

Deep Pocket Milling

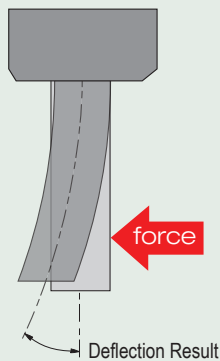
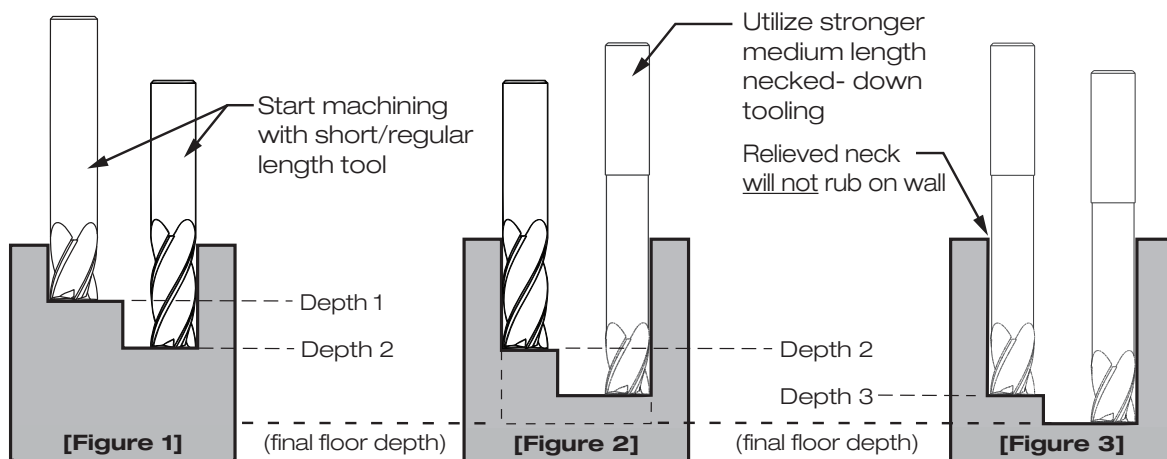
Deep pocket milling continues to be one of the most demanding milling operations. Deep pocket milling routines usually involve long reach, poor chip evacuation, limited coolant delivery, deflection issues and serious tool engagement violations. We have illustrated some helpful techniques below (see Figures 1, 2, 3).

Common Problems Experienced

- Chatter
- Wall taper
- Tool deflection
- Tool engagement violations
- Recutting chips
- Breakage

Some Things to Consider

- *Step down milling routine:* This procedure (shown in Figures 1, 2, 3) ensures that you are utilizing a controlled axial depth of cut (ADOC) at each level, thus optimizing speeds and feeds. It is imperative to start with a stub or standard length tool to get down to approximately 2-3 x dia. deep (depth 1-2), then employ necked down tooling.
- *Necked down tooling:* Once depths 2 and 3 are reached (Figure 2), use our stronger necked down tooling in order to maintain tool integrity and respectable feed rates. Necked tooling has a shorter length of cut (LOC), ensuring a much stronger tool and a neck diameter smaller than the cut diameter allowing for plenty of wall clearance.



Tool Deflection

Rigidity during a milling operation is key for optimal tool performance and desired results. Keeping tool deflection to a minimum will help increase success on a deep reach application.

A Deflection “Rule of Thumb”

Tool overhang length decreases rigidity as a third power (L^3), but even more importantly, tool diameter increases rigidity by the fourth power (D^4).

Common Techniques to Combat Deflection

- Ensure tools are sharp
- Increase tool diameter
- Decrease depth of cut
- Climb mill in lieu of conventional milling
- Decrease IPM
- Use shorter tool and/or employ necked tooling
- Increase number of flutes
- Re-evaluate SFM parameter