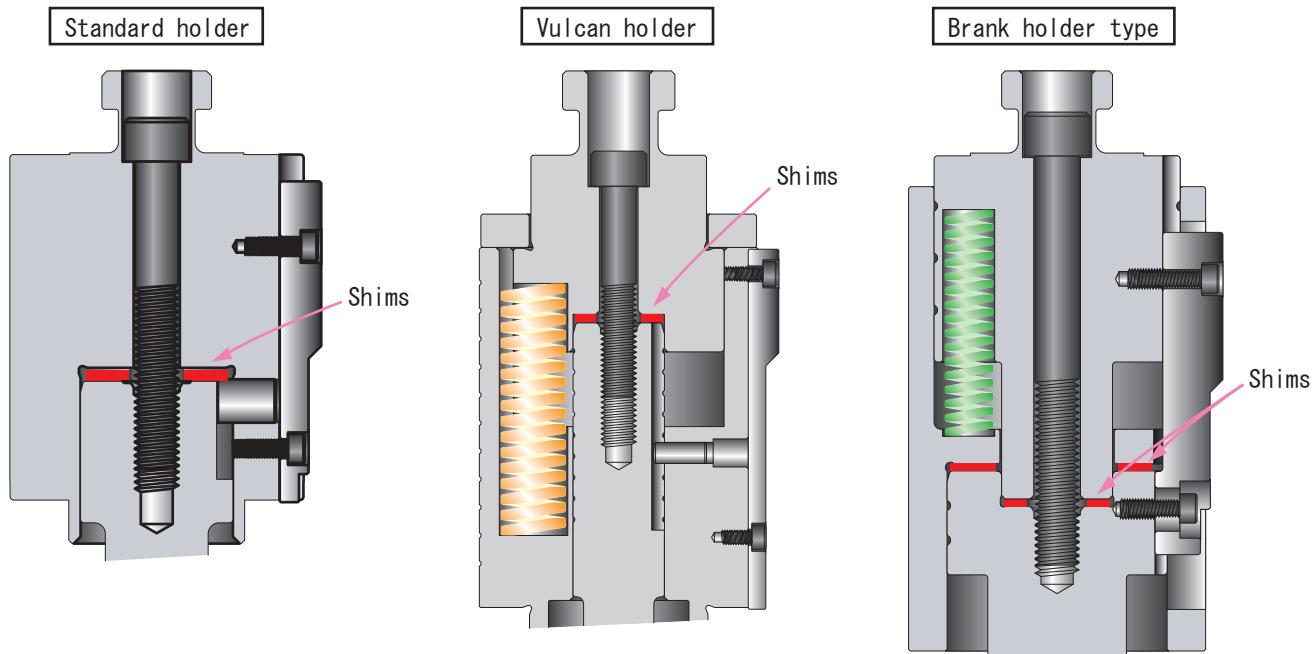
Note 1:

Please make sure to take out shims after punching.

Note 2:

Add the grinding amount of shims after grind the tools.

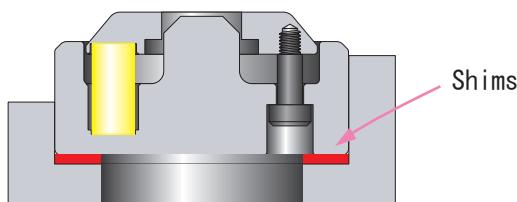
■ How to adjust punch shims. (put shims between punch and punch holder)



Note:

In case use blank holder type guide, please be careful, there are two positions to put same thickness shims in one is between punch and driver, another is punch and holder.

■ How to adjust die shims. (put shims between die and die holder)



Special forming shim set (sells separately) has 5 pieces shims. Thickness is  $t=0.4, 0.5, 0.6, 0.7, 0.8\text{mm}$ . It can be adjusted by those combination from  $0.4\text{mm}$  to  $2.6\text{mm}$   $0.1\text{mm}$  step.

Widest variety special forming tools in advanced technology.

## Conic Special tools

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Conic offers the best performance special tools to the customer.

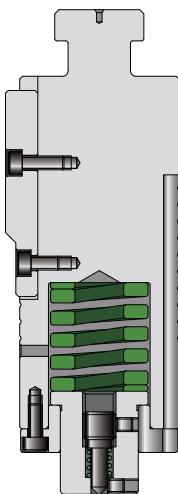
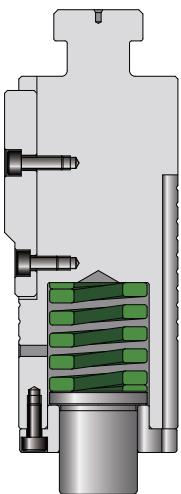
Conic engineers always try to find the best solution of productive tools to the customer which uses the most advanced tooling technologies.



## CENTER POINT

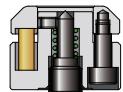
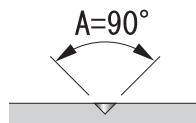
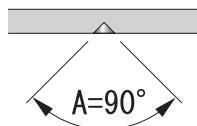
FORMING UP

FORMING DOWN



FORMING UP

FORMING DOWN



Forming process of making conical recess (center point).  
Used for locator, landmark and so on.

## BURRING FOR THREAD FORM

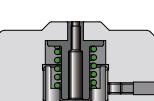
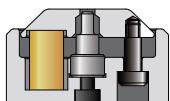
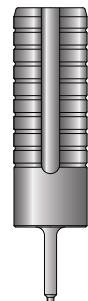
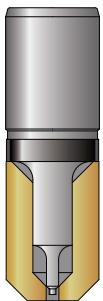
FORMING UP

114

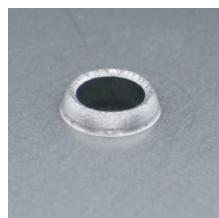
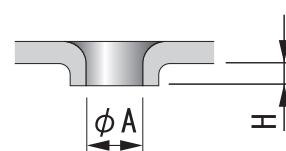
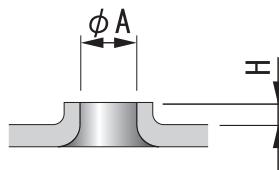
FORMING DOWN

114

VULCAN



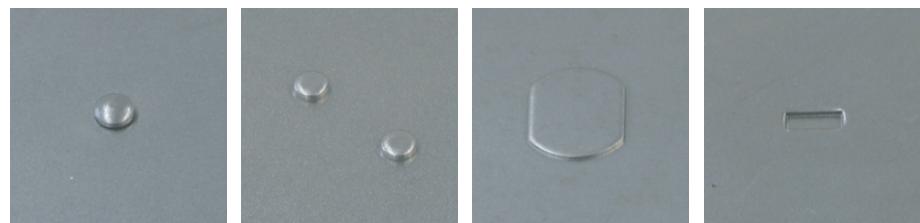
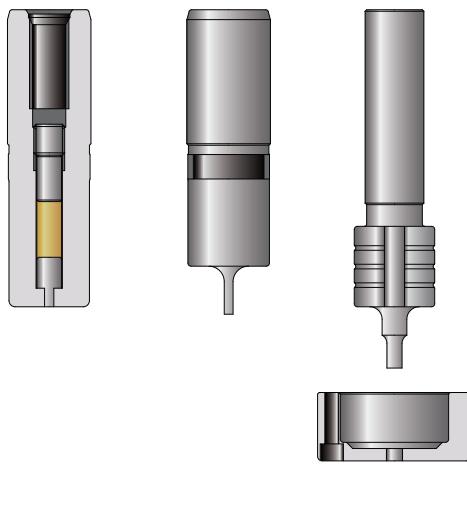
Screw size	Diameter (A)	Pre-hole
M2.5	$\phi 2.1$	$\phi 1.2$
M3	$\phi 2.6$	$\phi 1.5$
M4	$\phi 3.4$	$\phi 2.0$
M5	$\phi 4.3$	$\phi 2.4$
M6	$\phi 5.1$	$\phi 2.8$



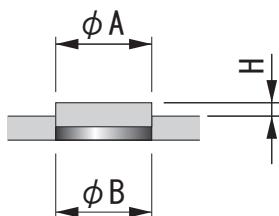
Forming process for making tubes of threading for screw.  
Threading for screws and increased bearing area for tubes.

## HALF SHEAR

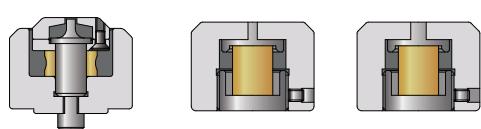
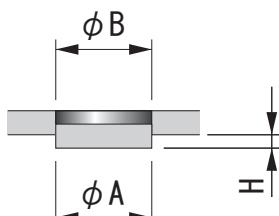
FORMING UP	FORMING DOWN
114	114



FORMING UP



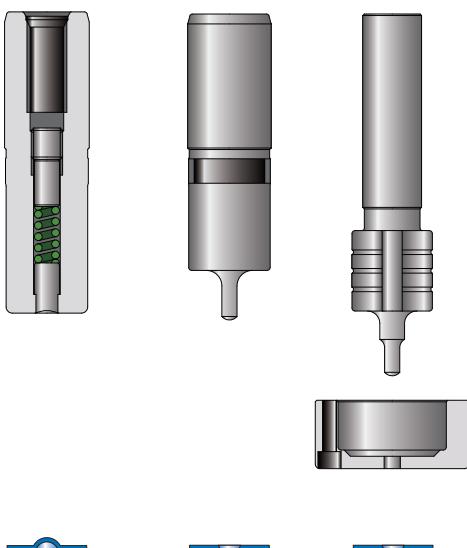
FORMING DOWN



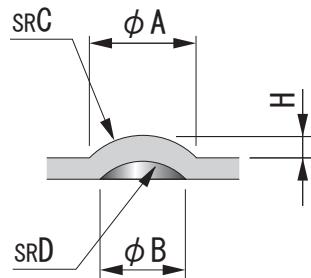
Forming process of pierce half of material thickness.  
Used for locator or stopper.

## EMBOSS (DIMPLE)

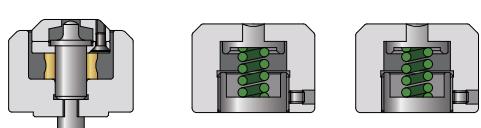
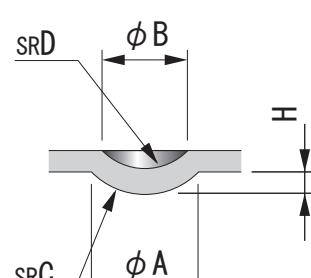
FORMING UP	FORMING DOWN
114	114



FORMING UP



FORMING DOWN



Forming process of embossing material like dimple.  
Used for locator or decorative pattern of the material.

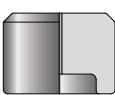
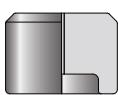
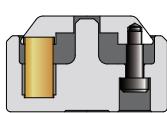
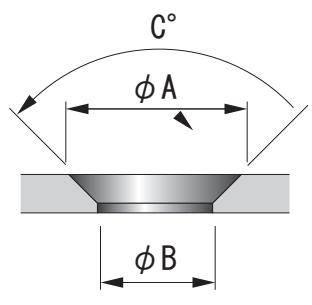
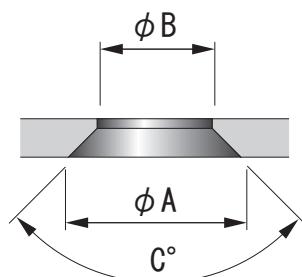
## COUNTERSINK FOR COUNTERSUNK SCREW (CHAMFERING)

FORMING UP	FORMING DOWN
114	114



FORMING UP

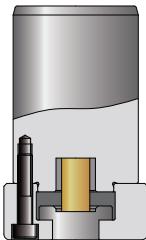
FORMING DOWN



Forming process of making a chamfer to material.  
Used for sink a countersunk screw head, make chamfer to a corner after punching, guide of tapping.

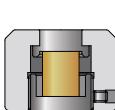
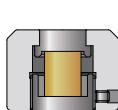
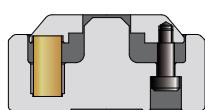
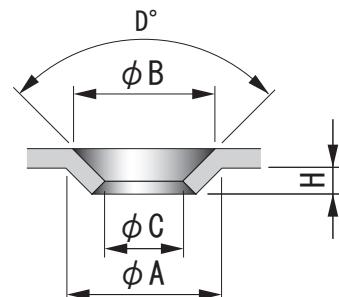
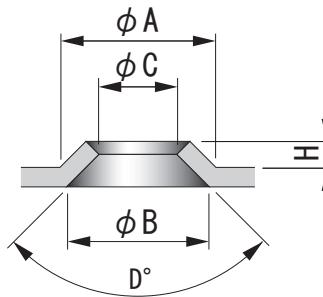
## COUNTERSINK

FORMING UP	FORMING DOWN
114	114



FORMING UP

FORMING DOWN



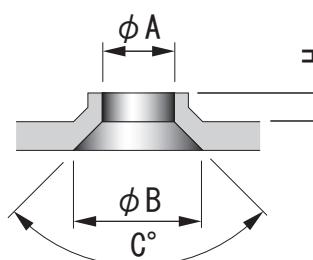
Forming process of embossing work, such as dish-shaped.  
Used for sink a countersunk screw head, or used for nonslip.

## COUNTERSINK BURRING

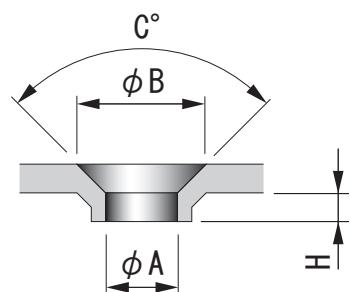
FORMING UP	FORMING DOWN
114	114



FORMING UP

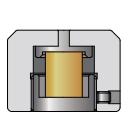
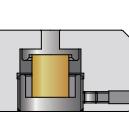
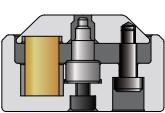


FORMING DOWN



Forming process for making tube of threading for screw, and at the same time make a chamfer in the entrance part.

Used for threading for screw. Used to guide at the time of tapping.



## ONE PITCH THREAD FORM

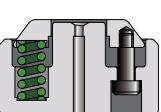
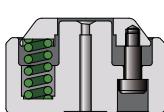
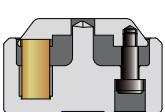
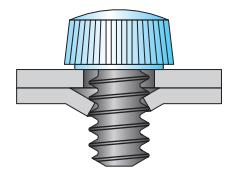
FORMING UP	FORMING DOWN
114	114



FORMING UP



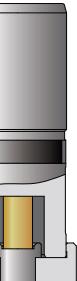
FORMING DOWN



Forming process of making the one pitch thread form. Used to screw in place that does not require a heavy strength.

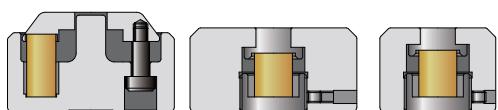
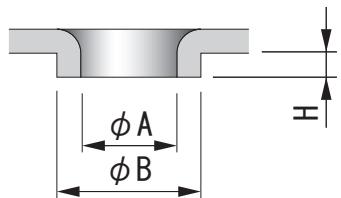
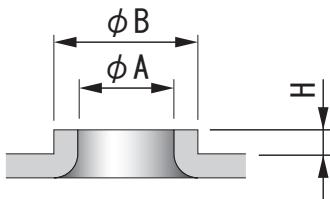
## COUNTERSINK BURRING

FORMING UP	FORMING DOWN
114	114



FORMING UP

FORMING DOWN

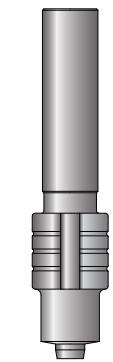
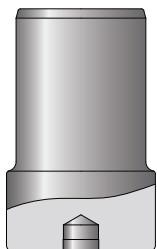


Forming process for making tubes.

Used to guide or protect the code and pipe.

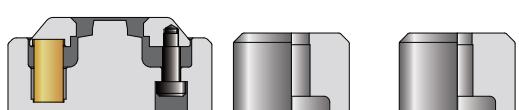
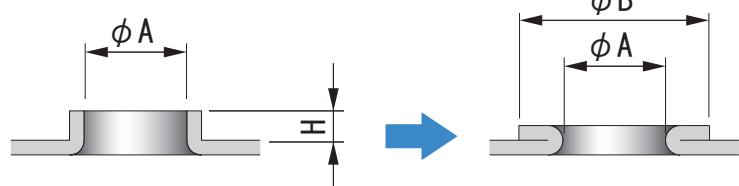
## CURLING

FORMING UP	FORMING DOWN
114	114



BURRING

CURLING



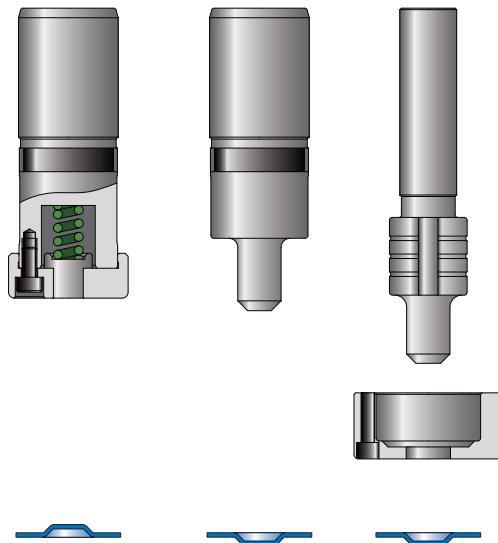
Forming process to bend the material after forming of burring.  
Used to guide or protect the code and pipe.

The order of processing is Pre-hole  $\Rightarrow$  Burring  $\Rightarrow$  Curling.

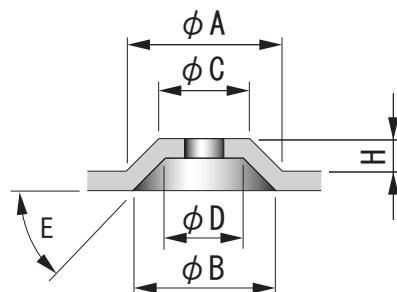
## EMBOSS

FORMING UP	FORMING DOWN
114	114

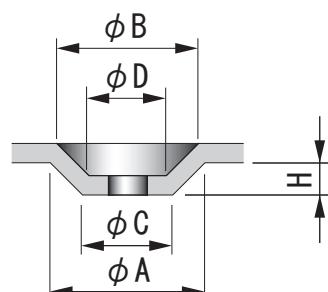
VULCAN



FORMING UP



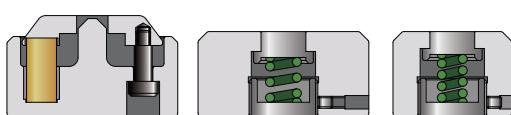
FORMING DOWN



Forming process to produce raised or sunken shape.

Used for sinking a head of bolts or nuts.

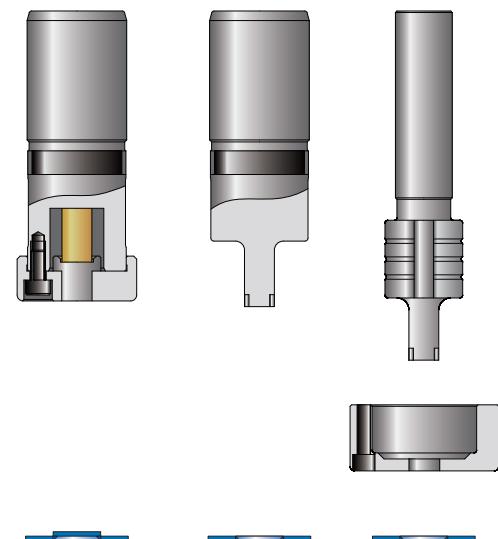
Used for the seat of the product.



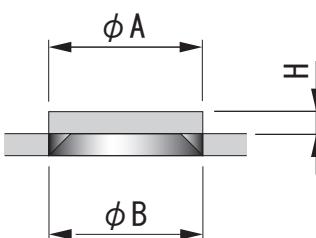
## KNOCKOUT

FORMING UP	FORMING DOWN
114	114

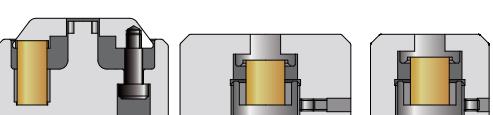
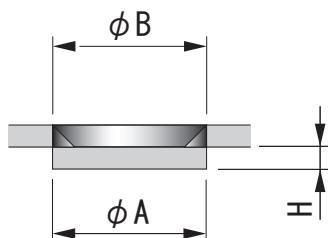
VULCAN



FORMING UP



FORMING DOWN



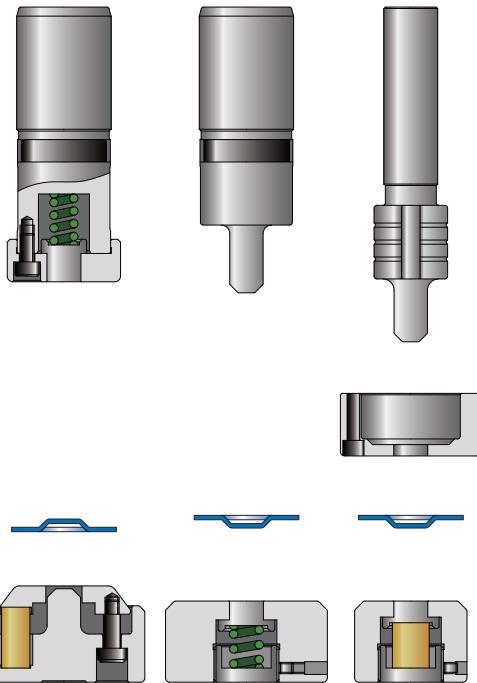
Forming process of piercing a hole and keep the slug on the sheet metal by tabs.

When using a hole, remove the slug using a screwdriver.

## BRIDGE, DOUBLE BRIDGE

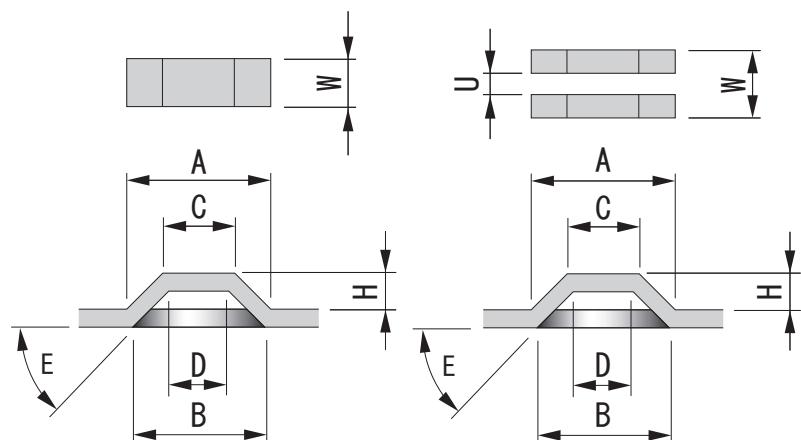
FORMING UP	FORMING DOWN
114	114

VULCAN



SINGLE BRIDGE (FORMING UP)

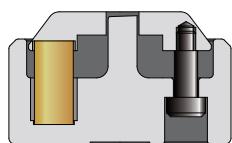
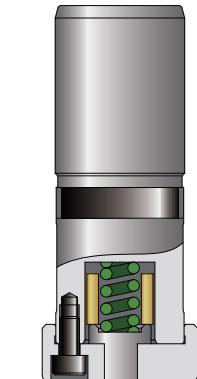
DOUBLE BRIDGE (FORMING UP)



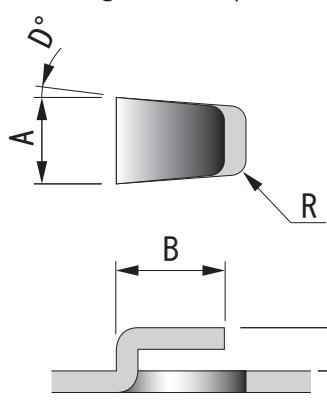
Forming process of lance like a bridge.

## LANCE (Z-BENDING)

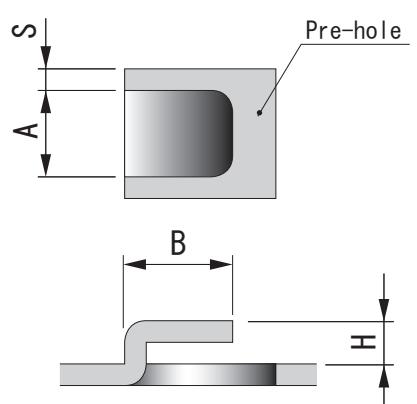
FORMING UP
114



Forming without pre-hole



Forming after pre-hole



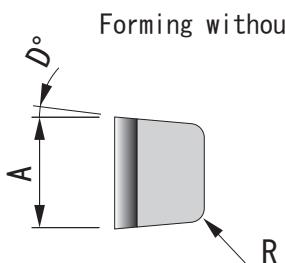
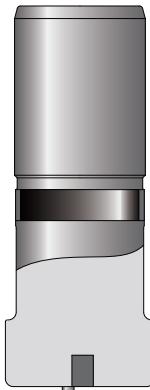
Forming process of lance like Z figure.

Used for hook, locator and stopper.

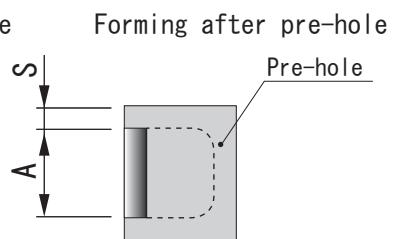
## LANCE (L-BENDING)

FORMING UP

114



Forming without pre-hole



Forming after pre-hole



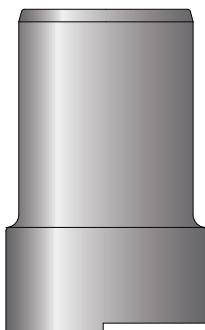
Forming process of lance like L figure.

Used for hook, locator and stopper.

## BENDING (OFFSET TOOL)

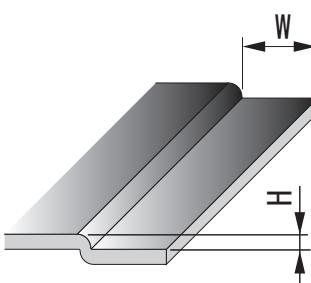
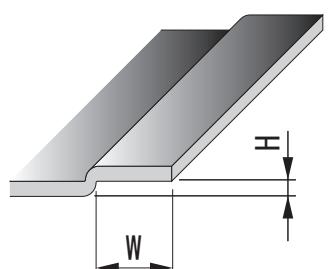
FORMING UP

114



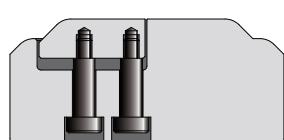
FORMING UP

FORMING DOWN



Forming process of bending that can hit continuously along the sheet.

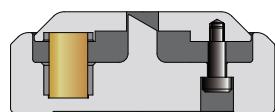
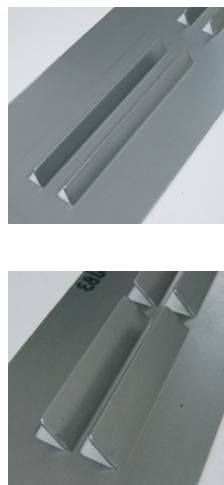
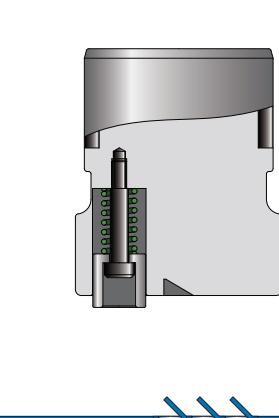
Used for the overlaying the sheet.



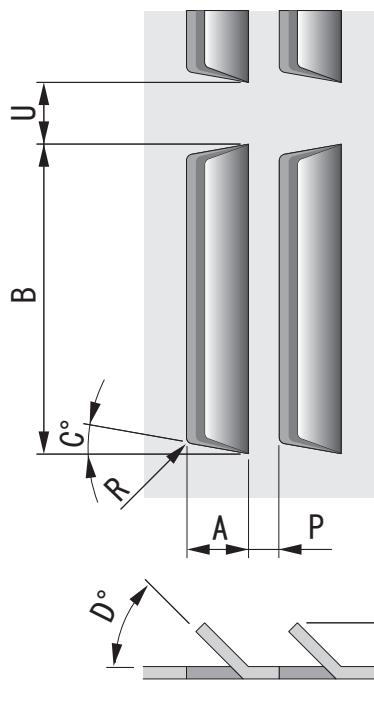
## LANCE FOR AIR FLOW

FORMING UP

114



FORMING UP



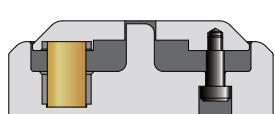
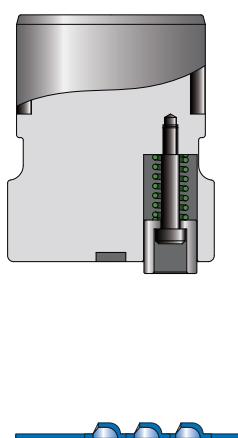
Forming process of lance to create an opening.

Used to provide air flow or ventilation.

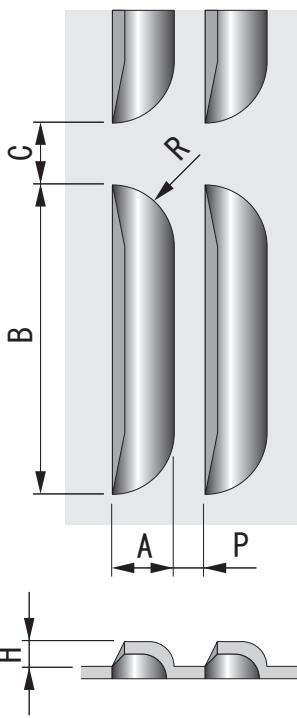
## LOUVER FOR AIR FLOW

FORMING UP

114



FORMING UP



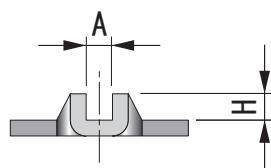
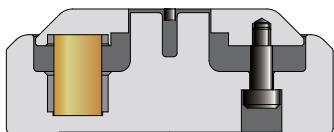
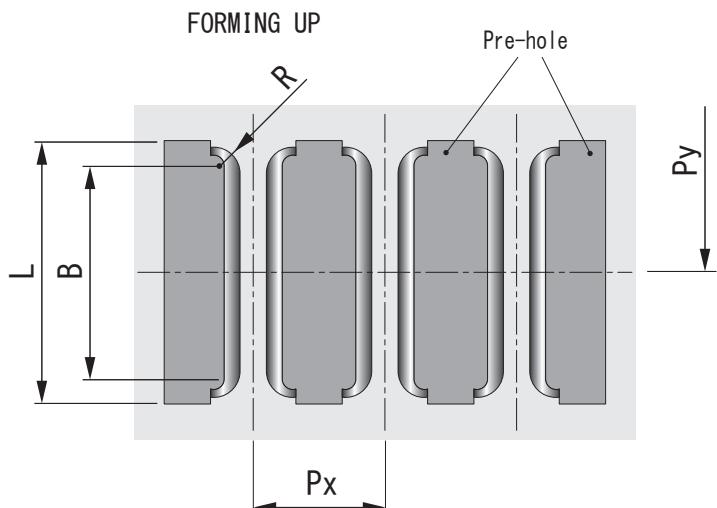
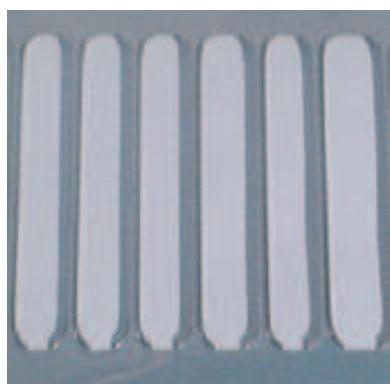
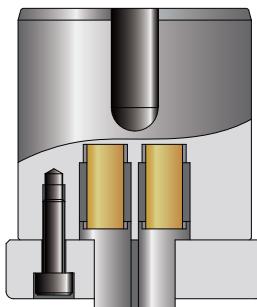
Forming process of louver to create an opening.

Used to provide air flow or ventilation.

## CARD GUIDE

FORMING UP

114

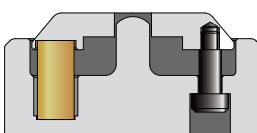
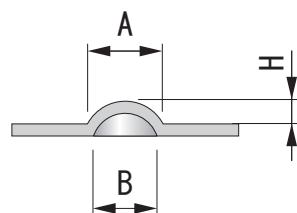
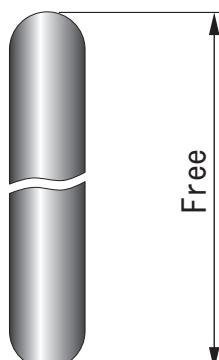
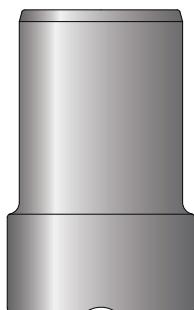


Forming process to form U-groove for a printed circuit board.

## BEADING

FORMING UP

114



Forming process of embossing that can hit continuously along the sheet.

Used for strengthening, nonslip or decoration.

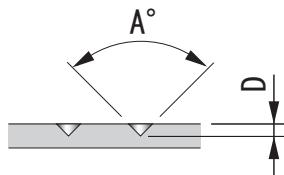
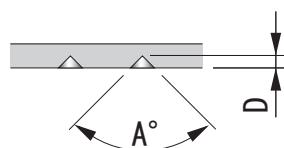
## MARKING (STAMPING)

FORMING UP	FORMING DOWN
114	114



FORMING UP

FORMING DOWN



conic 金型 ABC

Forming process of stamping the character or logo etc.



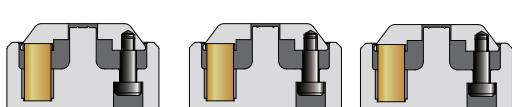
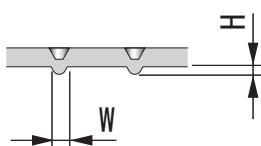
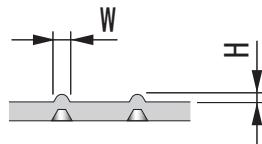
## MARKING (EMBOSS)

FORMING UP	FORMING DOWN
114	114



FORMING UP

FORMING DOWN



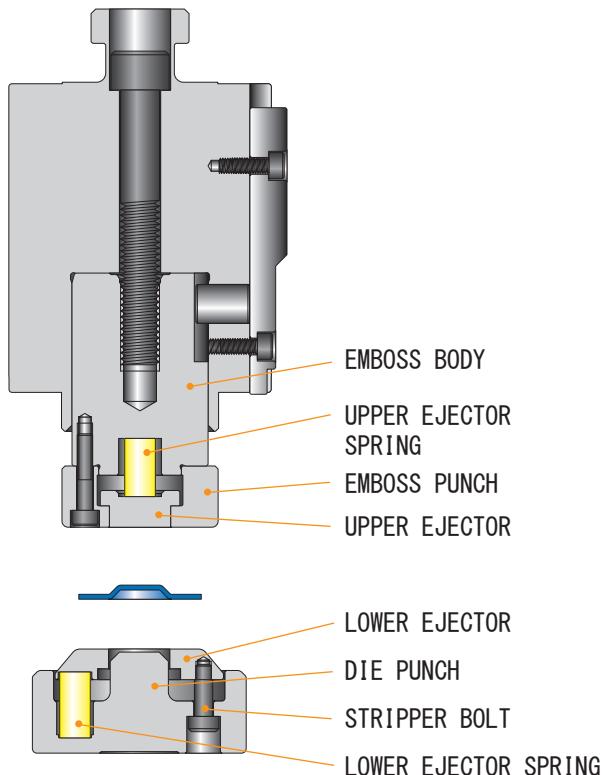
conic ABC



Forming process of embossing the character or logo etc.

## FORMING UP

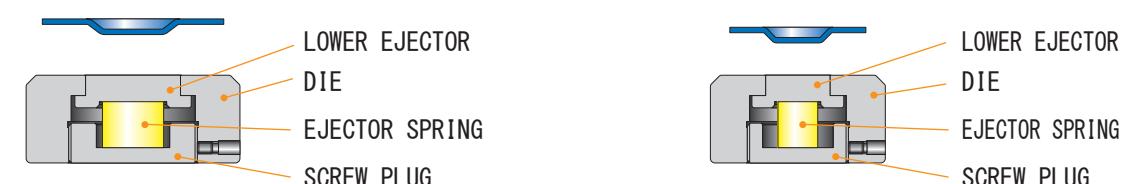
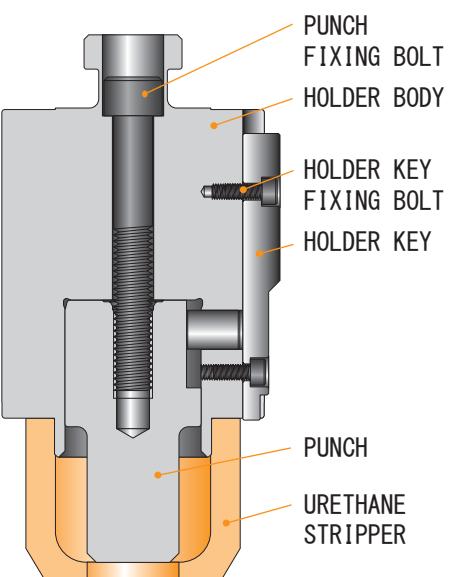
## MURATA STYLE 114



## FORMING DOWN

## MURATA STYLE 114

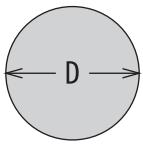
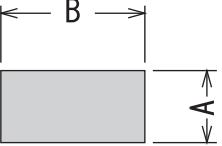
## MURATA VULCAN TOOL



## CALCULATE PUNCHING FORCE (TONNAGE)

Tonnage capacity is different depending on machines.  
Use the calculation formula below to prevent from over tonnage.

$$\text{Tonnage (ton)} = \frac{\text{Circumference (mm)} \times \text{Material thickness (mm)} \times \text{Shear resistance (kg/mm}^2\text{)}}{1000}$$

Circumference	
Round	Shaped
Diameter x 3.14	(Length dimension + Width dimension) x 2
	
Circumference = D x 3.14	Circumference = (A + B) x 2

### Shear resistance by material

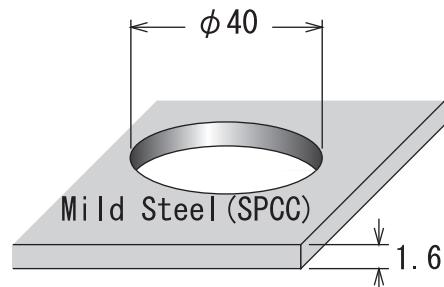
Material	Shear resistance (kg/mm <sup>2</sup> )
Mild Steel	26~35
SS400	33~42
Stainless Steel	52~56
Aluminum	7~16
Copper	18~30
Brass	22~40

### <Calculation example>

The tonnage when piercing  $\Phi 40$  to Mild Steel T=1.6mm.

$$\frac{\text{Circumference} \times \text{Material thickness} \times \text{Shear resistance}}{1000} = \text{tonnage}$$

$$\frac{40 \times 3.14 \times 1.6 \times 35}{1000} = 7 \text{ (ton)}$$



## DIE CLEARANCE

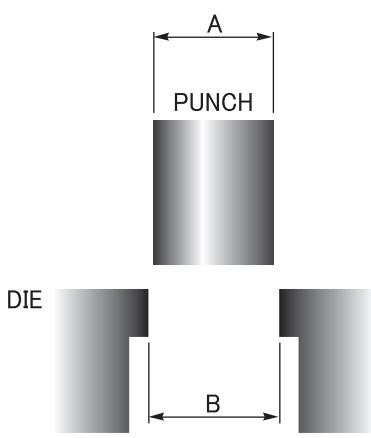
### DIE CLEARANCE IS ...

Die clearance is difference between punch diameter and die diameter.

$$\text{Die clearance} = B - A$$

### RECOMMENDED DIE CLEARANCE

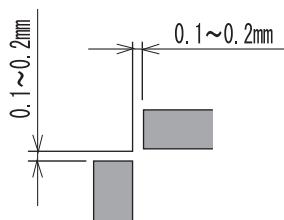
$$\text{Die clearance} = \text{Material thickness} \times \text{Clearance Ratio}$$



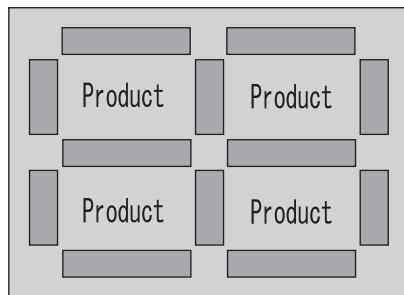
Material	Clearance Ratio	Material thickness					
		0.5~1.0	1.2	1.5	2.0	2.3	3.2
Mild steel	0.15	0.15	0.2	0.25	0.3	0.4	0.5
Stainless steel	0.2	0.2	0.25	0.3	0.4	0.5	0.6
Aluminum	0.1	0.15	0.15	0.15	0.2	0.25	0.35
Copper	0.1	0.15	0.15	0.15	0.2	0.25	0.35

## JOINT METHOD

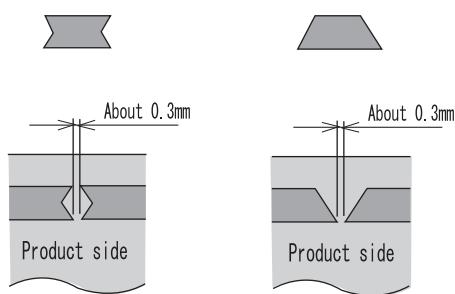
### CORNER JOINT



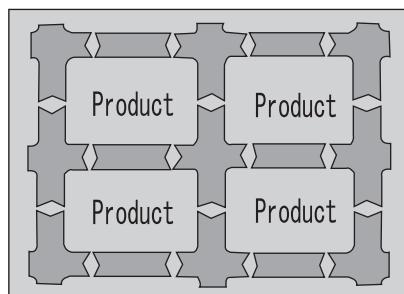
Joint of corner part



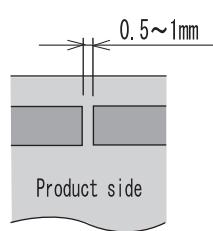
### MICRO JOINT



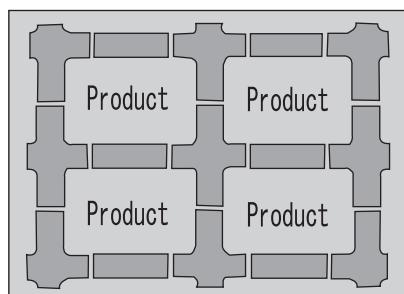
Joint of straight part



### WIRE JOINT



Joint of straight part



## CORNER ROUNDING

Standard Corner rounding tool	Corner rounding tool with tangent line	Corner rounding tool with joint