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STEEL FABRICATION EQUIPMENT

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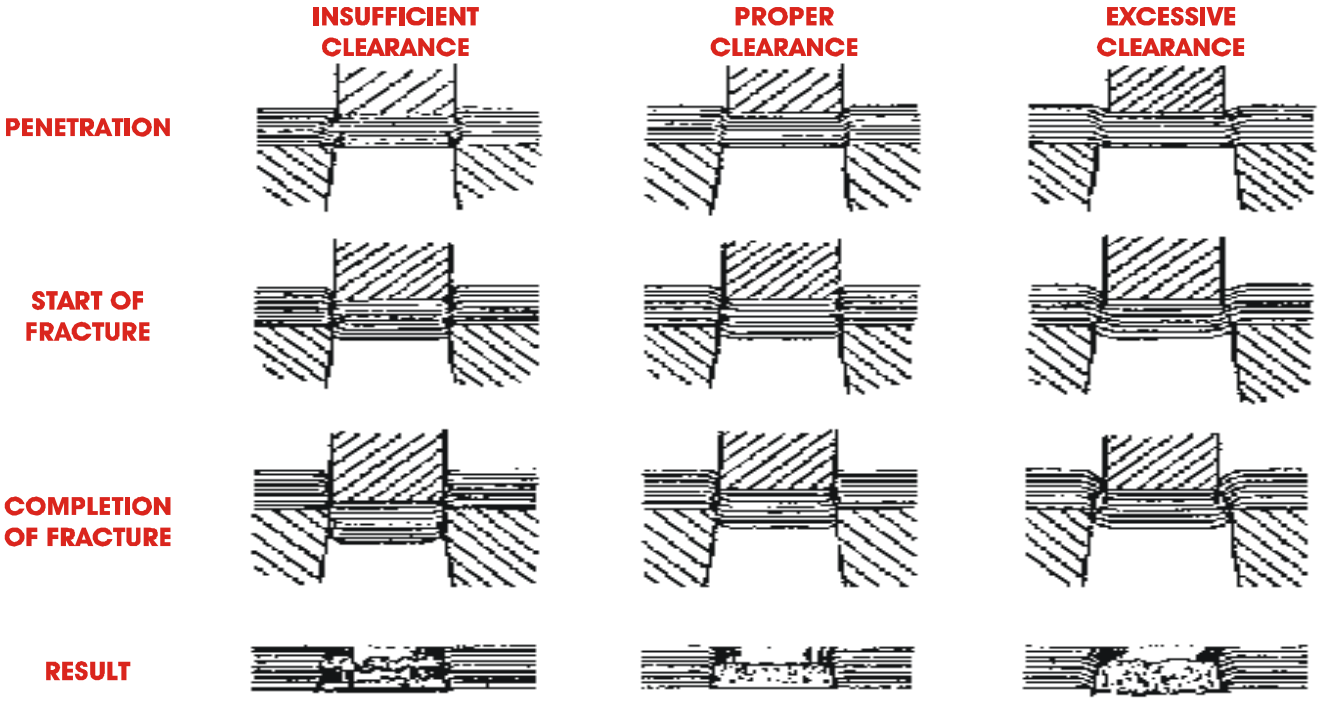
PUNCH AND DIE FAQ'S

THESE DRAWINGS SHOW RESULT OF PROPER AND EXCESSIVE DIE CLEARANCE.



PUNCH AND DIE CLEARANCE (MILD STEEL)

To obtain the best shearing effect between punch and die, it is necessary to allow proper clearance. Clearance is the difference between punch and die sizes and is directly dependent on thickness of material to be punched. The most generally used clearance for stock is approximately 10% of material thickness. This percentage is added to the punch size to give proper hole size for the die. Check the chart on the right for proper clearances.

RECOMMENDED PUNCH TO DIE CLEARANCE

THICKNESS	CLEARANCE
1/4" thru 15/32"	1/32"
1/2" thru 23/32"	1/16"
3/4" and Over	3/32"

EXAMPLE:

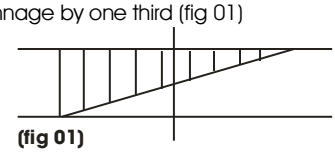
1" Round hole thru 3/4" Thick Steel, use a 1" round punch and a 1-3/32" round die.

STAINLESS STEEL

The shear strength of stainless steel is approximately 40% to 50% greater than mild steel depending on the physical properties of the material. The capacity of the punching unit must be reduced accordingly. Punches and dies should be sharpened more frequently for good hole quality and also to eliminate tonnage "build up" due to additional forces required when punches and dies lose their keen cutting edges.

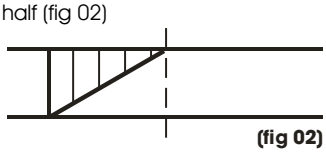
ADDING SHEAR TO PUNCH

Shear added to punch equal to the material thickness will reduce the required tonnage by one third (fig 01)



(fig 01)

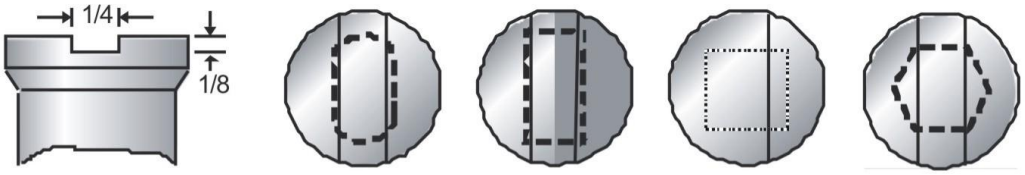
Shear double the material thickness will reduce the required tonnage by one half (fig 02)



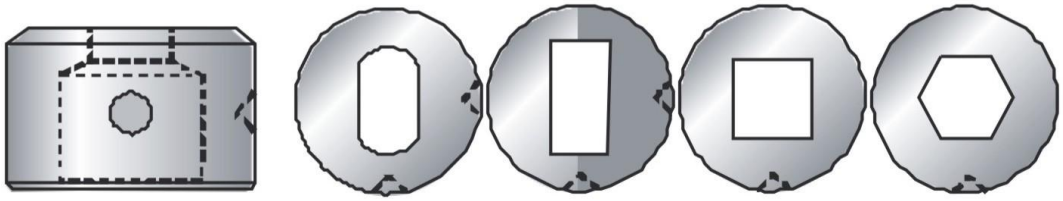
(fig 02)

Shear does not help in reducing punching tonnage when the material is 3/16" or more in thickness

Keyways and locating spots are recommended for alignment of shaped punches and dies. When ordering tooling, specify a CanSaw ironworker and a 1/4" wide x 1/8" deep keyway will be added to the head of shaped punches and a set screw will be added to shaped dies. If no machinery is specified,



Standard Keyway Positions for Alignment of Shaped Punches



Standard Locating Spot Positions for Alignment of Shaped Dies

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Equations for Determining Correct Required Tonnage

There are many factors that contribute to a successful operation. Determining the correct tonnage required for punching mild steel is just one of those variables. Cleveland Steel Tool recommends the following formula for computing the approximate tonnage required to punch a single round hole in mild steel.

Punch Diameter X Material Thickness X 80 = Tons of Pressure Required

Example: (to punch a 1/2" hole through 1/4" thick mild steel)

.500 X .250 X 80 = 10 tons

CanSaw recommends the following formula for computing the approximate tonnage required to punch a single shaped hole in mild steel.

1/3 of Perimeter X Material Thickness X 80 = Tons of Pressure Required

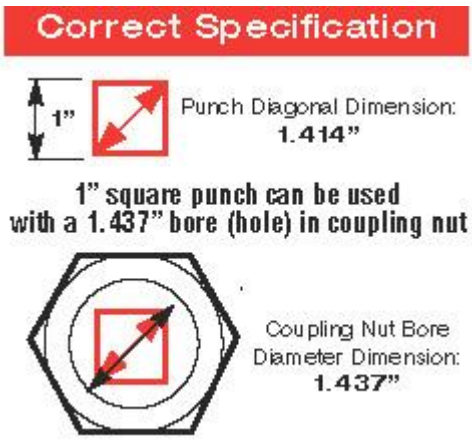
Example: (to punch a 9/16 x 1" rectangular hole through 1/2" thick mild steel)

(.33 X 3.124 X .500 X 80 = 41 tons

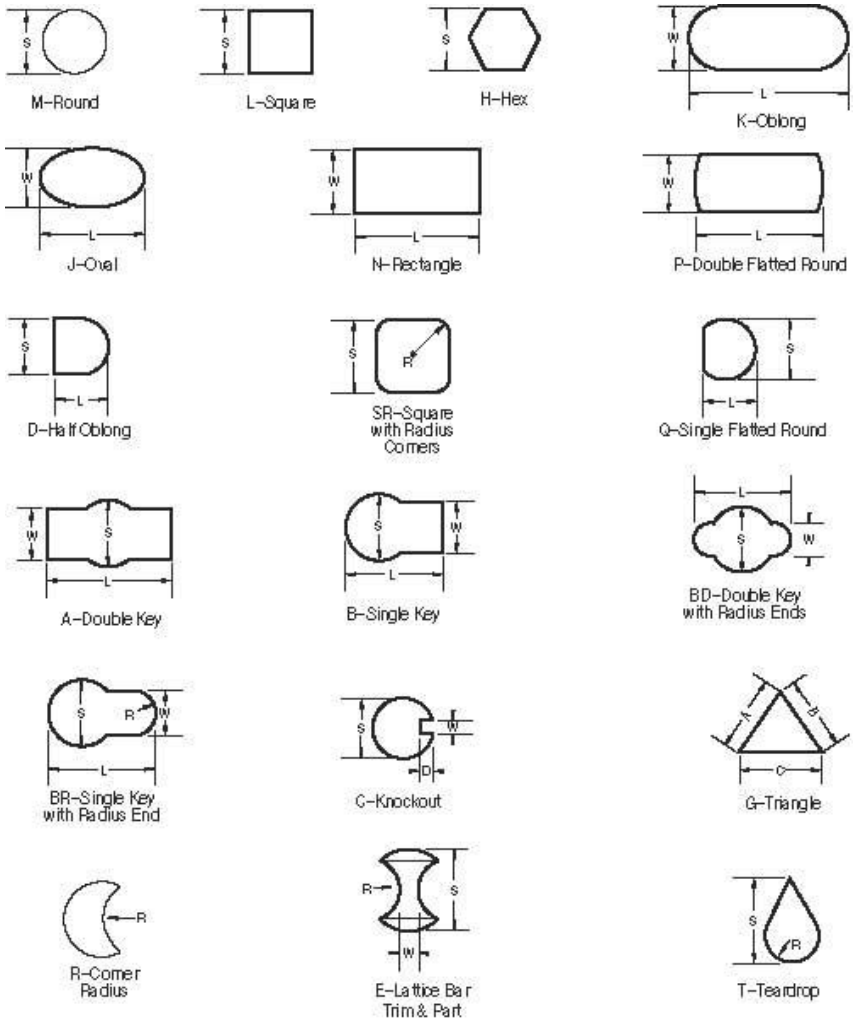
For punching materials with different tensile strength, first determine the tonnage required using the given formulas, then use the following multiplier:

Material	Multiplier
Aluminum	.38
Brass	.70
Copper	.56
Steel (mild)	1.00
Steel (50% carbon)	1.50
Steel (cold drawn)	1.20
Stainless Steel (303)	1.50

We are often asked why a 1" square punch can not be used in place of a 1" round punch when using the same coupling nut. Unlike the diameter of a round punch, the diagonal dimension of a square, rectangle or hex punch is measured like a television screen–from corner to opposite corner. If the diagonal dimension of your shaped punch exceeds the body diameter as it would in our 1" example, the punch would not fit through the bore of your coupling nut and therefore can not be used.



CanSaw Ltd. can supply you with any style of punch or die in most shapes. If you need a shape that is not shown, send us your sketch, sample or blueprint for a quotation.



Tonnage Required to Punch MILD STEEL

Material Thickness	Punch Diameter														
	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
3/32	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
1/8	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10
3/16		3	4	5	6	7	8	9	9	10	11	12	13	14	15
1/4			5	6	8	9	10	11	13	14	15	16	18	19	20
5/16				8	9	11	13	14	16	17	19	20	22	23	25
3/8					11	13	15	17	19	21	23	24	26	28	30
7/16						15	18	20	22	24	26	28	30	33	35
1/2		Multiply Tonnage by;					20	23	25	28	30	33	35	38	40
9/16		Aluminum x .36						26	28	30	34	36	40	42	45
5/8		Steel - Cold Drawn x 1.20							31	34	38	41	44	47	50
11/16		A36 Steel x 1.20								38	41	44	48	51	55
3/4		Stainless Steel x 1.50									45	49	53	56	60
13/16												53	57	61	65
7/8													61	66	70
15/16		*Do NOT punch a smaller diameter hole than the material thickness!*												71	75
1															80