VR3 Engineering
precision tube fabrication

VR3 TUBE BENDING CHART - FSAE and BAJA SAE

Last Updated: Apr. 2026

Purpose: This document lists the available bend dies for commonly used tube sizes in FSAE/BAJA Projects. Our bend capabilities are not limited to the below listed sizes, and radii - refer to notes.

Tube OD (in.)	Min. Tube Wall Thickness (in.)	Centerline Bend Radii (in.)	Min. straight length between bends (in.)	Min. end leg length (in.)
0.500"	≥ 0.049"	1.42"	3.00"	2.00"
0.750"	≥ 0.058"	1.81"	3.25"	2.50"
	≥ 0.049"	2.64"	4.00"	2.50"
	≥ 0.035"	6.00"	4.00"	2.50"
1.000"	= 0.095"	3.25" / 5.88"	4.50"	3.00"
	= 0.065"	3.25" / 5.88"	4.50"	3.00"
	= 0.049"	5.88"	4.50"	3.00"
	= 0.035"	5.88"	4.50"	3.00"
1.250"	= 0.065"	4.41" / 5.96"	4.50"	3.50"
	= 0.049"	5.96"	4.50"	3.50"
	= 0.035"	5.96"	4.50"	3.50"

Notes:

1. Our tube bends are made with fixed radius bend dies that are not adjustable.
2. Thinner wall tubes (.035", .049", .058") require larger bend radii / dies to avoid flattening or buckling or other deformation unless, willing to use expensive mandrel bending equipment, and deal with associated setup costs.
3. Refer to our bend guideline, checklist documents for additional information.
4. Our 3D Modeling Guidelines document (available on website - documentation - reference documents), covers every aspect of CAD modeling to ensure manufacturibility of your design.
5. **Do not make notches that intersect bend features! VR3 cannot provide these notches, only a square ended extension in its place. This adds steps and cost to manufacturing the part, as well as manual layout/fitting/trimming at weld assembly.
6. **Minimum end leg lengths are required to hold the tube around the die. Designing to meet these requirements is most economical. If neccesary, end lengths less than the minimum can be accomodated by adding an extension for an additonal cost. The extension would contain a 'scribed' trim line for the notch to facilitate trimming after bending by the student team or fabricators.
7. For additonal bend die sizes for one-off parts refer to our website-documentation-Manual tube bending tool list.
8. Automated cnc mandrel bending is available for thin wall tubing, and production bending with additional costs.
9. Our bending capabilities are not confined to the above listed specifications. So, if your project requires other tube sizes, or special features, contact us to collaborate on a solution!