

CUTTING DATA

Micro Internal Tooling

Starting data for micro boring bars, internal grooving bars, face grooving bars and micro threading bars.

Boring	Grooving	Threading	Small bores
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How to use this guide

For small bores, overhang, bar clearance, holder alignment, runout and chip evacuation usually matter more than maximum speed.

Micro boring starting conditions

Workpiece	Vc (m/min)	Feed f (mm/rev)	Typical ap (mm)
Carbon / alloy steel	60-120	0.010-0.050	0.02-0.15
Stainless steel	40-90	0.010-0.040	0.02-0.10
Cast iron	70-130	0.010-0.050	0.02-0.15
Aluminum / non-ferrous	100-200	0.010-0.080	0.02-0.20
Titanium / nickel	25-60	0.005-0.030	0.01-0.08
Hardened steel 45-55 HRC	30-70	0.005-0.025	0.01-0.06

OVERHANG & OPERATION

Overhang correction

Approx. L/D	Vc multiplier	Feed multiplier	Guidance
<=2.5D	100%	100%	Rigid baseline
~4D	75-85%	85-95%	Monitor vibration
~6D	50-65%	70-85%	Reduce ap strongly
>6D	Tool-specific	Tool-specific	Special process recommended

Operation modifiers

Operation	Starting range	Key point
Internal grooving	Vc = 70-85% of boring; f 0.005-0.030 mm/rev	Protect thin cutting edge
Face grooving	Vc = 65-85% of boring; f 0.005-0.025	Cutting diameter changes across groove
Micro threading - steel	30-70 m/min; f = pitch	Use controlled infeed passes
Micro threading - stainless	20-45 m/min; f = pitch	Avoid built-up edge
Micro threading - Ti/Ni	15-35 m/min; f = pitch	Conservative speed

TROUBLESHOOTING

Common micro-internal problems

Symptom	Check first	First correction
Chatter / taper	Overhang, clearance, rigidity	Shorten overhang; reduce Vc/ap
Poor finish	Built-up edge / rubbing	Improve lubrication; maintain cutting feed
Tip breakage	Entry impact / chip packing	Reduce ap/feed; improve evacuation
Groove width variation	Bar deflection	Reduce radial load
Thread damage	Pitch sync / infeed	Verify cycle and clearance

Disclaimer: Micro internal tools are geometry-specific. Bar section, nose radius, edge prep and minimum bore clearance can shift usable data substantially.