

BEND TOOLING MANDREL AND WIPER SELECTION CHART™

		"D" of Bend (Centerline Radius / Tube Diameter)											
		0.75	1	1.25	1.5	2	2.5	3	4	5	7	9	12
Wall Factor (Tube Diameter / Wall Thickness)	0	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN
	5	R0N	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN
	7	R1N	R0N	R0N	R0N	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN
	10	R1W	R1N	R1N	R1N	R0N	R0N	R0N	NNN	NNN	NNN	NNN	NNN
	15	R2W	R1W	R1W	R1N	R1N	R1N	R1N	R0N	NNN	NNN	NNN	NNN
	20	R2W	R2W	R2W	R1W	R1W	R1N	R1N	R0N	R0N	NNN	NNN	NNN
	25	R3W	R2W	R2W	R2W	R1W	R1W	R1W	R1N	R0N	R0N	NNN	NNN
	30	R3W	R3W	R3W	R2W	R2W	R2W	R1W	R1W	R1N	R0N	R0N	R0N
	35	R3W	R3W	R3W	R3W	R2W	R2W	R2W	R2W	R1W	R0N	R0N	R0N
	40	C4W	R3W	R3W	R3W	R3W	R2W	R2W	R2W	R2W	R1N	R0N	R0N
	45	C4H	C4W	R3W	R3W	R3W	R3W	R2W	R2W	R2W	R1W	R0N	R0N
	50	C4H	C4W	C4W	R3W	R3W	R3W	R3W	R3W	R3W	R2W	R1N	R0N
	60	C4H	C4H	C4W	C4W	R3W	R3W	R3W	R3W	R3W	R2W	R1W	R0N
	70	C5H	C4H	C4H	C4W	C4W	R3W	R3W	R3W	R3W	R3W	R2W	R1N
	80	C5H	C5H	C5H	C4H	C4H	C4H	C4H	C4H	C4H	R3W	R2W	R1W
	90	C5H	C5H	C5H	C5H	C5H	C4H	C4H	C4H	C4H	C4H	R3W	R2W
100	C6H	C5H	C5H	C5H	C5H	C5H	C5H	C4H	C4H	C4H	C4H	R3W	
125	C6H	C6H	C6H	C5H	C5H	C5H	C5H	C5H	C5H	C4H	C4H	C4H	
150	D7H	C6H	C6H	C6H	C6H	C6H	C6H	C6H	C5H	C5H	C5H	C4H	
175	D8H	D7H	D7H	D7H	D7H	D7H	D7H	D7H	C6H	C6H	C5H	C5H	
200	D9H	D9H	D9H	D9H	D8H	D8H	D8H	D8H	D7H	D7H	C6H	C6H	

NNN Zone 1: Mandrel bending optional.

R2W Zone 2: Mandrel bending required; inserted tooling recommended.

C5H Zone 3: Mandrel bending required; high-pressure tooling recommended.

1st character: "N" = no mandrel required, "R" = regular-pitch mandrel, "C" = close-pitch mandrel, "D" = double-close-pitch mandrel.

2nd character: "0" = plug mandrel, "1" through "9" = ball mandrel.

3rd character: "N" = no wiper required, "W" = standard inserted mandrel and wiper, "H" = high-pressure mandrel and wiper.

Notes:

[1] Recommendations based upon 180-degree bend of mild steel round tubing.

[2] Recommendations based upon "forward nose" set-up using link-type (as opposed to cable) mandrel.

[3] Regular-pitch mandrels may have either a small nose radius (for precision bending) or large nose radius (for high-production bending); for all other mandrels, the small nose radius is recommended.

[4] For stainless steel, titanium, copper-nickel, and "T6" aluminum tubing materials, adjust one column to the left for best recommendation; for nickel stainless and nickel alloys adjust two columns to the left.