

# Metal Component Manufacturing Technology Attributes

## Manufacturing Technology

		Cold Forming / Heading	Screw / Swiss Machining	Stamping	MIM
Attributes	Material Scrap	Typically less than 2-3%	As much as 50-70%	As much as 30+%	Typically less than 5%
	Production Rate (PPM)	90 - 350+	Typically 4 - 6	100+	100+
	Component Mechanical Strength	Ideal - retains native material properties	Poor - grain boundaries broken / cut	Reduction proportional to centroid distance	Acceptable except for possible lateral fatigue
	Total Cost	Generally lowest for 50,000 or > EAU quantities	Generally lowest for <10,000 EAU quantities	Economical solution for high volume EAU quantities of simple shapes	Generally higher due to required secondary operations
	Component Geometry	Ideal for complex, variable internal and external feature depth and thickness	Allows for large variability in feature outside diameters along part length	Well suited for parts with modest internal feature variation & a flatter profile	Supports complicated asymmetrical part features
	Secondary Operations	Minimal - process generally produces burr-free parts off machine	Requires deburring	Generally requires deburring and possible machining	Requires vacuum heat treat and trimming
	FAI lead-time	Generally 2 - 13 weeks	Generally 1 - 2 weeks	Generally 4 - 13 weeks	Generally 4 - 13 weeks
	Tooling	Modest initial investment	Low cost	High initial investment	High Initial investment