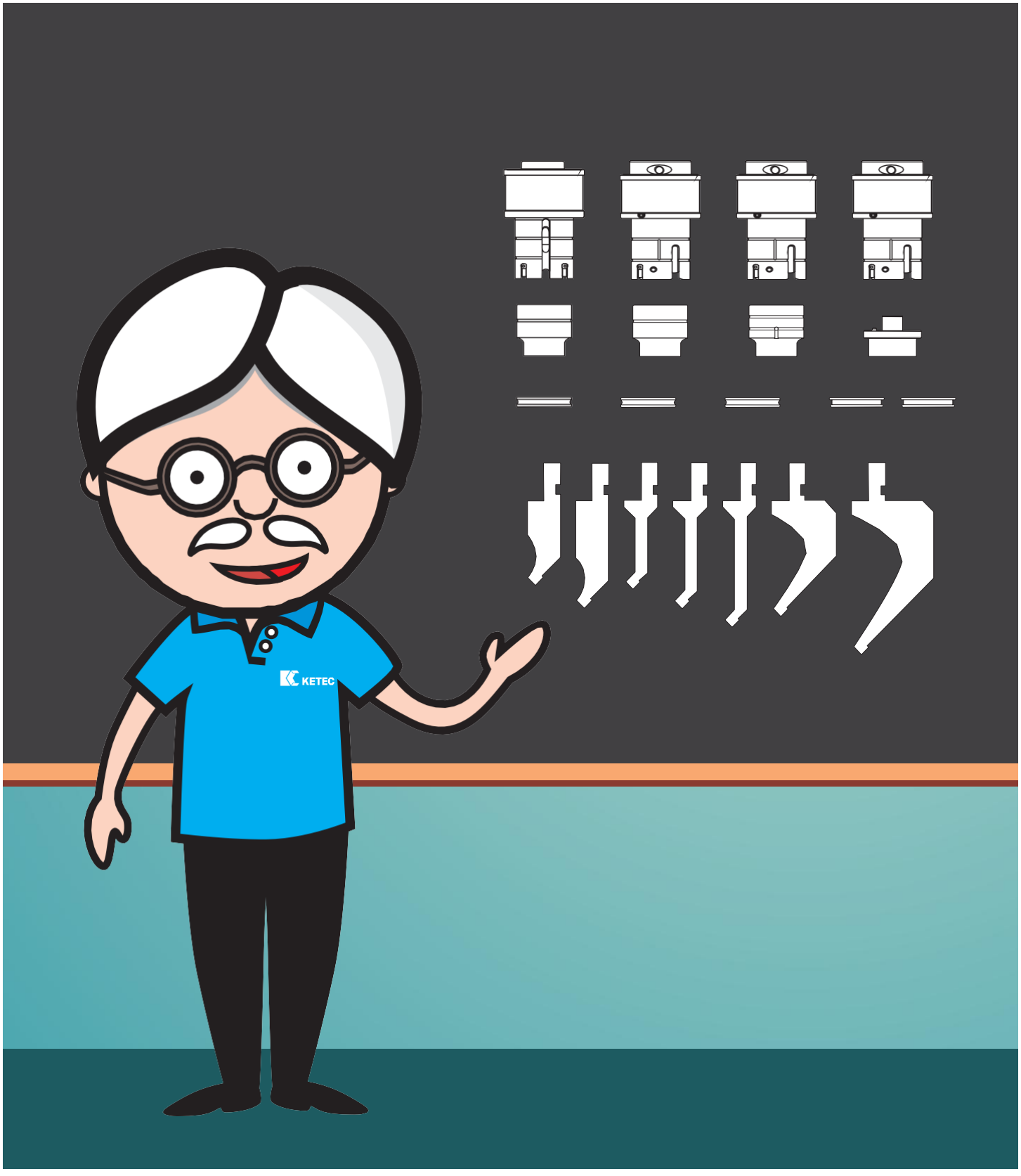
KETEC® KTCA®

SHEET METAL TOOLING SELECTION AND MAINTENANCE MANUAL



KETEC®

Part 1 CNC Punch Press Tooling



Contouring



SPH
Heavy Duty



E-Break Tool
E-Bend Tool



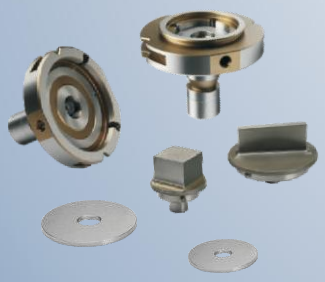
Slitting Tool



TOP 85
Thick Turret Tooling



Close To Clamp



Trumpf RP-Series



Trumpf Tooling



Wheel Rib



Murata Wiedemann
Tooling



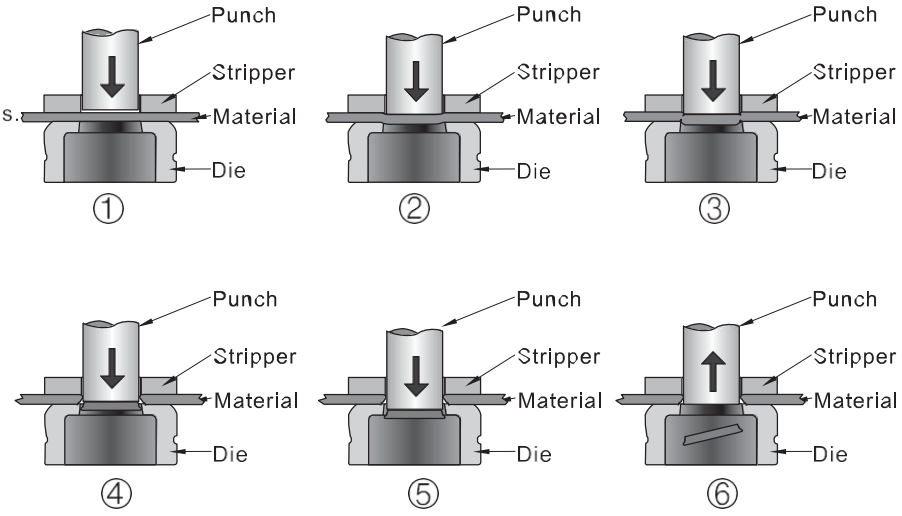
Salvagnini Tooling



Thin Turret Tooling

1 Punch Press Process

① Stripper compress tightly to the material.
② Punch insert touches the material, and it deforms.
③ Punch insert and die are shearing the material.
④ The material fractures.
⑤ Punch insert to the bottom.
⑥ Punch insert retracts and slug falls freely.



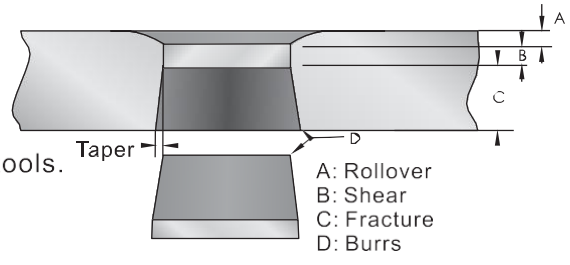
2 Information from the Slug



I have deep feeling on the slug, it can help me to solve many problems. Do you know what you can find with observing the slug?

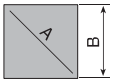
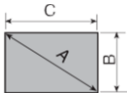
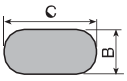
Such as: Is the die clearance suitable or not? Is the punch cutting edge sharp or not? Is the alignment of the machine or tool good or not? Does the dowel pin abraded or not? Is the programming reasonable or not? Observe the slug and its situation after being punched for many hits carefully, it is of important significance for quality guarantee, in-time maintenance of the machine / tools, extending the tool life, reducing costs. The following few things are for observing the slug, rollover of the upper surface, shear, fracture and burrs. Rollover appears in the material deformation stage, shear happens in shearing stage, fracture and burrs appear in tearing stage.

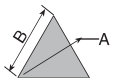
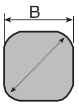
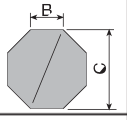
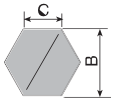
The ideal slug should have normal rollover, uniform shear, less burrs. So that it can maintain the minimum punching force, punching hits and obtains the best quality holes. And it depends on suitable die clearance, sharp punch cutting edge, good status of machine and the up to standard tools.

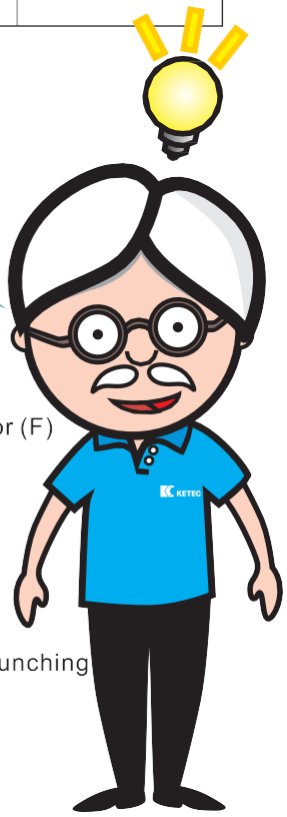


Calculating Punch Force

3.1 A & L Dimension

Round 	A = Diameter	L = 3.14 × A
Square 	A = B × 1.414	L = 4 × B
Rectangle 	A = √(B² + C²)	L = 2 × (C + B)
Oblong 	A = C	L = 2C + 1.14B

Equilateral Triangle 	A = 1.155 x B or A = 1.334 x C	L = 3 × B
Quad D 	A = Diameter	L = 3.14 × A
Octagon 	A = 1.082 x C or A = 2.613 x B	L = 8 x B L = 3.32 x C L = 3.06 x A
Hexagon 	A = 1.155 x B or A = 2 x C	L = 3 × A



3.2 Punching Force

Punching force (KN) = Shape Perimeter (L) x Thickness (t) x 0.345 x Material Multiplication Factor (F) x Shear Factor (S)

e.g. Square 40x40mm, thickness3.0mm, SPCC, horizontal punch

Punching force (KN) = (40x4)x3.0x0.345x1.2x1.0=198.72KN=19.9TONS

If thickness ⩾3mm, it needs to calculate the punching force. With calculating the punching force, following things can be judged:

(1) Whether punching force required go beyond the rated value of the machine or not?

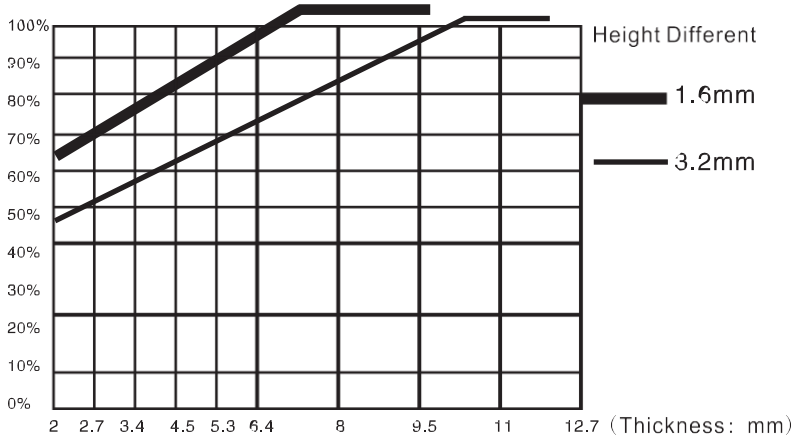
(2) Whether punching force required exceed the strength of the weak part of the punch or not?

With changing the structure of punch insert, station or select and use Heavy Duty to reduce the punching force, avoiding damage on the tools or machine.

Table 1. material factor table

material	material factor
AL (soft)	0.30
AL (half-hard)	0.38
AL (hard)	0.50
Brass	0.70
Red Copper	0.57
Mild Steel	1.00
SPCC	1.20
SUS	1.40

Table 2. shear factor table

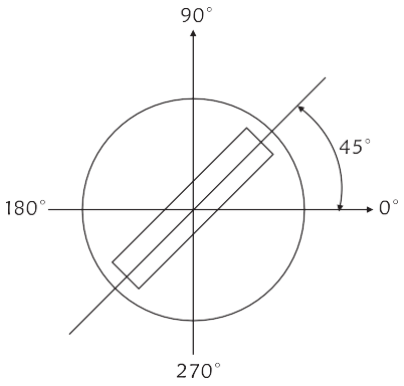


4.1 The angle restriction of position or dowel pin (slot)

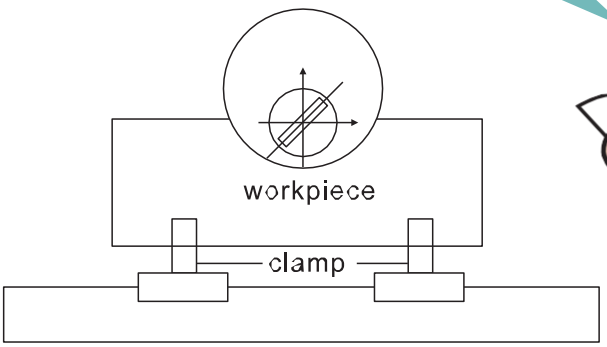
The angle of the dowel pin (slot) turns anti-clockwise, the angle of the workpiece should accord with the vertical view of the turret as below:

As you find out the angle of the tool is not correct when receiving, which means your understanding on angle is different from the engineer's. The best way to avoid this mistake is to make a common agreement! Please read this page carefully.



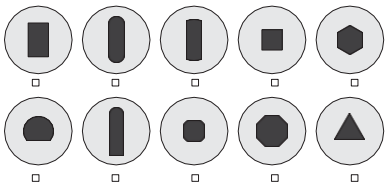
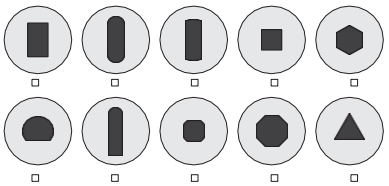
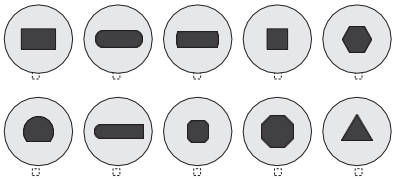
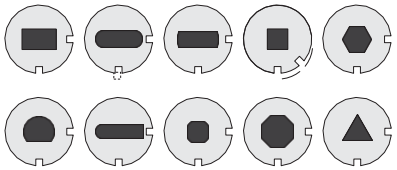
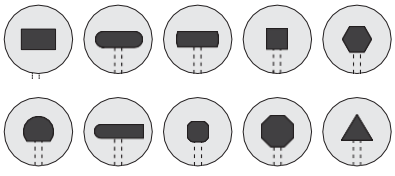
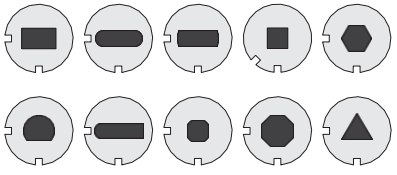
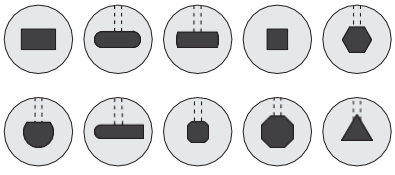
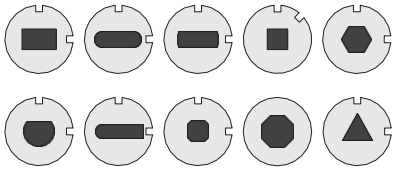


Die vertical view



Turret vertical view

4.2 Dowel pin (slot) 0°setting of STD shape punch

STN	PUNCH	DIE
A, B STN		
C STN		
D STN		
E STN		

Technical Parameters of Thick Turret Tooling

5.1 The relation size with CNC punch press machine

Tools		The stations of Tools				
		A(1/2")	B(11/4")	C(2")	D(3½")	E(4½")
Punch Ass'y	Ass'y Length	209.50	209.50	209.00	211.00	211.00
	Punch Length	207.50	207.50	96.00	84.00	85.00
	Guide Outer Diameter	$25.91^{-0.007}_{-0.020}$	$47.83^{-0.009}_{-0.025}$	$69.85^{-0.010}_{-0.029}$	$111.125^{-0.012}_{-0.034}$	$133.35^{-0.014}_{-0.039}$
	Guide Slot	$4.76^{+0.022}_{+0.010}$	$4.76^{+0.022}_{+0.010}$	$12.70^{+0.034}_{+0.016}$	$12.70^{+0.034}_{+0.016}$	$12.70^{+0.034}_{+0.016}$
Die	Outer Diameter	$25.40^{-0.007}_{-0.020}$	$47.62^{-0.009}_{-0.025}$	$88.89^{-0.012}_{-0.034}$	$125.43^{-0.014}_{-0.039}$	$158.74^{-0.014}_{-0.039}$
	Height	30	30	30	30	30

The data of this page is from JB/T10928-2010, the machinery industry CNC Turret Punch Tooling Standard is the unique public industrial standard. The data in the tables are fully validated.



5.2 Basic performance parameters of each STN

Basic parameters		Station				
		A(½")	B(11/4")	C(2")	D(3½")	E(4½")
Maximum processing range (Circumcircle Diameter) mm		12.7	12.7~31.7	31.7~50.8	50.8~88.9	88.9~114.3
Maximum thickness (mild steel) mm		3.8	6.4	6.4	6.4	6.4
Minimum thickness (mild steel) mm		0.5	0.5	0.5	0.5	0.5
Allowable pressure for tooling KN		60	170	250	350	400
Punch shape before radius mm		16.0	18.0	25.5	25.5	26.5
Die penetration mm		3	3	3	4	5
Grinding Life mm	Punch	2	2	2	2	2
	Die	2	2	2	2	2

5.1 The relation size with CNC punch press machine

Tools		Station	
		B(11/4")	D(3½")
Punch Ass'y	Ass'y Length	140	141
	Punch Length	139.2	49.0
	Guide Outer Diameter	$4.76^{0}_{-0.008}$	$6.35^{0}_{-0.009}$
	Guide Slot	$38.10^{-0.009}_{-0.025}$	$111.10^{-0.012}_{-0.034}$
Die	Outer Diameter	$47.62^{-0.009}_{-0.025}$	$125.43^{-0.014}_{-0.034}$
	Height	30	22

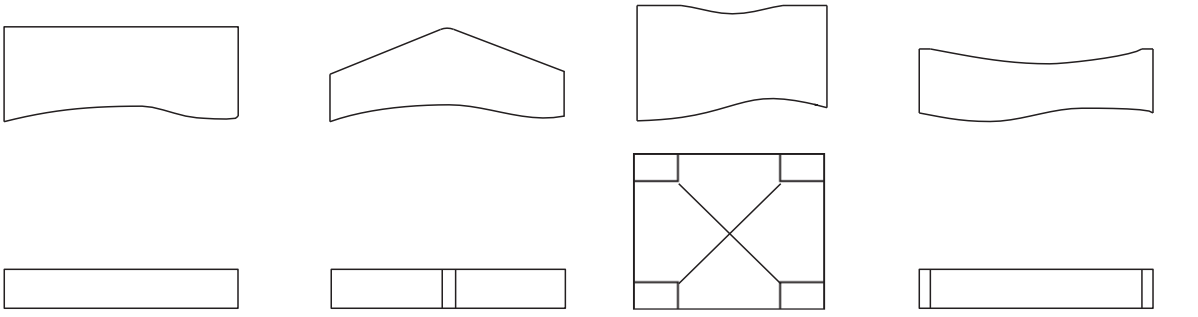
5.2 Basic performance parameters of each STN

Basic parameters		Station	
		B(11/4")	D(3½")
Maximum processing range (Circumcircle Diameter) mm		31.7	31.8~88.9
Maximum thickness (mild steel) mm		6.4	6.4
Minimum thickness (mild steel) mm		0.5	0.5
Punch shape before radius mm		18	18
Die penetration mm		3	4
Grinding Life mm	Punch	2	2
	Die	2	2

The data of this page is from JB/T10928-2010, the machinery industry CNC Turret Punch Tooling Standard is the unique public industrial standard. The data in the tables are fully validated.



7.1 Punch Shear



Horizontal Shear | Rooftop Shear | Quad Concave Shear | Double Concave Shear

Punch is the part that being used in the worst working environment, with enduring amount of punching force and erosion, generally punch is made from better material, which equip with better tenacity and abrasive resistance. Certainly, punch is a quick-wear part, it is normal to discard as useless after being used for a period of time. For a punch to exert complete effects, you need to know it, treasure it, use it for reasonable.



7.2 Punch Shear Options

Station	Punch Shape	STD Shear	Optional Shear
A(1/2")	Round & Specail	Horizontal Shear	None
B(11/4")	Round & Specail	Horizontal Shear	None
C(2")	Round	Horizontal Shear	Double Concave Shear
	Rectangle Wide ≤4. 78 mm	Horizontal Shear	Rooftop Shear
	Rectangle Wide ≥4. 78 mm	Horizontal Shear	Rooftop, Double Concave, Quad Concave Shear
	Square	Horizontal Shear	Rooftop, Quad Concave Shear
D(3½")	Round	Horizontal Shear	Double Concave Shear
	Rectangle Wide ≤4. 78 mm	Horizontal Shear	Rooftop Shear
	Rectangle Wide ≥4. 78 mm	Horizontal Shear	Rooftop, Double Concave, Quad Concave Shear
	Square	Horizontal Shear	Rooftop, Quad Concave Shear
E(4½")	Round	Rooftop Shear	Double Concave Shear
	Rectangle Wide ≤4. 78 mm	Rooftop Shear	Double Concave Shear
	Rectangle Wide ≥4. 78 mm	Rooftop Shear	Double Concave Quad Concave Shear
	Square	Rooftop Shear	Quad Concave Shear

7.3 Negative Taper on Punch

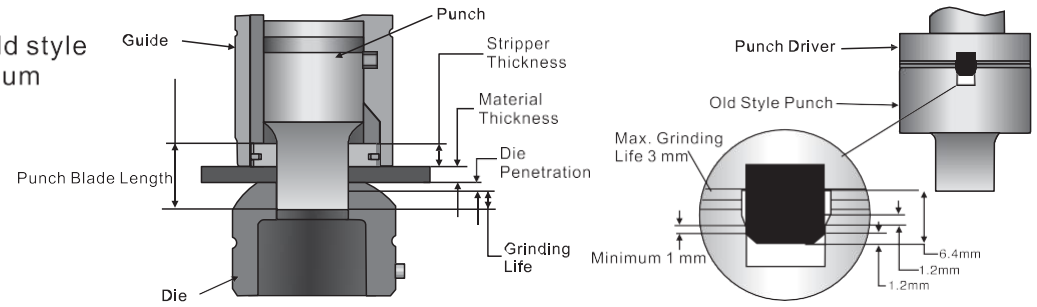
The two sides of punch is unparallel, the size of the edge is biggest, the farther away from the edge, the smaller size. The negative taper can reduce the friction when stripping.

7.4 Grinding Life of Punch (Theoretical value)

(Theoretical)

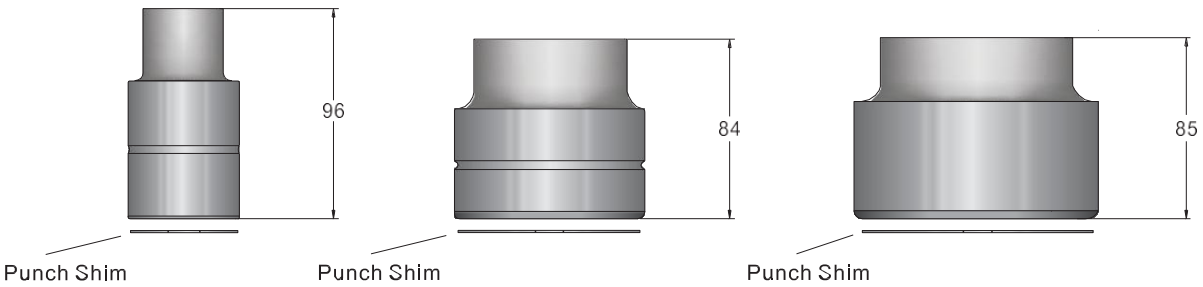
Grinding Life = Punch Insert Length - Stripper Thickness - Die Insert Length

For C, D, E station old style guide ass'y, the maximum grinding life is 3 mm.



7.5 Adjustment after Regrinding

- The height of C, D, E stations after regrinding as below figures.
- With using the old style punch like E85 this kind, add punch shim to adjust the height every time after regrinding the punch.
- Adjusting way is: die shim thickness plus punch height equals the No. in the below figures.
- With using TOP85 or TOP90 like this kind of new style guide ass'y, adjust the punch height with rotating the screw system, no need punch shim.



Comparing with the punch, the working environment of die is much better. But in order to solve the slug rebound problem, engineers think out many solutions, in actual use, they has played a very good role. In addition, the choice of die clearance is very important, it is not only related to the life of the die, but also the life of the punch, the quality of the punch hole, flatness of the workpiece, slug rebound and lots of things, must be careful!
By the way, what's the big difference with choosing 0.48mm or 0. 5mm die clearance? Nobody will give conclusion.



8.1 Die Type Shapes



Positive Taper



Positive Negative Taper



Slughugger



Stairs

8.2 Selection of Die Clearance

Why do we need to select the suitable die clearance?

(1) The best clearance: shear radius are in a straight line, even punching force, good quality workpiece, reduce machine power, extend tool life, unload the slug well, reduce burrs and extrusion, keep the material straight, punch hole locates accurately.

(2) Smaller clearance: increase punching force, cause quality reduction, punch and die abrase quickly, shorten the tool life.

(3) Bigger clearance: more burrs on the workpiece, bad quality for punch hole, workpiece deforms.

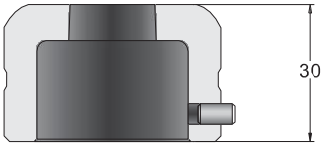
(4) It's very easy to cause adhesion on the punch blade if the die clearance is too big or too small, then causes material adhesion.

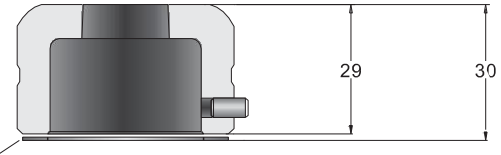
(5) The die clearance is related to material type and thickness.

Table 1. Die clearance recommended value (mm)

Material \ Thickness	0.8	1.0	1.5	2.0	2.5	3.0	3.2	3.5	4.0	4.5	5.0	5.5	6.0
Aluminum (AL)	0.12	0.15	0.2	0.3	0.35	0.45	0.48	0.53	0.6	0.68	0.75	0.83	0.9
SPCC	0.15	0.2	0.3	0.4	0.5	0.6	0.65	0.7	0.8	0.9	1	1.1	1.2
SUS	0.15	0.2	0.35	0.45	0.5	0.6	0.65	0.7	0.8				

8.2 Grinding Life and Adjustment





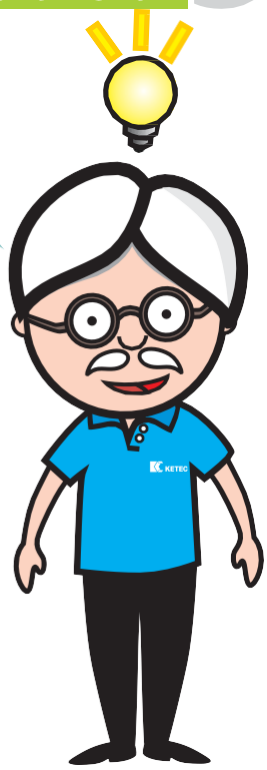
Die Shim

Guide plays a pivotal role in the CNC turret press tooling, circum-circle slides with the turret punch holder, in-circle slides with the punch, slot matches up the pins on turret and punch to control the angle, pin matches up with the slots on turret and punch to control the angle.

The working environment of guide is bad, enduring high speed reciprocation hundreds of times per minute, offset loading force, poor lubrication, uncleanness.

Guide is a part that can be common used in relative to the consumable parts like punch and die, designed in reusable.

So that, a good quality guide is being considered in working accuracy, abrasive resistance, corrosion resistance and an import part that avoiding collision.



9.1 Standard Configuration of Slot

Station	Pin	Purpose	Remark
A	Round (0°)	Round	
	Shape (0°,90°)	STD Shape	If changed, need notice
	Square (0°,135°)	Square	If changed, need notice
B	Round (0°)	Round	
	Shape (0°,90°)	STD Shape	If changed, need notice
	Square (0°,135°)	Square	If changed, need notice
C/D/E (E85)	STD Slot (0°,90°)	Common Use	More angles, need to change pin position
C/D/E (TOP85)	STD Slot (0°,90°,135°)	Common Use	More angles, need to change pin position
C/D/E (TOP90)	STD Slot (0°,90°,135°)	Common Use	More angles, need to change pin position

9.2 Solid Guide and Open Guide of A, B STN

Advantage & Disadvantage of Open Guide:

① Open guide becomes a common use part, only change the stripper, save cost.
② Pressing area becomes smaller, when pressing the soft material,
③ Stripper is too small, taking care of it more carefully.



Manufacturability

Any device that is not omnipotent. The manufacturability of CNC punch press is also affected by the structure, accuracy, tooling. It is very important to know the manufacturability, which can let the punch machine have fully function.



10.1 Accuracy Index

The international standard: +/- 0.1mm

10.2 Maximum Thickness (mm)

SPCC	0.5~6.4 mm
SPHC	0.5~6.4 mm
AL	0.5~6.4 mm
SUS	0.5~3.0 mm

Note: use SPH heavy duty to punch AL, the Max. thickness is 8.0 mm.

10.3 Minimum Die Clearance

With considered the accuracy of the machine (+/- 0.1mm), accuracy of the tooling (size accuracy, symmetry), we provided the minimum value of the die clearance is 0.12 mm (single clearance 0.06mm), generally should not less than 0.15mm. The smaller die clearance is not the best choice, especially for the tooling life.

10.4 Uneven Shear and Minimum Step

Strictly prohibit uneven shear! Tooling life can not be guaranteed under the uneven shear!

Based on the experimental data, the step is over 1.5 times of thickness, both width of the shearing in slug are basically the same, and the step is bigger the better. While the step is below 1.5 times of thickness, the width of the shearing in the slug are different, this is one of the reason that causes uneven wear. (as shown in figure 1)

10.5 Empirical Value of Punch Bearing Pressure

Station	Structure	Part	Bearing Pressure (TON)
A	Standard 85	Screw Thread	6
A	ABS 85	Screw Thread	4.5
B	Standard 85	Screw Thread	17
B	ABS 85	Screw Thread	16

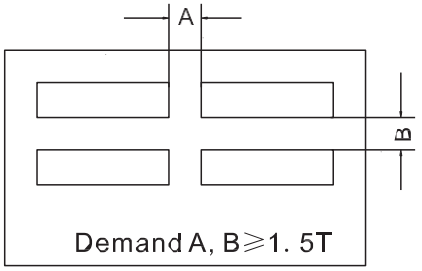
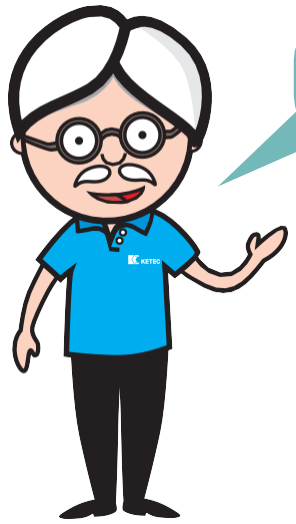
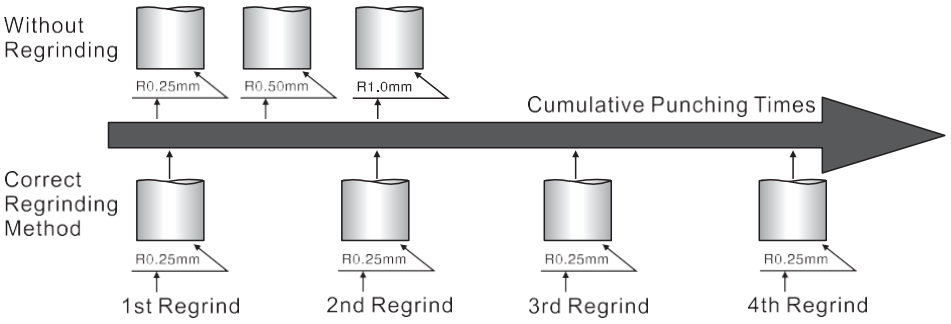


Figure 1



I don't like people say: We're so busy, no time to maintain the tooling. Following the correct method to regrind the tooling, the tooling life will be extended 1 time at least.



11.1 Indicators That a Tool Needs Regrinding

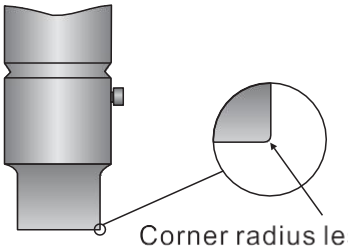
Regular regrinding ensures the consistency of the quality of punch holes, extend the tooling and machine life. It can not take the number of hits of punch as a standard to see whether the tooling needs regrinding or not. It depends upon sharpness of the cutting edge. There are 3 key indicators that a tool needs regrinding:

① Monitor the corner radius of the cutting edge, the radius is 0.1~0.25mm, need regrinding.

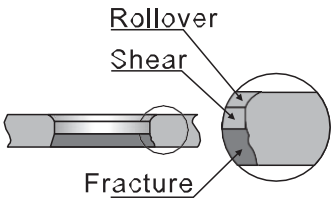
② Monitor the quality of punch holes, are there excessive burrs?

③ Monitor the punching noise, whether the tooling needs regrinding.

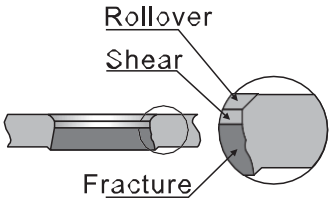




Corner radius less than 0.25 mm, needs regrinding



Qualified Hole



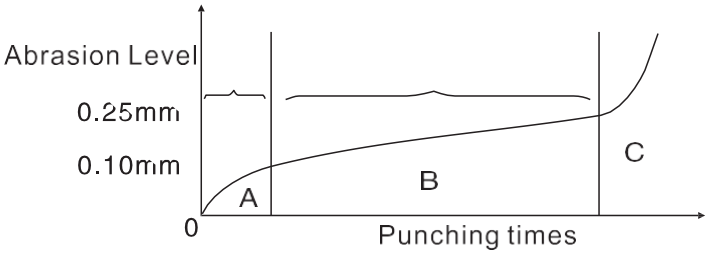
Disqualified Hole

11.2 The Relationship of Abrasion Level Punch Times

A. Abrasion Initial Stage

B. Normal Abrasion Stage

C. Abnormal Abrasion Stage



11.3 The Notes of Regrinding

There are many regrinding methods: use dedicated grinder machine, or the surface grinder.
When regrinding the machine, below factors should be considered:

① Use suitable grinding wheel, suggest using loose, coarse sand, soft wheel such as WA46KV.

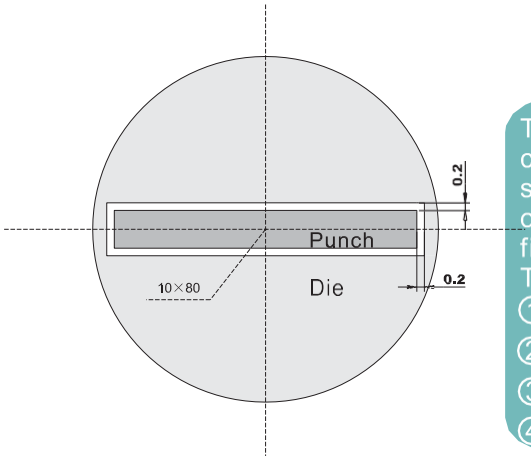
② Each grinding can not exceed 0.015 mm, over grinding will cause the surface over heating, tools become soft and fracture.

③ Enough cooling is needed, and keep the wheel keen.

④ Keep the punch and die fixed stable, use dedicated fixture.

⑤ After grinding, use the oilstone to clean the burrs, avoid the sharp point, do the clean, demagnetization, oiled, adjust the height.

Alignment of Punch and Die



The ideal working status of punch and die

The figure on the left is what we want the working situation to be, clearance is completely coincident, full hole punching. However, this situation will hardly happen. Affected by the comprehensive accuracy of upper and lower turrets and the tooling accuracy, the situations from figure 1 to figure 4 always happens.
Therefore, it comes out below situations:

① Tail appears on the slug
② Uneven wear (side loading) happens, shorten the tool life
③ Diagonal wear (side loading) happens, shorten the tool life
④ Uneven burrs

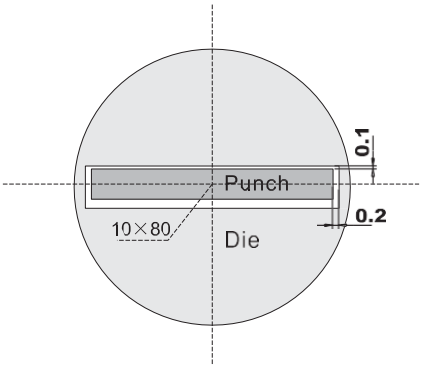


Figure 1. Clearance changes in the length

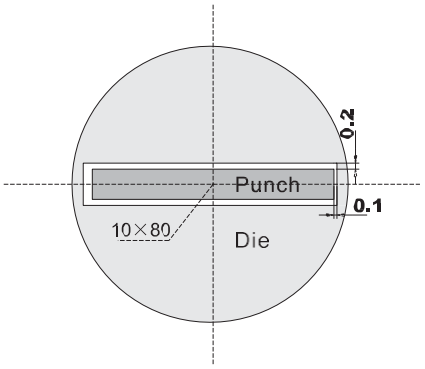


Figure 2. Clearance changes in the width



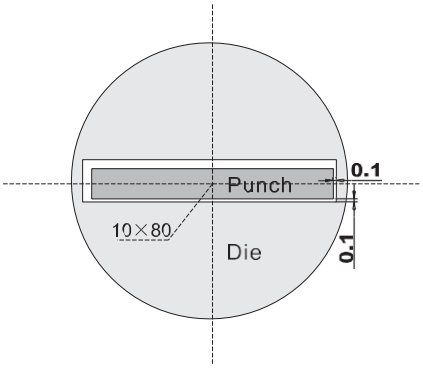


Figure 3. Clearance changs in both length and width

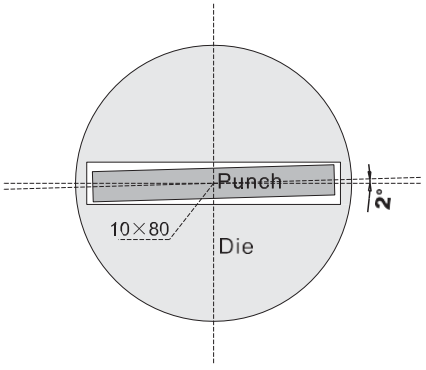
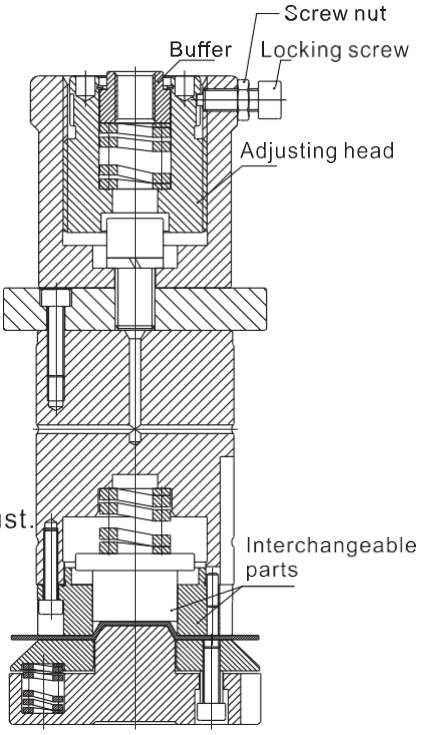


Figure 4. Clearance change deflection

Supplementary Instruction of Tail
A rigorous experiment concluded that: the excursion is over +/-0.03 mm, the tail will appear. To restrain the tail, the accuracy must be in less than +/-0.02 mm. With considering the comprehensive accuracy of machine and tool, it is difficult to restrain the tail.

13.1 Basic Structure of Forming Tool

As the figure on the right, the B, C station forming tool is the basic structure of KETEC, similar with A, D station. The adjust method states as below.



13.2 Mounting Precautions

As for the stroke length of the machines are varied, for preventing accident, all the tools are in the shortest setting.

① Check the height of punch ass'y, ensure it is less than 204 mm, otherwise adjust.

② Confirm the working direction of the production and the key position when installing the tools.

③ Take a sample hit under the shortest setting, measure the height, adjust the height of punch head until meets the measurement.

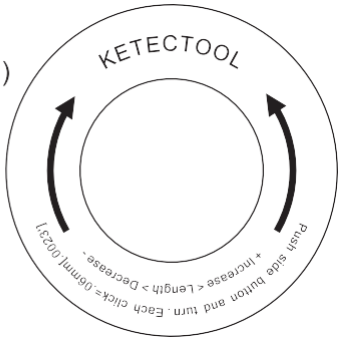
④ Always check the screw is lock or unlock

13.3 Adjusting Operation (as on the right)

① Loosen the screw nut on the side.

② Turn the punch head in anti-clockwise way, increase the length. (as below table)

③ Iteratively adjust until ok for use, lock the screw nut and the locking screw.



	1/2"	1 1/4"	2" 3 1/2" 4 1/2"
Adjust Height	1.25 mm /circle	1.5 mm /circle	3.175 mm /circle 0.13 / click

13.2 Usage Precautions

1. Forbid punching without sheet, always check the screw is lock or unlock.
2. For preventing the galling, should lubricate the tool in time.
3. Please do not switch the tooling when the clamp is going in the turret.
4. Clean the slug of the fragment in the forming tools.
5. Low speed punch, use forming tool programme
6. Machine stroke length varies, can not get a tool from a machine and put it in to another (adjust the height before use).
7. Forming part should be far away from the clamp and punch hole part.
8. Arrange the forming process in the final operation as possible.
9. Give tool enough time to strip.
10. The forming die is higher than the punching die, therefore, please do not use the punching die next to the forming station to avoid sheet distortion.

Forming tool is the most complicated tool in the CNC punch press. Consider the material, thickness, forming height , match with the machine, stripper etc. A qualify product comes out finally by testing and modifying the tool over and over again.
So when using the forming tool, please follow the instruction in this page, and remember KS code in each tooling, do not mash up.



Terminology



Complete set tooling: Consist of punch ass'y that installed in upper turret and die (or die ass'y) that installed in lower turret, with those can finish the punch hole (or forming)works.

Special Tips: The companies overseas called the C, D, E stations as complete SETS, which only includes punch, die and strippers.

Punch ass'y: An assembly that installed in the upper turret.

Die ass'y: A special assembly that installed in the lower turret of the CNC punch machine.

Guide ass'y: An assembly of C, D, E stations without punch and stripper.

SPH Heavy Duty: A tooling that has a strengthen punch and a stronger stripping ability, it is fit for punching the material that is 4.0 mm and above.

Punch: A part that penetrates the material or cuts through the material in the punch press process.

Regular Shape of Punch Shear: Rooftop Shear, Inverted Rooftop Shear, Quad Concave Shear, Whisper Shear.

Die: A die supports the material when the punch penetrates into it. The open hole of a die must larger than the insert part of a punch. The actual hole of a die depends upon the type and thickness of the material that is being punched. The hole determined the size of the slug.

Die Type Shapes: Positive Taper, Negative Taper, Slughugger, Stairs

Die Clearance: The space between the actual size of the die opening and the size of the punch, defined as double clearances.

Selection of die clearance should be based upon the type and thickness of material to be punch. Generally, selection value is 15%~25% thickness.

Nibbling: A tool that can achieve punching big size opening, hole or shape after punching serval times.

Generally working in the high-speed circumstance, the feeding is small.

Shear Zone: The shiny zone between the rollover and the burrs on the sheet metal.

Burrs: The rough edge of stay in the bottom of the sheet metal after punching.

Alignment Tool: A tool can make alignment for the upper turret and lower turret.

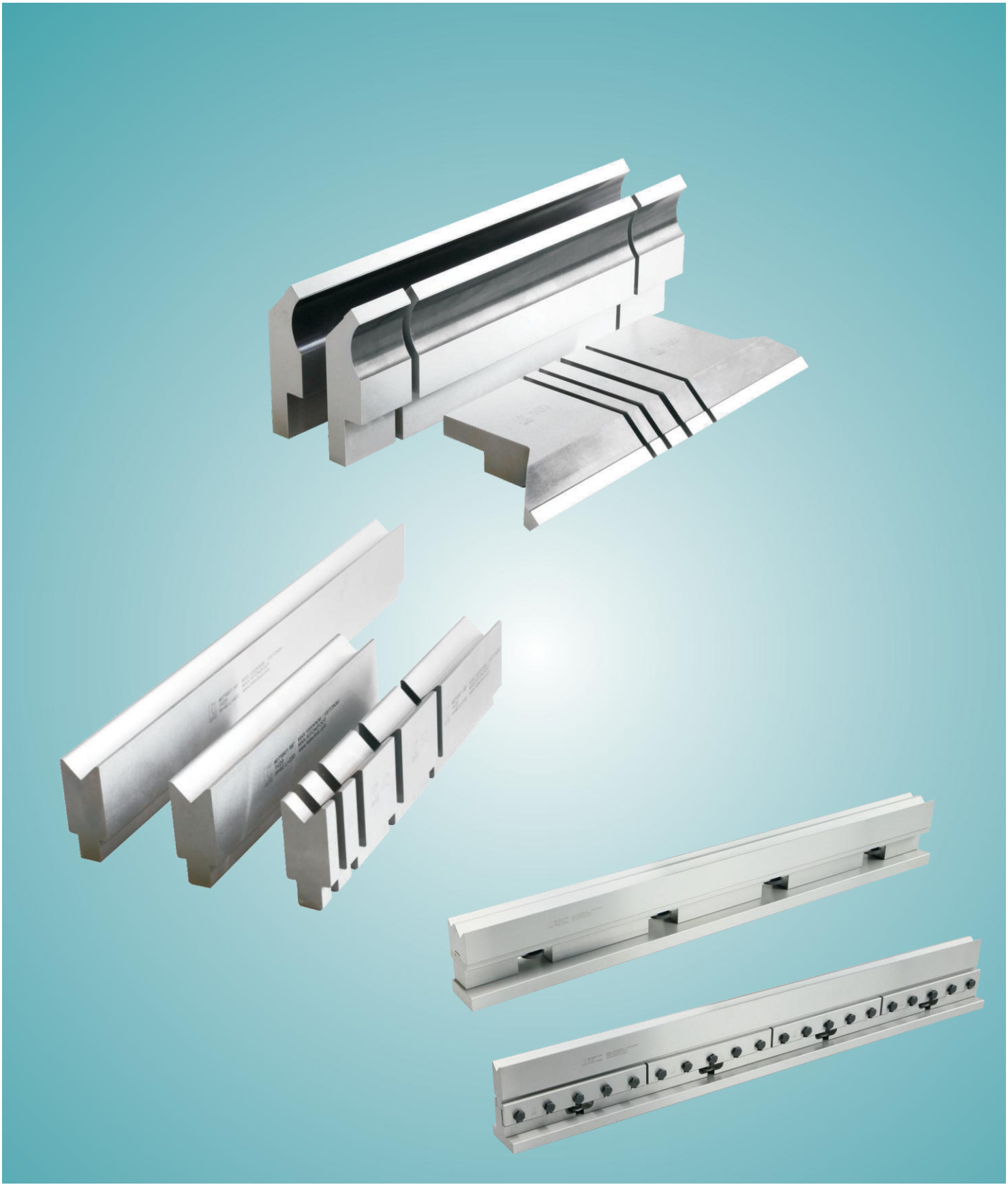
Adaptor: A transitional holder that can make the smaller station tools to be put in the bigger station on the turret.

Such as: Put A station tools in the B station turret hole, needs B-A adaptor; Put A station tools in the C station turret hole, needs C-A adaptor.

Key: A part that used for positioning and alignment.

Such as the key in the die holder and turret.

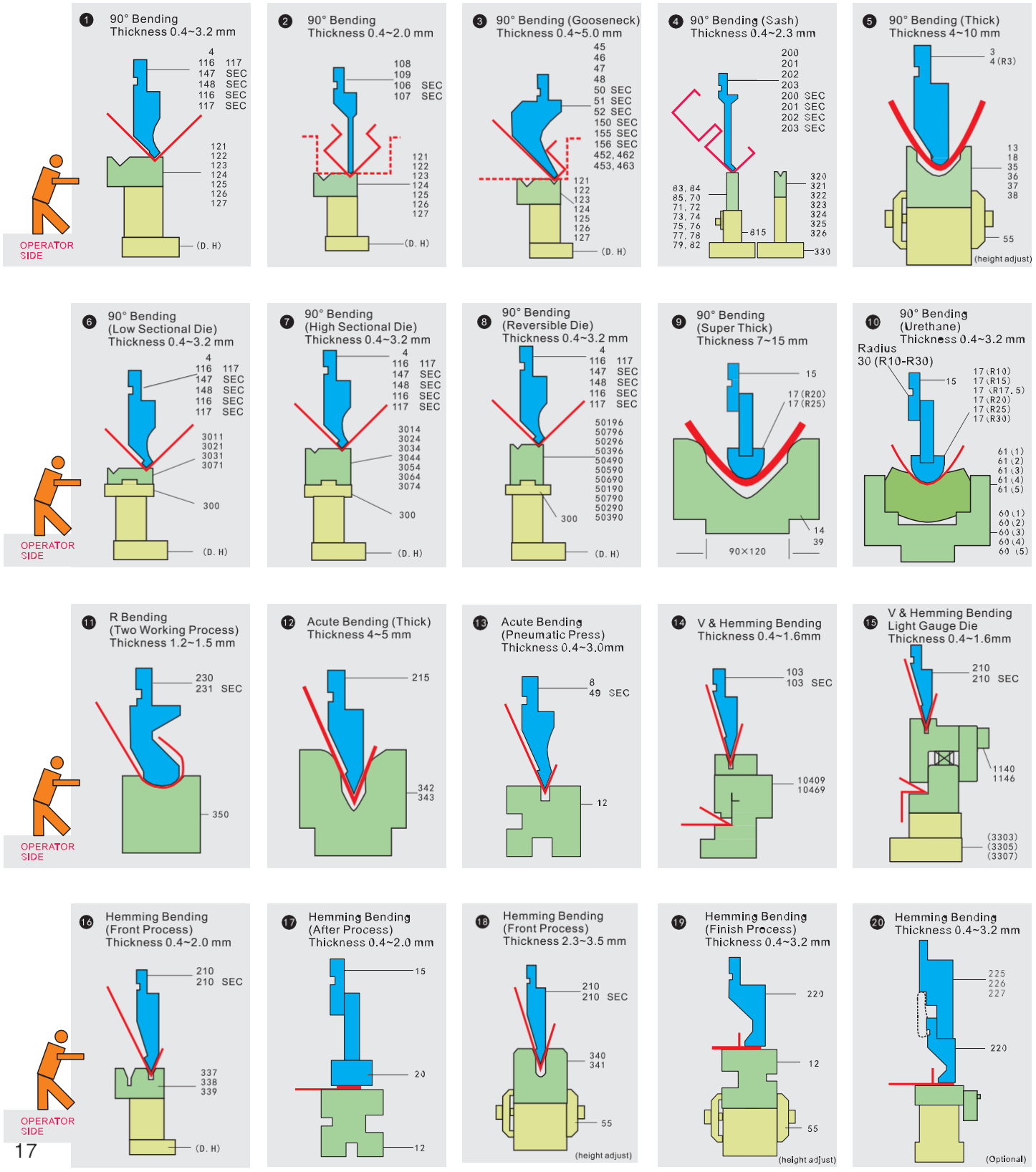




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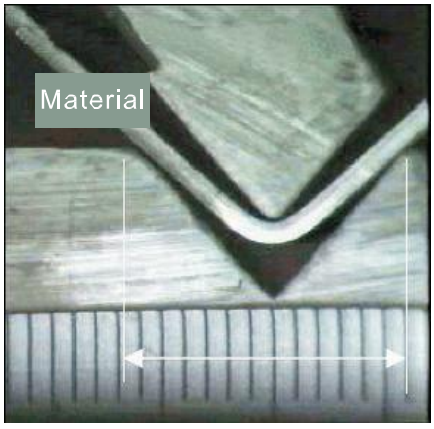
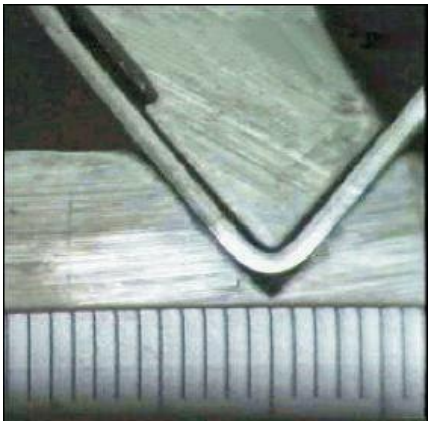
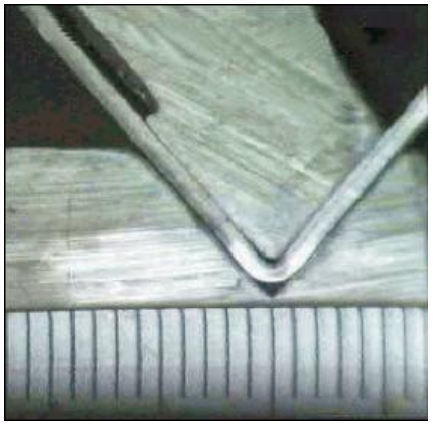
Tool Types Combination

These are the often-use press brake tool types combination, according to the workpiece bending shape. How the punches and dies match, adjust the distance between the punch and die using the height of the die. These types basically cover all the bending tools and production, your fully understanding on these types and what can they produce will help your customers to choose the correct tooling.



Bending Technique



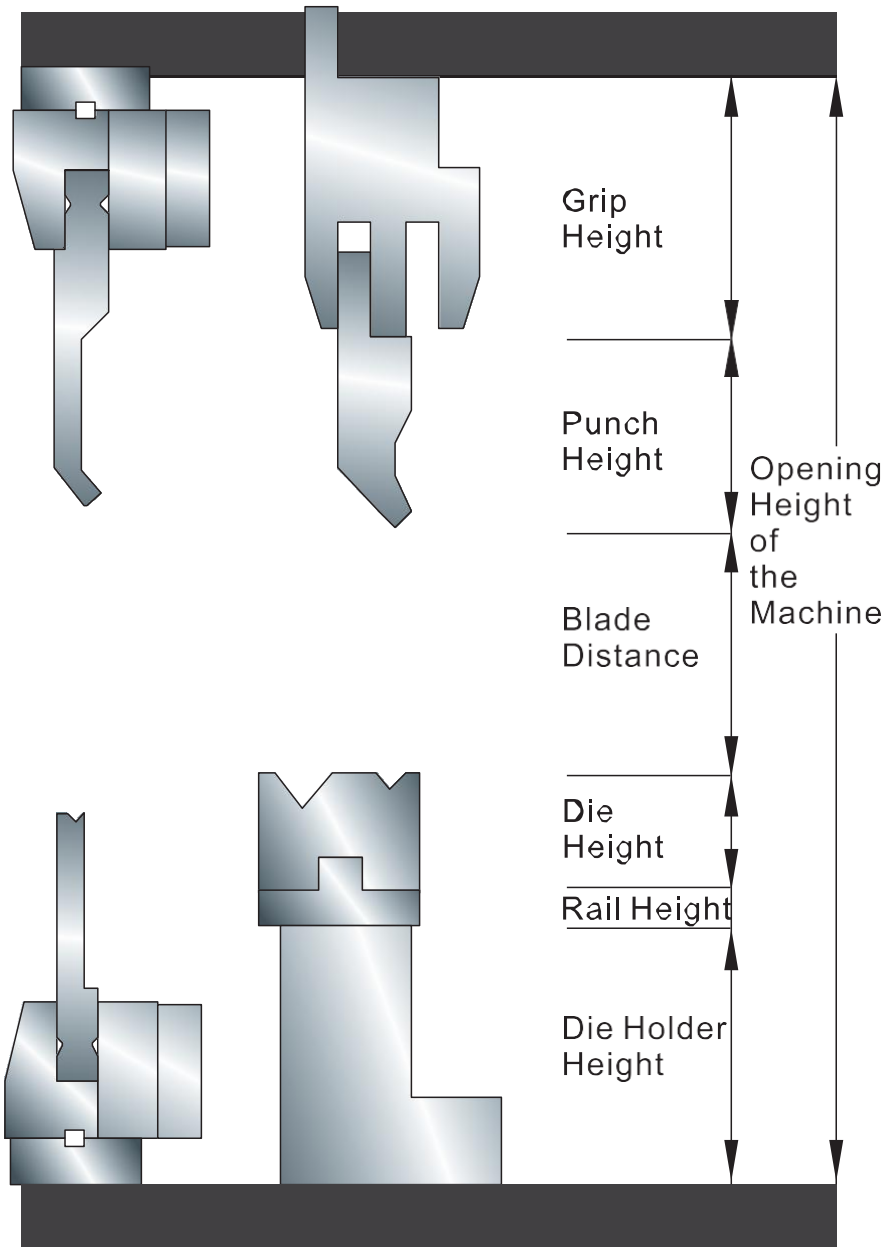
	Air Bending	Bottoming	Coining
Instruction Photos			
V width	12~15t	6~12t	5~6t
Inner Radius	2~2.5t	1~2t	0.5~0.8t
Bending Accuracy	over +/- 45'	+/-30'	+/- 15'
Accuracy	Large curvature radius circle arc surface	Good	Good
Features	Obtain any angles you want	Bending accuracy is gained with relatively smaller tonnage	Very good accuracy is gained but 5-8 times bigger tonnage is required than air bending

Stoke > Tool Space + 0.5 V (V width of Die)

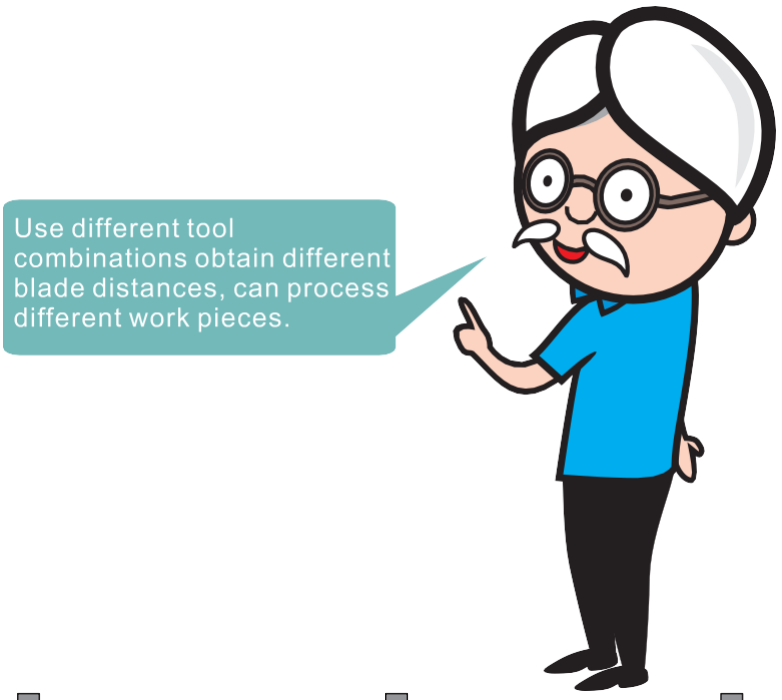
How to choose tool combination to finish the bending work process:

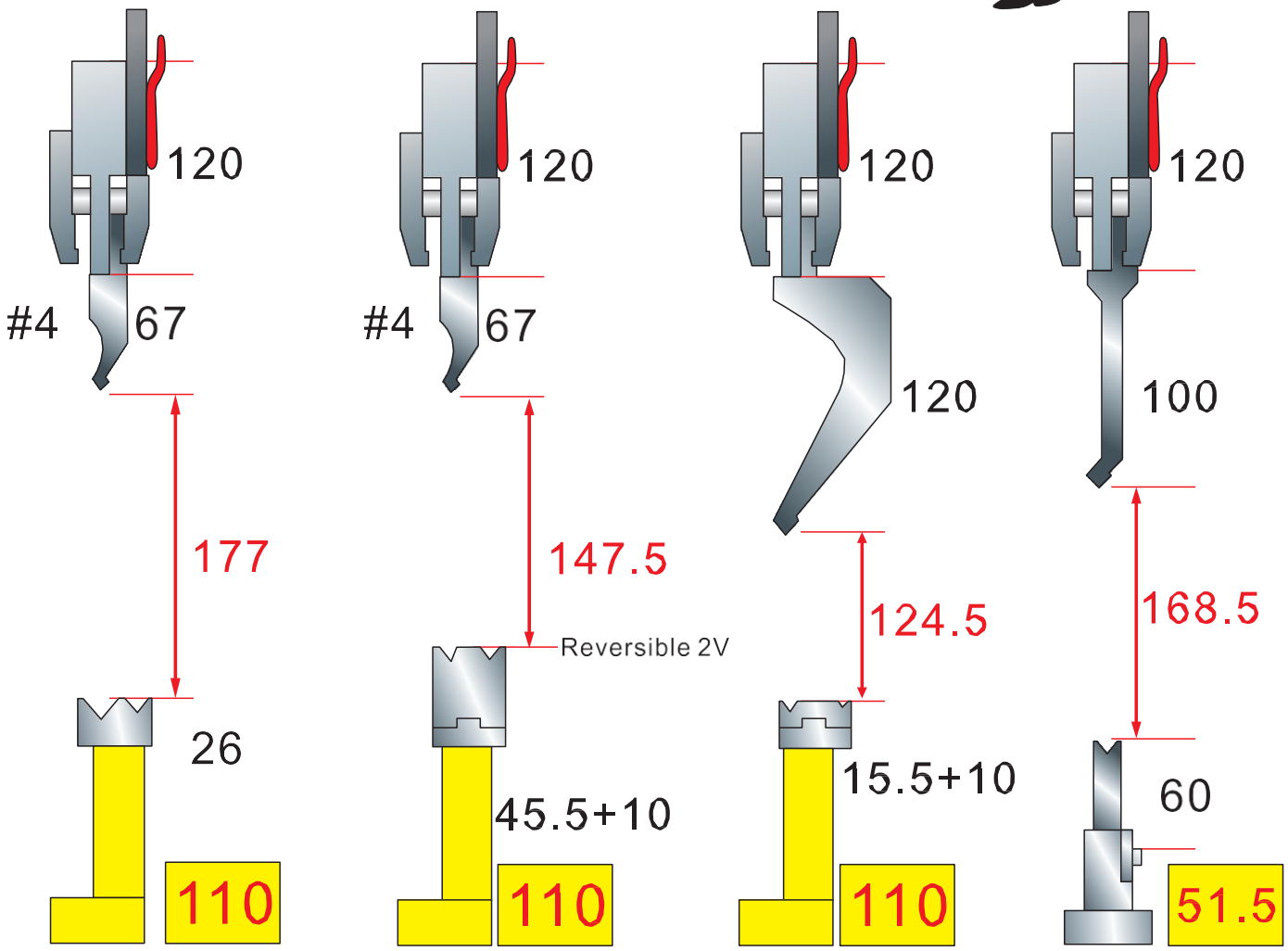
The distance between punch and die (called: blade distance) is less than machine stoke, and consider the occlusion of punch and die, half of the V width of 90° die.





Different Height Tooling Combination





For different tool combinations,
the blade distance can not exceed its stoke minus half of the V width
Blade distance ≤ Stoke − 0. 5 x V width of Die

Bending Pressure Calculation

$$P = C \times \frac{L \times T^2 \times \sigma b}{V \times 1000} \times 10$$

P: Press Brake Pressure (kN / M)
V: V width of the Die (mm)
L: Bending Length (mm)
T: Thickness (mm)
σ b: Expansion Force (N / mm²)
C: Add and Correct Coefficient



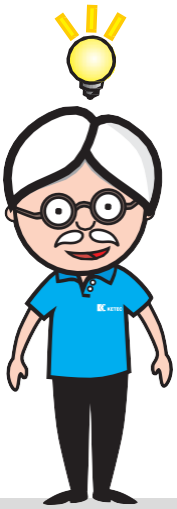
C: Add & Correct Coefficient Table

V	5×T	6×T	8×T	10×T	12×T	16×T
C	1.45	1.40	1.33	1.28	1.24	1.20

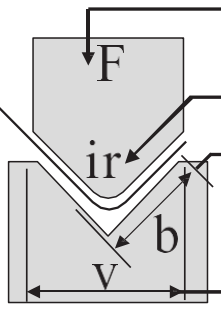
Calculating Formula

P = 68 x T x T÷V Width (Tonnage with bending 1m)

Usage of Press Brake Pressure

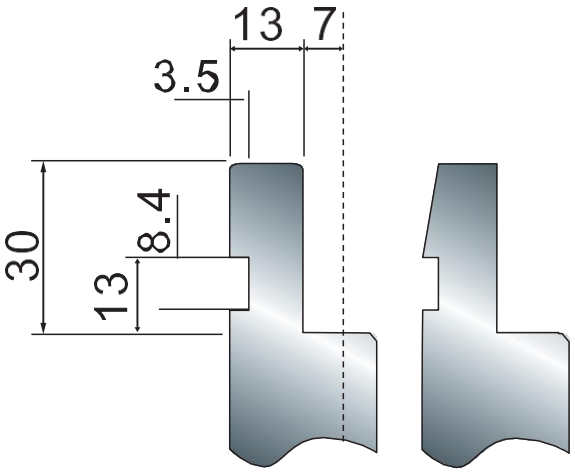


t-Thickness
F-Pressure per meter
ir-inner R
b-minimum bending length
v-V Width of the die

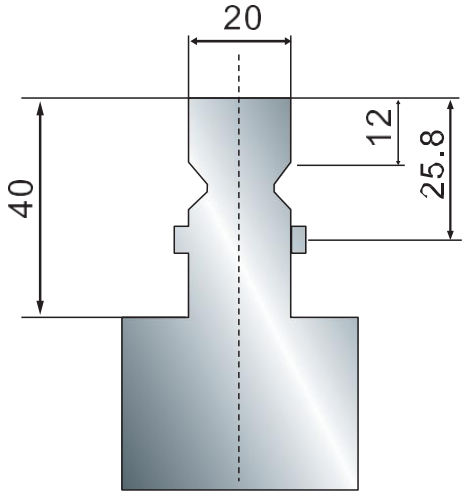


t mm	4	6	7	· · ·	10	12	· · ·	18	20	25	v
	2.8	4	5		7	8.5		13	14	17.5	b
	0.7	1	1.1		1.6	2		3	3.3	4	ir
· · ·											
0.8		70(7)	70(7)								
1.0		110(11)	110(10)								
· · ·											
1.6					170(17)	150(15)					
2.0						220(22)					
· · ·											
3.0								340(34)	300(30)	240(24)	
3.2									340(34)	270(27)	

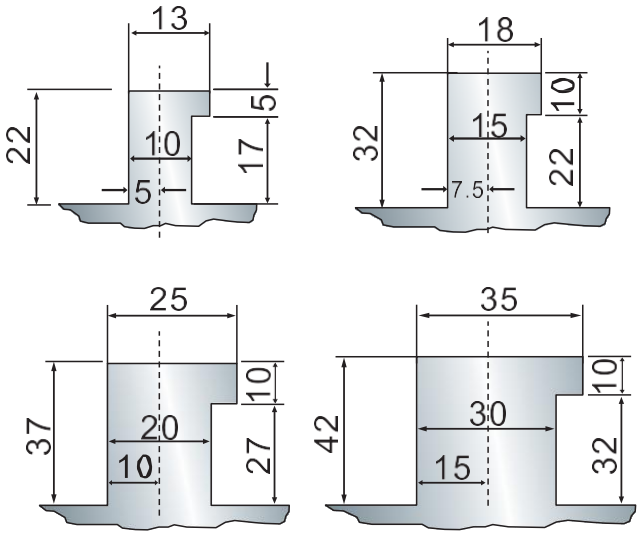
Tool and Grip Type



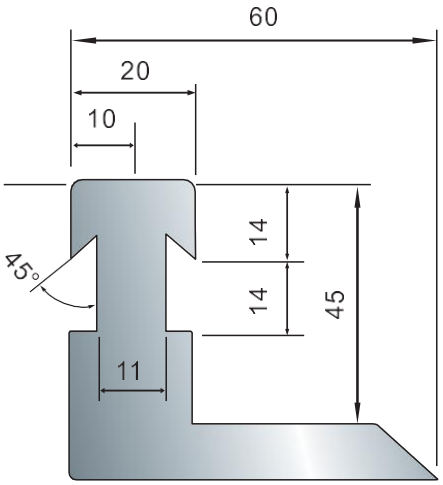
European Style - Amada



Trumpf - Wila

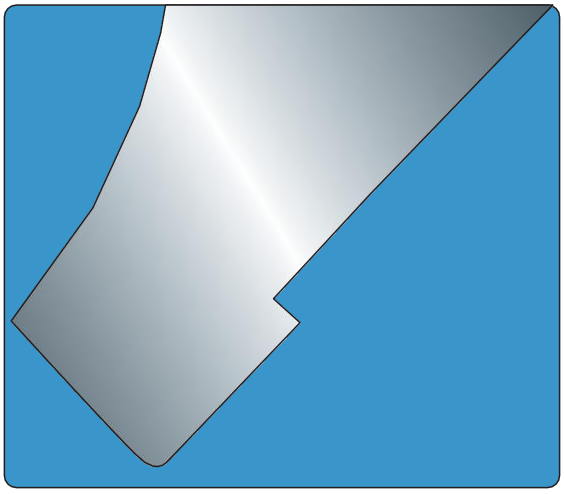


LVD Style

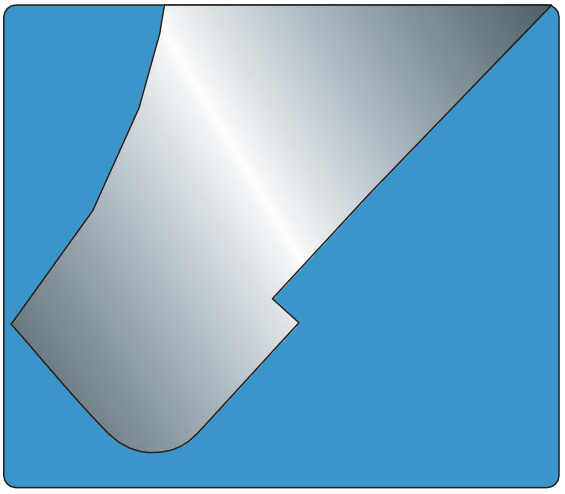


Beyeler - Bystronic

Selection of Punch Radius

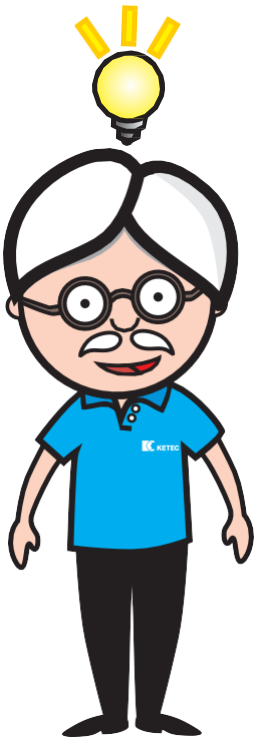


Easy Wear 0.2 R



Slow Wear 0.6 R

The smaller the radius is, the easier it wears! Suggest to use R = 0.6 or over.



Principles of Storage and Management

1. Avoid knocking against each other:

   Cause workpiece wear, affect accuracy and quality, shorten the tooling life.

2. Simplified to find:

   Save time for production, avoid repeat ordering.

3. Convenient for maintenance:

   Easy to clean, rust prevention.

4. Safety for operator:

   Easy to take out and put back, avoid dropping and hurting.







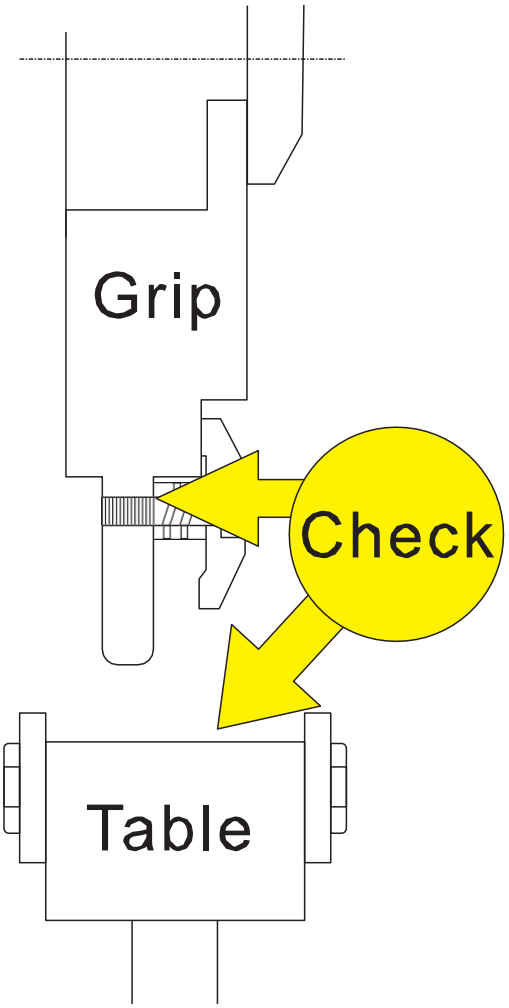




X WRONG O CORRECT

Identify the tools with different color, it is very clear that certain tools for certain press bending machines, or also can manage the tools with tool height.









● Regular inspection of the bending machine

1. Tool installing surface on the grip.
2. Level surface of the work table.

● Approach:
Make it glossy with small oilstone.

● Regular inspection of the punch blade and the clamp plate

1. Punch blade Radius
2. V surface V width of the die
   Make sure no collision marks and the other defect that affects the accuracy.

● Approach:
Polish the small marks with oilstone and engine oil, and return to the factory for big marks.

● Regular rust prevention of tools

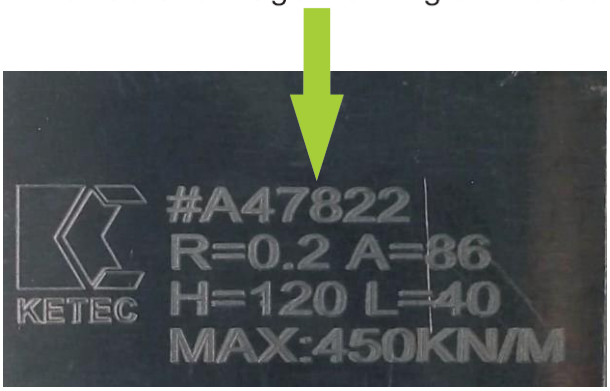
1. Clean and wipe oil on the tool surface with oily wiper.
2. Before touching the tool, please wear glove, the sweating on the hand will cause tool corrosion.

Allowable Tonnage

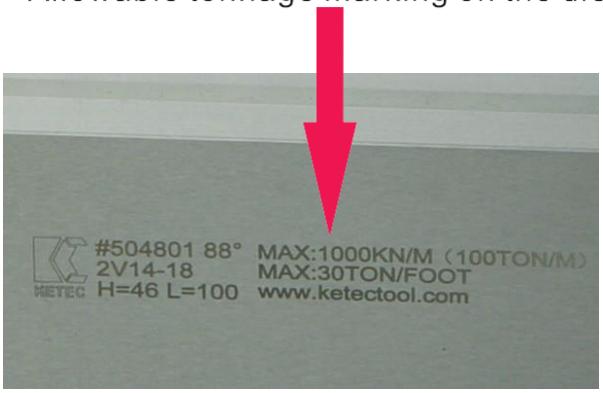
1.Every tool has its maximum allowable tonnage, if the bending pressure exceeded this maximum allowable tonnage, which will cause deformation, curve or even splintering on tools, what's worse, it may cause bodily injury on the operators.

2. Allowable tonnage marking on the tool means allowable tonnage per meter please calculate the applied tonnage according to the bending length.

Allowable tonnage marking on the die



Allowable tonnage marking on the die



Example: Product length 200 mm
Tonnage shown on the tool 1000 kN/m

1000 kN/m x 0.2m = 200kN/m (20 ton)

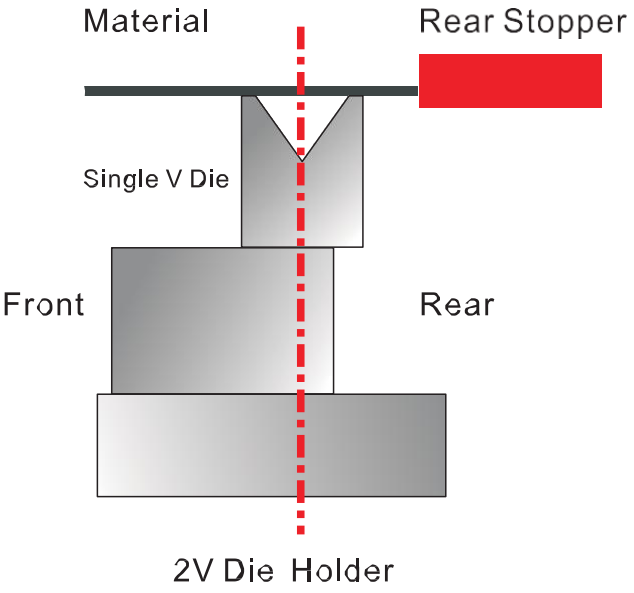
Maximum bending pressure can not exceed 20 ton



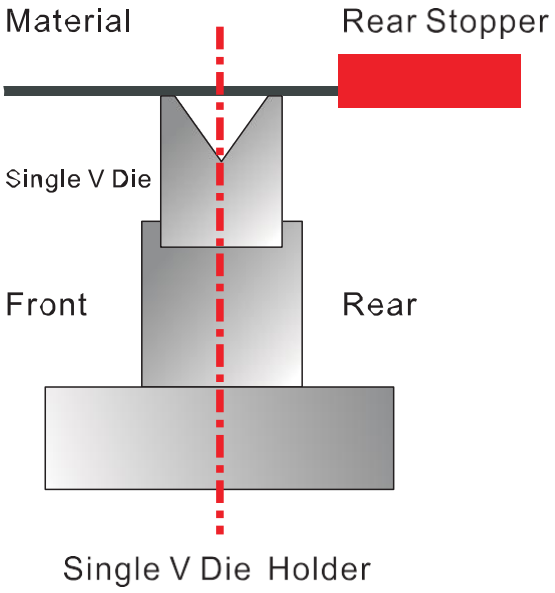
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Correct Way for Using Single V Die





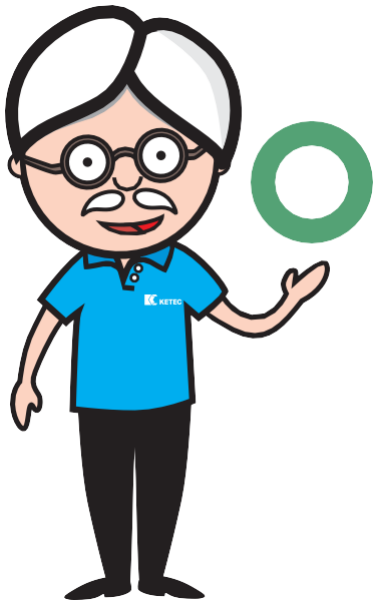
2V Die Holder

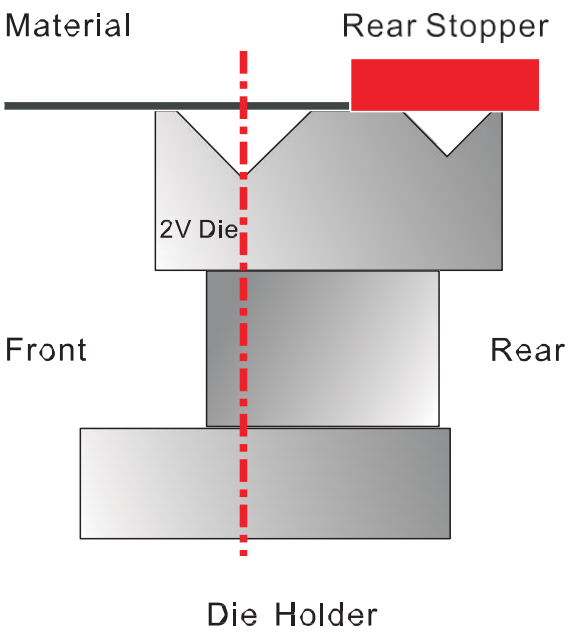


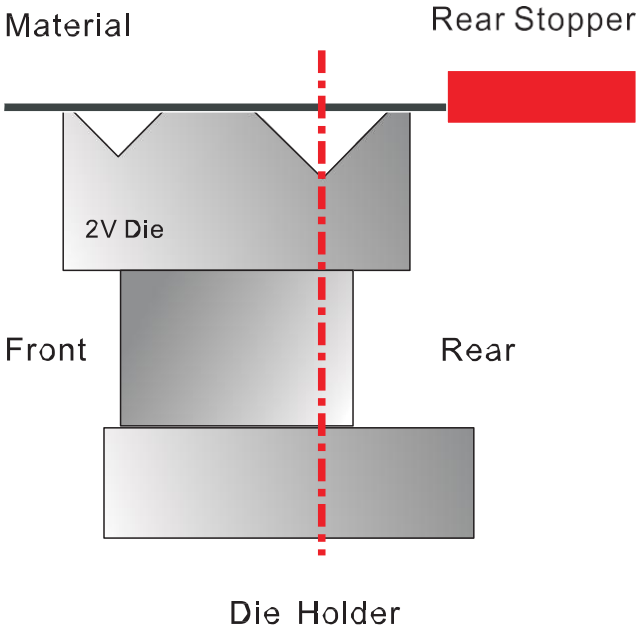
Single V Die Holder

X WRONG O CORRECT

Correct Way for Using 2V Die







X WRONG O CORRECT

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