

# REFERENCE

## Tons of Force Required to Punch Mild Steel

(tonnage based on flat punches, taper punches require less because of their progressive shearing action)

Mittler Brothers Machine & Tool

Round Hole Diameter	Ga.	20	18	16	14	12	11	10	3/16"	1/4"	5/16"	3/8"	1/2"
	In.	.036	.048	.062	.075	.105	.120	.135	.188	.250	.312	.375	.500
1/8"		.4	.5	.6	.7	1.0	1.2	1.3	-	-	-	-	-
3/16"		.5	.7	.9	1.1	1.5	1.8	2.0	2.8	-	-	-	-
1/4"		.7	.9	1.2	1.5	2.1	2.4	2.6	3.7	4.9	-	-	-
5/16"		.9	1.2	1.5	1.8	2.6	2.9	3.3	4.6	6.1	7.8	-	-
3/8"		1.1	1.4	1.8	2.2	3.1	3.5	4.0	5.5	7.4	9.2	11.1	-
7/16"		1.2	1.6	2.1	2.6	3.6	4.1	4.6	6.4	8.6	10.7	12.8	-
1/2"		1.4	1.9	2.3	2.9	4.1	4.7	5.3	7.4	9.8	12.3	14.8	19.7
9/16"		1.6	2.1	2.6	3.3	4.6	5.1	5.9	8.3	11.1	13.9	16.5	22.0
5/8"		1.8	2.4	2.9	3.7	5.1	5.9	6.6	9.2	12.3	15.4	18.5	24.6
11/16"		1.9	2.6	3.2	4.0	5.7	6.2	7.3	10.1	13.5	17.0	20.2	26.9
3/4"		2.1	2.8	3.5	4.4	6.2	7.1	7.9	11.0	14.7	18.5	22.1	29.5
13/16"		2.3	3.1	3.8	4.8	6.7	7.6	8.6	12.0	16.0	20.0	23.8	31.8
7/8"		2.5	3.3	4.1	5.1	7.2	8.3	9.2	12.9	17.2	21.5	25.8	34.4
15/16"		2.6	3.5	4.4	5.5	7.7	8.8	9.9	13.8	18.4	23.0	27.5	36.8
1"		2.8	3.8	4.7	5.9	8.2	9.4	10.6	14.8	19.7	24.6	29.5	39.4
1 1/2"		4.2	5.5	7.0	8.8	12.3	14.0	25.9	22.0	34.4	43.0	51.5	68.8
2"		5.6	7.5	9.5	11.7	16.4	18.8	21.0	29.5	39.3	49.0	59.0	78.5
2 1/2"		7.0	9.4	11.7	14.7	20.5	23.5	26.5	36.8	49.0	61.5	73.6	98.2
3"		8.5	11.3	14.0	17.6	24.5	28.2	31.7	44.2	60.0	76.5	88.4	118.0

## Blade Clearances For Mild Steel

Mittler Brothers Machine & Tool

Gauge or Thickness	Decimal Thickness	Overall Clearance To Add To Punch Size
30	.0120	Slip Fit
28	.0149	Slip Fit
26	.0179	.002
24	.0239	.003
22	.0299	.003
20	.0359	.004
18	.0478	.005
16	.0598	.006
14	.0747	.007
13	.0897	.009
12	.1046	.010
11	.1196	.012
1/8	.125	.012
10	.1345	.013
9	.156	.015
8	.164	.017
7	.1793	.021
3/16	.1875	.023
1/4	.250	.037
5/16	.3125	.047
3/8	.375	.057
1/2	.500	.075
5/8	.625	.125
3/4	.750	.150

## Tons of Force Required to cut 1" Length of Mild Steel

Mittler Brothers Machine & Tool

Metal Gauge	Mild Steel	Stainless Steel	Brass
20	1.01	1.50	.75
18	1.25	1.75	1.00
16	1.75	2.50	1.25
13	2.50	3.50	2.00
11	3.25	4.75	2.25
3/16"	4.25	7.00	3.25
1/4"	6.25	9.50	4.50
5/16"	8.00	12.00	5.50
3/8"	9.50	14.25	6.25
7/16"	11.00	16.50	7.75
1/2"	12.50	18.75	8.75
5/8"	15.75	23.50	11.00
3/4"	18.75	28.25	13.25
7/8"	22.00	33.00	15.50
1"	25.00	37.50	17.50