Milling Feeds & Speeds Quick Reference (Expanded Materials)

1. Feed Rate Formula

Feed (IPM) = Chip Load per Tooth × Flutes × RPM

Material	1/8″	1/4″	3/8″	1/2″	3/4″	1″
Aluminum Alloys (6061/7075)	0.001–0.002	0.002–0.004	0.003–0.006	0.004–0.008	0.006–0.012	0.008–0.016
Brass / Copper	0.001–0.002	0.002–0.003	0.002–0.004	0.003–0.005	0.004–0.008	0.006–0.010
Bronze (Phosphor/Aluminum)	0.0008–0.0015	0.0015–0.003	0.002–0.004	0.002–0.004	0.003–0.006	0.004–0.008
Mild Steel (1018/1045)	0.0005–0.001	0.001–0.002	0.0015–0.003	0.002–0.004	0.003–0.005	0.004–0.006
Tool Steel (O1/A2)	0.0004–0.0008	0.0008–0.0015	0.001–0.002	0.0015–0.0025	0.002–0.0035	0.003–0.004
Stainless Steel (304/316)	0.0004–0.0008	0.0008–0.0015	0.001–0.002	0.0015–0.003	0.002–0.0035	0.003–0.0045
Cast Iron (Gray/Ductile)	0.0005–0.001	0.001–0.002	0.0015–0.003	0.002–0.004	0.003–0.005	0.004–0.006
Titanium	0.0003–0.0006	0.0006–0.0012	0.0008–0.0015	0.001–0.002	0.0015–0.0025	0.002–0.003
Plastics (Delrin/Nylon/Acrylic)	0.002–0.004	0.003–0.006	0.004–0.008	0.005–0.010	0.008–0.015	0.010–0.020

2. Flute Count Guidelines

- Aluminum: 2–3 flutes
- Steel: 4 flutes
- Stainless: 4–6 flutes
- Cast Iron: 4 flutes
- Brass: 2–4 (neutral rake)
- Plastics: 1–2 (O-flute)

3. Depth of Cut (Starting Points)

- Axial (depth): ~½ tool diameter
- Radial (stepover): ~½ tool diameter
- Reduce for harder materials or smaller tools

4. Notes

- Start low and increase chip load until tool runs efficiently without chatter
- Carbide can handle ~2–3× HSS chip load if rigid
- Use coolant/oil/air as appropriate