MEASUREMENTS/ SPECIFICATIONS

Die Clearance

CHART #3 TONS OF PRESSURE REQUIRED TO SHEAR 1" LENGTH

Material Thickness	Mild Steel	Stainless Steel	Brass	TONS OF PRESSURE
3/16	4.25	7.0	3.25	
1/4	6.25	9.5	4.5	
5/16	8.0	12.0	5.5	
3/8	9.5	14.25	6.25	
7/16	11.0	16.5	7.75	
1/2	12.5	18.75	8.75	

DETERMINING TONNAGES FOR IRREGULAR SHAPED HOLES

When punching irregular shaped holes (square, obround, etc…) multiply the length of metal to be cut by the multiplier given for a 1" length of cut in chart #3. Example: The shear length (or total distance around a 1/2" square hole) is 2". To punch such a hole in 1/4" thick mild steel, multiply 2" x 6.25 (from chart #3) = 12.5 tons. For stainless steel this would be 2" x 9.5 = 19 tons.

DIE CLEARANCE

The relationship of the larger die hole size to the punch size is die clearance and is stated as a percentage of the thickness of the material being punched. The range of clearances varies from 10% for thin materials to 20% for thicker materials. For 0.75" material, the total die clearance is .150".

Clearance should always be specified when there is any reason for doubt (see illustrations below). Effects of die clearance are more noticeable in thicker materials (such as 0.50") than in thinner materials (such as 0.19"). When ordering die sets, specify the type and thickness of material being punched (see chart #4).

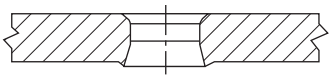
CHART #4 CLEARANCE FOR MILD STEEL

Material Thickness	Approximate Decimal Thickness	Overall Clearance– Add to Punch Size	TONS OF PRESSURE
7 gauge	.1793	.021	
3/16	.1875	.023	
1/4	.250	.037	
5/16	.3125	.047	
3/8	.375	.057	
1/2	.500	.075	

NOTE: Most grades of half hard aluminum use the same clearance as shown above. In many cases, your own experience may dictate that you call for clearances different from the above, especially when punching other materials such as stainless steel. Special clearances may be ordered for that purpose.

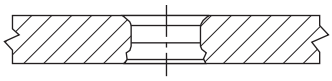
DIE CLEARANCE HAS THE FOLLOWING EFFECTS:

Too much clearance



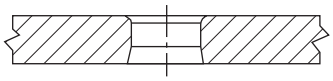
1. Extra roll-in at top of the hole.
2. Too much burr at bottom of the hole.

Too little clearance



1. More punching pressure needed. Can reduce tool life.
2. High stripping force causes part distortion and extra punch wear.

Correct Clearance



1. Straighter hole thru material.
2. Minimum distortion at top of hole.
3. Minimum burr at bottom of hole.