

# AHB

TOOLING & MACHINERY

COMPLETE METALWORKING SOLUTIONS

(800) 991-4225

[www.ahbinc.com](http://www.ahbinc.com)

ISO Certified

[customerservice@ahbinc.com](mailto:customerservice@ahbinc.com)



**-For most accurate bending**, always bend in the middle of the brake if possible. This is because on 2-cylinder press brakes, the bed is crowned in the middle and tapers to both ends.

**-To choose the proper vee die opening**, ideal opening is 8x metal thickness up to 1/2" material. i.e., 1/4" x 8 = 2". For 1/2" material and over, choose 10x metal thickness: 1/2" x 10 = 5" vee. (These ideal openings are the dark shaded areas in the attached chart). For extremely hard material such as Hardox, proper openings can be 12x or larger

**-The minimum flange length for a given vee die opening** is about 70% of it's opening. So, a part being formed over a 2" vee die will need at least a 1.4" flange (notated as "f" in the attached chart). If you need to bend a shorter flange, you can use a smaller vee opening, keeping in mind this will increase the tonnage per foot required to bend the material

**-The formed inside radius of a part** can be calculated by multiplying 15% x the vee die opening for mild steel i.e., bending 1/4" MS over a 2" vee yields an inside radius of .300". (this is notated by "r" in the attached chart). Figure 20% x vee for stainless steel and 12% x vee for aluminum. If the punch tip is larger than this calculated amount, the material will wrap around the punch tip i.e. If the punch tip is 3/8" bending over a 2" vee, the ISR will be .375" instead of .300"

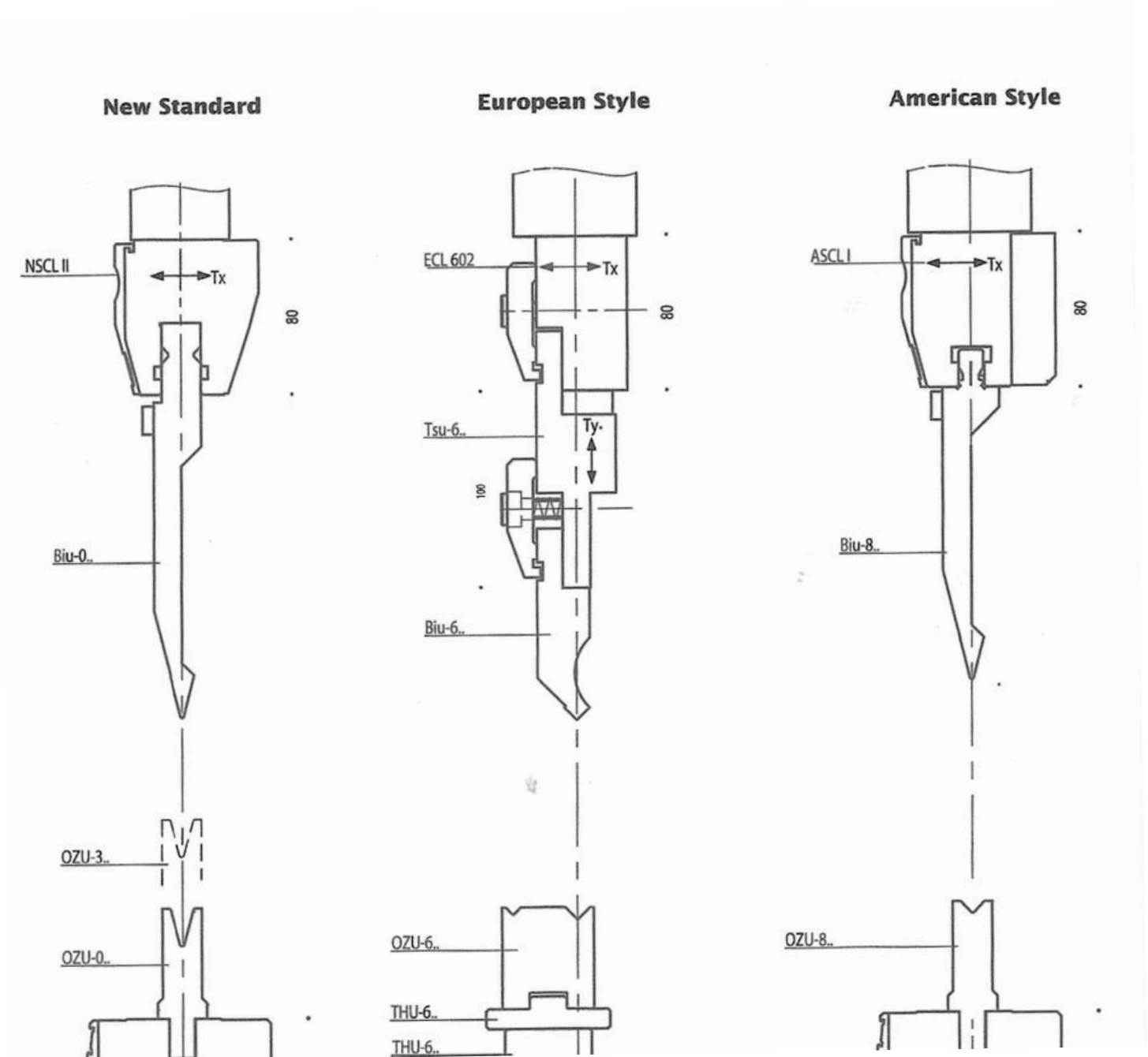
**-Ideally, the minimum flange length to avoid cambering** of a longer bent part is 15x material thickness. i.e., if you are bending 1/2" material, 1/2" x 15 = 7.5" minimum flange. You can bend flanges shorter than 15x material thickness, however on longer parts you may experience cambering of the part (banana shape)

**-Maximum material bending thickness on a punch** is typically 3 x the tip radius. i.e. a punch with a 1/8" tip radius can typically bend up to 3/8" thick material over the proper vee die

-It takes about **.007" x vee opening ram movement** per 1 degree bend. i.e.: on a 3" vee die, it takes about .021" ram movement per degree of bend. On a 1/2" vee it takes about .0035" ram movement for 1 degree of material bend ( $.007" \times \frac{1}{2} = .0035"$ )

-When approaching **full tonnage on a press brake**, in order not to damage the bed and ram you want to use at least 2/3 of the bed measured between the housings. i.e., on a 12 ft brake with 10'6" between the housings, the material width should be at least 7 ft long when approaching full tonnage ( $10.5 \times .67 = 7$  ft)

The last attachment is from Wila tooling and shows the 3 most popular types of tooling used today: New Standard, European and American style. Most people in the states still use American-style tooling, whether its precision hardened and ground ( $\pm .0004"$ ) or conventional planed tooling. Most new brakes purchased today are precision Y1/Y2 synchronized brakes with  $\pm .0004"$  accuracy and therefore use precision hardened and ground tooling with the same  $\pm .0004"$  tolerances. And because of the accuracy of today's precision press brakes, they use air bend tooling.

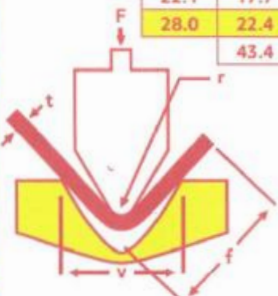


# PRESS BRAKE TONNAGE CHART

## Force to Air-Bend Mild Steel (80,000 PSI Tensile)

f = U.S. tons/lineal ft. of workpiece  
All dimensions in inches

t	v	¼	⅜	½	⅝	¾	1	1 ¼	1 ½	2	2 ½	3	4	5	6	8	10																		
f	3/16	1/8	1/4	3/8	1/2	5/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3	4	5																		
r	1/32	1/16	1/8	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	4																		
Thickness	Inches																	Thickness																	
20	0.036	4.0	2.7	2.0																	20														
18	0.048	7.1	4.7	3.5	2.8	2.4																	18												
16	0.060	11.1	7.4	5.5	4.4	3.7	2.8																	16											
14	0.075		11.5	8.6	6.9	5.8	4.3	3.5																	14										
12	0.105		22.6	16.9	13.6	11.3	8.5	6.8	5.6	4.2																	12								
11	0.120			22.1	17.7	14.8	11.1	8.9	7.4	5.5	4.4																	11							
10	0.135			28.0	22.4	18.7	14.0	11.2	9.3	7.0	5.6	4.7																	10						
9/16	0.188				43.4	36.2	27.1	21.7	18.1	13.6	10.9	9.0																	9/16						
¾	0.250					64.0	48.0	38.4	32.0	24.0	19.2	16.0	12.0	9.6																	¾				
5/8	0.313						75.2	60.2	50.2	37.6	30.1	25.1	18.8	15.1	12.5																	5/8			
¾	0.375							86.4	72.0	54.0	43.2	36.0	27.0	21.6	18.0	13.5	10.8																	¾	
7/8	0.438								117.9	98.2	73.7	58.9	49.1	36.8	29.5	24.6	18.4	14.7																	7/8
1	0.500									96.0	76.8	64.0	48.0	38.4	32.0	24.0	19.2																	1	
¾	0.625										100.0	75.0	60.0	50.0	37.5	30.0																	¾		
¾	0.750											108.0	86.4	72.0	54.0	43.2																	¾		
¾	0.875												147.0	117.6	98.0	73.5	58.8																	¾	
1	1.000													153.6	128.0	96.0	76.8																	1	



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

For steel of different yield 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 bending. If t is 1/2 inch or more use v = 10t.



**CONTACT US:**  
1-800-991-4225  
CUSTOMERSERVICE@AHBINC.COM

