Air Bending Force Chart • Metric values

Xometry

	V, mm	6	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200	250	320	400	500
	b, mm	4	5.5	7	8.5	11	14	17.5	22	28	35	45	55	71	89	113	140	175	226	280	350
	ir, mm	1	1.3	1.6	2	2.6	3.3	4	5	6.5	8	10	13	16	20	26	33	41	53	65	83
t, mm	0.5	**4**	**4**																		
	0.8	**4**	**5.5**	7																	
	1	**11**	**8**	7	6																
	1.2	16	**12**	**10**	8	6															
	1.5		17	**15**	**13**	9	8														
	2			27	**22**	**17**	13	11													
	2.5				35	**26**	**21**	17	13												
	3					38	**30**	**24**	19	15											
	4						54	42	**34**	**27**	21										
	5							67	52	**42**	**33**	26									
	6								75	60	**48**	**38**	30								
	8									107	85	**68**	**53**	43							
	10										134	105	**85**	**67**	53						
	12											153	120	**95**	**78**	60					
	15												188	150	120	**95**	**75**				
	20														215	170	**135**	**108**	85		
	25															265	210	**170**	**130**	105	
	30																300	240	**190**	**150**	120

Larger v-openings are possible, they require less force

Smaller v-opening requires increased force and is not recommended

t = Sheet thickness **V** = Die V-opening **b** = Minimum flange length **ir** = Internal radius **F** = Bending force **68** – Blue colored values are optimal

*This chart is applicable to structural steels with an approximate yield strength of 400 MPa, specifically when formed into a 90° angle.

Calculate force for other materials:

Aluminium: F * 50%

Stainless Steel: F * 150%

Air Bending Force Chart • Imperial values

Xometry

		V, in	.157	.236	.276	.315	.394	.472	.551	.630	.709	.787	.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921	6.299	7.874	9.843
		b, in	.110	.165	.193	.220	.276	.331	.397	.454	.510	.567	.709	.945	1.181	1.476	1.860	2.362	2.953	3.789	4.850	6.063	7.579
Gauge	Dec.	ir, in	.026	.039	.046	.052	.066	.079	.092	.105	.118	.131	.164	.210	.262	.328	.413	.525	.656	.820	1.050	1.312	1.640
20	.036	F, t/ft	5.4	**3.6**	3.3	2.5	2.0	1.7															
18	.048			7.2	**5.8**	4.8	3.7	2.7	2.4	2.0													
16	.060					7.8	**6.0**	5.0	4.2	3.5	3.1	2.7											
14	.075						11.3	**7.5**	7.1	5.6	4.8	4.1	3.2										
13	.090							12.5	**10.1**	8.2	7.2	5.4	3.7										
12	.105							15.8	13.0	**10.5**	9.5	7.5	5.6	4.0									
11	.120									16.1	13.1	10.1	**7.2**	5.0	3.8								
10	.135											12.0	**8.1**	6.2	4.7								
9	.150												13.1	**9.0**	6.7	5.2							
3/16″	.188												24.1	15.0	**11.3**	7.5	5.8						
1/4″	.250													30.0	20.0	**15.0**	10.5	8.5					
5/16″	.313														37.6	25.0	**18.8**	13.1	10.0				
3/8″	.375															38.3	28.1	22.5	**15.0**	11.3			
1/2″	.500																52.0	39.0	30.0	**22.0**	16.0		
5/8″	.625																	70.0	52.5	37.5	27.5	**20.0**	15.0
3/4″	.750																			66.0	45.0	32.3	**22.5**
1″	1.000																				90.0	60.0	44.0
1-1/4″	1.250																					102.5	75.0

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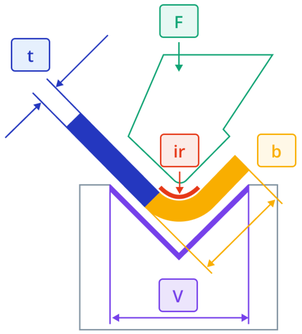
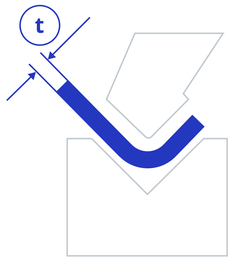
Sheet Metal Bending Radius



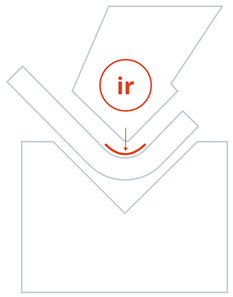
Sheet thickness

The measurement of the thickness of a sheet metal. It is usually expressed in millimeters (mm) or gauge. The thickness affects the metal's strength, flexibility, and the required bending force.



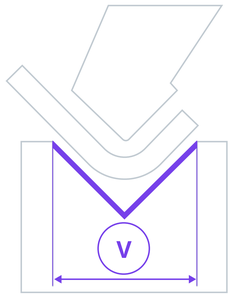
Internal radius

The radius of the inside curve of a bend in sheet metal. The internal radius affects the material's structural integrity and the ease of bending. A smaller internal radius requires more precision and can increase the risk of cracking.



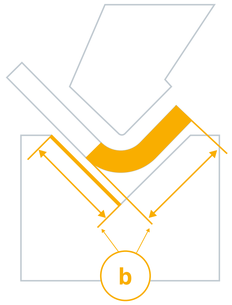
Die V-opening

The width of the V-shaped groove in the die used for bending sheet metal. It influences the bending angle and the required force. A larger V-opening can accommodate thicker sheets and reduce the bending force needed.



Minimum flange length

The shortest length of the bent part of the sheet metal from the bend (its outer radius) to the edge. It is crucial for ensuring the bend is formed correctly without distorting the material.



Bending force

The amount of force required to bend a sheet of metal to the desired angle. It depends on factors like sheet thickness, die V-opening, material type, and the bend radius. Proper calculation of bending force is essential to avoid damaging the material or the tooling.

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