Bending Guideline Chart

Centerline Radius
Divided by
Tube Outside Diameter

	1 x Tube OD 90°	1 x Tube OD 180°	1.5 x Tube OD 90°	1.5 x Tube OD 180°	2 x Tube OD 90°	2 x Tube OD 180°	2.5 x Tube OD 90°	2.5 x Tube OD 180°	3 x Tube OD 90°	3 x Tube OD 180°	5 x Tube OD 90°	5 x Tube OD 180°
10	G	G	G	G	G	G	G	G	G	G	G	G
	G	G	G	G	G	G	G	G	G	G	G	G
20	R	R	B	B	B	B	G	G	G	G	G	G
	R	R	B	B	B	B	B	B	B	B	G	G
30	R	R	R	R	R	R	B	B	B	B	G	G
	R	R	R	R	R	R	R	R	R	R	B	B
	R	R	R	R	R	R	R	R	R	R	B	B
40	R	R	R	R	R	R	R	R	R	R	R	R

Tube Outside Diameter Divided By Tube Wall Thickness

Example:
.750" OD X .035" wall
to be bent on a 1.75" CLR
1.75 ÷ .750 =2.3 so is 2 x tube OD
.750 ÷ .035 = 21.4 so is just over 20
Resulting bend is a **B**

Green: Tube requires little to no cleaning after bending
Is the best ratio for higher volume production (1000s)
Tooling is simpler and lasts longer

Blue: Requires lubricant in ID of tube which must be cleaned out after bending
Is a workable ratio for medium volume production (100's)
Tooling is a little more complex and is subject to some wearing

Red: Requires lubricant both internally and externally which must be cleaned after bending
Is very difficult bending so is better limited to small quantities
Tooling is complex and subject to significant wearing

NOTE: Increasing the bend radius and/or the tube wall thickness
or decreasing the outside diameter of the tube during
the design stage of a project can make a substantial
difference in the cost & manufacturability of a part.