

Application Tips for Ultra-Tool® Solid Carbide Products

Trouble Shooting for Ultra-Tool® Carbide Endmills

Problem	Cause	Solution
Chipping	<ul style="list-style-type: none"> Feed rate too high Up milling (conventional) Cutting edge too sharp Chattering Loose tool Workpiece rigidity Tool rigidity Low cutting speed Loose toolholder 	<ul style="list-style-type: none"> Reduce feed rate Change to down milling (climb) Hone cutting edge or allow break-in Reduce RPM Remove, clean, and retighten Tighten workpiece holding method Shorten LOC, place shank further up holder Increase RPM Remove from spindle, clean and replace
Wear	<ul style="list-style-type: none"> High cutting speed Low feed rate Up milling (conventional) Hard material Poor chip evacuation Improper cutter helix Poor coolant 	<ul style="list-style-type: none"> Reduce RPM Increase feed rate Change to down milling (climb) Use coated tool Reposition coolant lines, use air blasting Change to recommended helix angle Replace coolant or correct mixture
Breakage	<ul style="list-style-type: none"> Feed rate too high Depth of cut too large Poor tool rigidity Tool wear Poor chip evacuation 	<ul style="list-style-type: none"> Reduce feed rate Reduce depth of cut Shorten LOC, place shank further up holder Replace/regrind sooner Reposition coolant lines, use air blasting
Chattering	<ul style="list-style-type: none"> Speed and feed too high Poor toolholder rigidity Poor spindle rigidity Workpiece rigidity Relief angle too high Depth of cut too large Poor tool rigidity 	<ul style="list-style-type: none"> Reduce feed rate Replace with shorter/more rigid holder Use larger spindle or different machine tool Tighten workpiece holding method Regrind with smaller relief angle Reduce depth of cut Shorten LOC, place shank further up holder
Short Life	<ul style="list-style-type: none"> Cutter/workpiece friction Hard material Poor material condition Improper cutter angle Poor coolant 	<ul style="list-style-type: none"> Use coated tool Use coated tool, clean material surface Regrind with proper primary relief angle Replace coolant or correct mixture
Chip Packing	<ul style="list-style-type: none"> Feed rate too high Low cutting speed Insufficient chip room Insufficient coolant 	<ul style="list-style-type: none"> Reduce feed rate or increase speed Increase RPM or reduce feed rate Use tool with less flutes, increase helix Increase volume of coolant
Poor Surface Finish	<ul style="list-style-type: none"> Feed rate too high Low cutting speed Tool wear Edge build up Depth of cut too large Chip welding 	<ul style="list-style-type: none"> Reduce feed rate Increase RPM Replace or regrind tool Increase RPM, switch to higher helix tool Reduce depth of cut Increase volume of coolant
Burring or Workpiece Chipping	<ul style="list-style-type: none"> Tool wear Improper helix angle Feed rate too high Depth of cut too large 	<ul style="list-style-type: none"> Replace or regrind tool Change to recommended helix angle Reduce feed rate Reduce depth of cut
Workpiece Inaccuracy	<ul style="list-style-type: none"> Loose/worn toolholder Poor toolholder rigidity Poor spindle rigidity Insufficient number of flutes Tool deflection 	<ul style="list-style-type: none"> Repair or replace Replace with shorter/more rigid toolholder Use larger spindle or different machine tool Use tool with higher flute quantity Shorten LOC, place shank further up holder

Trouble Shooting for Ultra-Tool® Carbide Drills

Problem	Cause	Solution
Heavy Wear at Outer Edge	<ul style="list-style-type: none"> Insufficient coolant Incorrect speed & feed 	<ul style="list-style-type: none"> 5, 6 1, 2, 8
Chipping at Outer Cutting Edge	<ul style="list-style-type: none"> Loose tool, tool movement Workpiece movement Poor coolant conditions Incorrect speed & feed 	<ul style="list-style-type: none"> 8, 10, 11, 12, 14, 16, 17, 21 8, 12, 13, 21 5, 6 1, 2, 3, 4
Drill Point Chipping	<ul style="list-style-type: none"> Loose tool, tool movement Incorrect speed & feed Drill centering 	<ul style="list-style-type: none"> 10, 11, 12, 14 1, 2, 3, 4 8, 10, 11, 12, 21
Margin Wear	<ul style="list-style-type: none"> Drill margin rubbing wall Poor chip evacuation Poor coolant conditions Workpiece movement 	<ul style="list-style-type: none"> 20 (check drill for backtaper) 5, 6, 8, 20 5, 6 8, 13, 21
Tool Breakage	<ul style="list-style-type: none"> Loose tool, tool movement Workpiece movement Wrong drill type Poor coolant conditions Incorrect speed & feed 	<ul style="list-style-type: none"> 8, 10, 11, 12, 14, 16, 17, 21 8, 12, 13, 21 9, 15, 16, 18, 19, 20 5, 6 1, 2, 3, 4
Poor Tool Life	<ul style="list-style-type: none"> Incorrect speed & feed Poor coolant conditions Wrong drill point 	<ul style="list-style-type: none"> 1, 2, 3, 4 5, 6 8, 21
Drill Walk	<ul style="list-style-type: none"> Incorrect speed & feed Tool wear Wrong drill point Material condition 	<ul style="list-style-type: none"> 1, 2 7, 8, 21 8, 10, 11, 21 11, 12, 15, 16, 17
Chip Welding	<ul style="list-style-type: none"> Poor coolant conditions Wrong drill type 	<ul style="list-style-type: none"> 5, 6 19, 20
Hole Size Inaccuracy	<ul style="list-style-type: none"> Incorrect speed & feed Poor coolant conditions Loose tool Wrong drill type 	<ul style="list-style-type: none"> 1, 2, 3, 4 5, 6 14 9, 18
Non-Cylindrical Hole	<ul style="list-style-type: none"> Loose tool, tool movement Workpiece movement Incorrect speed & feed Wrong drill type 	<ul style="list-style-type: none"> 8, 10, 11, 12, 14, 16, 17 13 1, 2 18, 21
Heavy Burr	<ul style="list-style-type: none"> Incorrect speed & feed Incorrect drill point 	<ul style="list-style-type: none"> 1, 2 8, 21
Blue Chips	<ul style="list-style-type: none"> Poor coolant conditions Tool wear 	<ul style="list-style-type: none"> 5, 6 7, 8
Long Chips	<ul style="list-style-type: none"> Poor point grind Incorrect speed & feed 	<ul style="list-style-type: none"> 8 1, 2
Solutions Key	<ol style="list-style-type: none"> 1) Reduce RPM 2) Increase feed 3) Increase RPM 4) Reduce feed 5) Increase coolant 6) Increase mixture 7) Add negative hone 8) Repoint drill 9) Correct drill type/size 10) Use self-centering drill 11) Spot/center drill 12) Clean surface 13) Improve rigidity/clamp 14) Tighten holder 15) Use straight flute 16) Use stub length 17) Place further up holder 18) Use three-flute 19) Use slower helix 20) Use parabolic design 21) Change point style 	

Trouble Shooting for Ultra-Tool® Carbide Reamers

Problem	Cause	Solution
Chatter	<ul style="list-style-type: none"> High cutting speed Feed rate too low Workpiece movement Toolholder rigidity Tool rigidity 	<ul style="list-style-type: none"> Lower RPM or increase feed rate Increase feed rate Tighten workpiece rigidity Tighten toolholder or reduce float Use shorter tool, place further up holder
Tool Wear / Chipping	<ul style="list-style-type: none"> Incorrect feed rate Incorrect speed Poor hole condition Abrasive material Poor chip evacuation Poor coolant Insufficient coolant Workpiece alignment Excessive stock removal 	<ul style="list-style-type: none"> Increase feed rate (typically) Reduce speed (typically) Work-hardened hole; change drilling type Use proper coolant, coated reamer Use/increase coolant, use helical reamer Replace coolant or correct mixture Increase coolant volume Use bushing, floating holder, lead chamfer Use larger diameter starter drill
Tool Breakage	<ul style="list-style-type: none"> Incorrect feed rate Incorrect speed Tool wear Bottoming of hole Coolant conditions Insufficient stock removal Poor set up Excessive stock removal 	<ul style="list-style-type: none"> Increase feed rate (typically) Reduce speed (typically) Sharpen or replace reamer Adjust stop depth, check preset Increase, replace, or correct coolant Use smaller diameter starter drill Use bushing, floating toolholder Use larger diameter starter drill

Ultra-Tool® Carbide Reamers Continued

Problem	Cause	Solution
Poor Finish	<ul style="list-style-type: none"> Feed rate too low Insufficient stock removal Poor hole condition Poor coolant Insufficient coolant 	<ul style="list-style-type: none"> Increase feed rate Use smaller diameter starter drill Work-hardened hole; change drilling type Replace/correct coolant mixture Increase coolant volume
Hole Tolerance	<ul style="list-style-type: none"> Workpiece alignment Incorrect tool size Material shrinkage Tool wear Toolholder runout 	<ul style="list-style-type: none"> Use bushing, floating toolholder Check diameter of tool Adjust diameter for shrinkage; more coolant Sharpen or replace tool Adjust or replace toolholder

For detailed, real-time material reference, application data, and cutting tool series referrals, visit Tool Alliance's speedsandfeeds.com



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