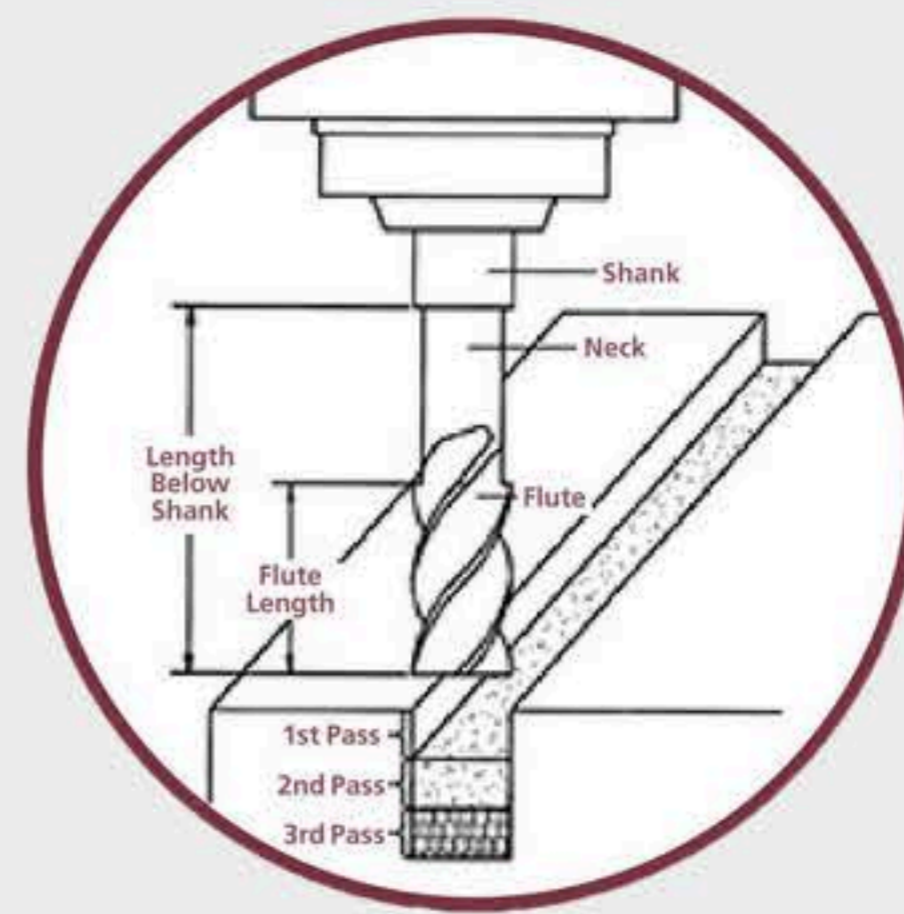


Neck Relieved Tool Application

Deep Pocket and Slot Milling with Neck Relieved Series End Mills

Necked end mills for extended reach minimize tool deflection. The rigidity of these end mills enable multiple passes at faster feed rates. The appropriate depths of cut per pass are as follows: One half (1/2) times the diameter in ferrous materials and one (1) times the diameter in non-ferrous materials. The diagram at right shows 3 passes. The number of passes will vary, depending on depth of the pocket. Call us with your specific application.



Trouble Shooting Guide

| PROBLEM | CAUSE | SOLUTION |
|-------------------------------------|-------------------------------------|--|
| Chipping | Feed too fast | Reduce feed rate |
| | Loose Tool | Tighten screws |
| | Loose Workpiece | Tighten clamps |
| | Tool not rigid enough | Try shorter length end mill |
| Rapid Wear | Speed too fast | Use slower speed |
| | Hard metal | Add coating |
| | Feed rate too slow | Increase feed rate |
| | Improper cutting angle | Adjust cutting angle |
| | Primary relief angle too small | Use a larger relief angle |
| Breakage | Feed rate too fast | Decrease feed rate |
| | Cutting amount too large | Take smaller cut per tooth |
| | Flute length too long | Try shorter flute length |
| | Too much wear | Regrind sooner |
| Chattering | Feed and speed too fast | Adjust feed and speed rates |
| | Machine and holder not rigid enough | Use appropriate machine or holder |
| | Relief angle too great | Use smaller relief angle |
| | Workpiece too loose | Refixture part |
| | Cut too deep | Use shallower cut |
| | Flute length too long | Try shorter flute length |
| Short Tool Life (Dull Teeth) | Cutting friction too great | Regrind more frequently |
| | Improper cutting angle | Adjust primary clearance angle |
| Chip Packing | Cutting amount too great | Modify feed or speed rates |
| | Not enough chip room | Use different end mill |
| | Insufficient coolant | Use additional coolant or use air flow |
| Rough Surface Finish | Feed rate too fast | Decrease feed rate |
| | Speed rate too slow | Increase feed rate |
| | Too much wear | Regrind soon |
| | No end tooth concavity | Add more dish to bottom teeth |
| | | |
| Burring | Primary relief wearing | Regrind more frequently |
| | Improper cutting angle | Adjust cutting angle |