

CNC Tolerance & Cost Reference Chart

1. Tolerance-to-Cost Table

Tier	Tolerance Range	Relative Cost	Lead Time Impact	Typical Use
Standard	±0.1mm – ±0.125mm	1x (baseline)	Standard	Clearance holes, non-mating surfaces, overall dimensions
Tight	±0.025mm – ±0.05mm	1.5x – 2x	+2-4 days	Bearing press fits, alignment dowels, mating parts
Precision	±0.01mm or tighter	4x+	+1-2 weeks	Requires secondary grinding; seal faces, precision shafts

2. Process Capability Matrix

Process	Typical Achievable Tolerance	Best For
CNC Milling	±0.05mm standard	Prismatic parts, pockets, complex geometry
CNC Turning	±0.025mm standard	Cylindrical/rotational parts
Wire EDM	±0.005mm	Hardened materials, complex internal geometry
Precision Grinding	±0.0025mm	Final-stage finishing on flat/cylindrical surfaces

3. Surface Finish (Ra) Reference

Ra (µm)	Feel	Common Application
Ra 3.2	Visible machining marks	General structural parts
Ra 1.6	Smooth to touch	Standard mating surfaces
Ra 0.8	Fine, near-mirror	Sealing faces, light-duty bearings
Ra 0.4 or finer	Mirror finish	Precision bearing fits, hydraulic seals — requires grinding

Need help optimizing your next design?

Upload your CAD file at www.clarwe.com for an online quote and expert DFM feedback.