TONNAGE CHART

FORCE TO AIR-BEND MILD STEEL (60,000 PSI)

F = U.S. tons/lineal ft. of workpiece

t	V	1/4	3/8	1/2	5/8	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	V
	f	3/16	9/32	11/32	7/16	9/16	11/16	7/8	1-1/8	1-3/8	1-3/4	1-3/16	2-3/16	3-1/2	4-1/2	5-1/2	6-7/8	f
	r	1/32	1/16	5/64	7/64	9/64	5/32	13/64	1/4	5/16	13/32	33/64	5/8	3/4	1-1/32	1-5/16	1-5/8	ga.
ga.	in.																	
20	0.036	3.1	1.75.	1.2														20
18	0.048	5.4	3.1	2.1	1.55	1.3												18
16	0.060	9.6	5.5	3.8	2.8	2.2	1.45											16
14	0.075		9.3	6.4	4.7	3.8	2.5	1.85										14
12	0.105		20.5	14.0	10.4	8.1	5.6	4.1	3.2	2.2								12
11	0.120			18.5	13.9	10.9	7.4	5.6	4.3	2.9	2.15							11
10	0.135			25.2	17.2	14.5	9.9	7.3	5.7	3.8	2.85	2.23						10
3/16	0.188				34.8	27.6	19.1	13.9	11.0	7.5	5.6	4.3						3/16
1/4	0.250					68.0	39.5	29.0	22.8	15.5	11.4	8.9	6.1	4.5				1/4
5/16	0.313						69.5	51.0	40.0	27.0	20.0	15.6	10.5	7.8	6.1			5/16
3/8	0.375							75.0	59.0	40.0	29.5	23.4	15.8	11.7	9.2	6.2	4.6	3/8
7/16	0.438							115.0	90.0	61.0	45.5	35.2	24.0	17.8	13.9	9.4	6.9	7/16
1/2	0.500									85.0	62.0	44.3	33.0	24.5	19.1	13.0	9.8	1/2
5/8	0.625											86.0	58.0	43.0	34.0	23.2	17.5	5/8
3/4	0.750												91.0	67.0	53.0	36.4	26.7	3/4
7/8	0.875												136.0	101.0	79.0	54.0	40.0	7/8
1	1.000													146.0	115.0	68.0	58.0	1

F Values

For steel of different tensile strength, F value differs in proportion to strength ratio.
Inside radius r. for mild steel, is about 5/32 of female = Die opening V for any t.
shaded F values are for V = 8t.
Common for average 90 degree bending
If t is1/2 inch or more use V=10t

t =Workpiece thickness
r =Inside radius of formed part
V =Vee-die opening
f =Minimum flange

NOTE:
The chart above illustrates the appropriate tonnages to air bend mild steel with 60,000 PSI tensile properties. It must be noted that most North American steel mills are producing harder metals with typical mechanical properties of 44,000 PSI yield and up to 80,000 PSI. tensile strengths. The tonnages required to form these metals are substantially higher and must be taken into consideration in the selection of a press brake.
With an eight-to-one die ratio, the inside radius of a right angle bend is approximately equal to the thickness of the metal. The bending pressures for mild steel are shown on the chart below.

BENDING PRESSURES FOR OTHER METALS ARE:
Soft brass = 50% of pressure shown.
Soft aluminum = 50% of pressure shown.
Aluminum alloys heat treated = same as steel.
Stainless = 50% more than steel.

COINING:
When coining, it must be remembered that the tonnage requirements are three to five times greater than for air bending. Coining is normally only done in very high precision environments and on light gauge materials only.

TONNAGES:
The tonnages indicated in the boxes are produced when using a female die opening eight times the metal thickness up to 3/8" plate, and ten times the metal thickness when bending 1/2" plate and more.