



*The Cutting Edge **M**astered*

# Troubleshooting Guide for Burs, Endmills, Drills and Reamers



# Troubleshooting Guide for Carbide Burs - Possible Causes and Solutions

Poor Tool Life	 Excessive RPM's	 Excessive Tool Pressure	 Lack of PVD Coating		
Chipping (Minor)	 Seized/Stalled In or Against Work Piece	 Avoid drops from Significant Heights			
Fracturing (Major)	 Seized/Stalled In or Against Work Piece	 Overly Aggressive Radial Force	 Avoid drops from Significant Heights		
Braze Failure	 Excessive RPM's	 Excessive Tool Pressure	 Overheating of Carbide	 Faulty, Worn or Loose Colletting	 Avoid Contact with Solder Flange against Work Piece
Flute Plugging	 Excessive Tool Pressure	 Overly Aggressive Radial Force	 Lack of Anti-Stick Compound	 Lack of PVD Coating	 Coarser Flute Geometry Needed
Mid-shank Breakage (not due to solder failure)	 Overly Aggressive Radial Force	 Faulty, Worn or Loose Colletting	 Avoid drops from Significant Heights	 Cylindrical Overheating of Shank	
Bent Shank	 Excessive Tool Pressure	 Overly Aggressive Radial Force	 Improper Position Within Collet	 Excessive Tool Length	
Excessive Vibration	 Faulty, Worn or Loose Colletting	 Faulty Spindle Bearings	 Excessive Total Indicator Runout (Wobble)	 Excessive Tool Length	 Account for Non-Cutting Dimensions on Tapered geometries
Poor Work-piece Finish	 Adjust Flute Count				
Work-Hardening (Stainless steel, etc)	 Excessive RPM's	 Excessive Tool Pressure	 Adjust Flute Count		

## Troubleshooting Guide for Mastercut Tool Solid Carbide Endmills

Challenge	Cause	Corrective Action
Chattering	Incorrect Feed Rate	Reduce feed rate 10%
	Incorrect Speed	Check recommendations, adjust accordingly
	Low Tool holder Rigidity	Replace tool holder with higher rigidity tool holder
	Low Machine Tool Spindle Rigidity	Utilize machine with larger spindle
	Relief Angle too Steep	Switch to tool with less relief or regrind tool to reduce angle
	Low Work Piece Rigidity	Tighten or improve work piece holding method
	Depth of Cut	Reduce depth of cut
	Incorrect Tool Cut Length	Use shorter flute length and/or place tool shank deeper in tool holder
	Bad Collet	Replace collet
	Tool too Sharp	Reduce feed rate 10% for initial cut to break in tool
Breakage	Incorrect Feed Rate	Reduce feed rate
	Incorrect Depth of Cut	Reduce depth of cut
	Incorrect Tool Cut Length	Use shorter flute length - Place tool shank deeper in tool holder
	Incorrect Tool Overall Length	Use shorter tool or place tool shank deeper in tool holder
	Tool Wear	Replace tool or sharpen tool at earlier stage
	Chip Impaction	Increase coolant flow
Chipping	Incorrect Feed Rate	Reduce feed rate
	Improper Tool Break In	Reduce feed rate 10% for initial cut to break in tool
	Incorrect Feed Direction	Change cut path to climb milling
	Chatter	See recommendations for correcting chatter, pg. 2
	Low Tool Holder Rigidity	Replace tool holder with higher rigidity tool holder
	Low Machine Tool Spindle Rigidity	Utilize machine with larger spindle
	Low Work Piece Rigidity	Tighten or improve work piece holding method
	Tool Too Sharp	Reduce feed rate 10% for initial cut to break in tool
	Loose Tool Holder	Clean and tighten tool holder
Loose End Mill	Tighten tool holder	
Wear	Incorrect Speed	Check recommendations and adjust accordingly
	Incorrect Feed Rate	Reduce or increase feed rate
	Incorrect Feed Direction	Change cut path to climb milling
	Hard Material	Use tool designed for hard material - Use coated tools
	Chip Impaction	Increase coolant volume - Increase coolant pressure
	Poor Coolant Condition	Replace coolant or correct mix ratio
	Short Tool Life	Use tool designed for work piece material - Use coated tools
	Incorrect Tool Geometry	Utilize tool recommended for work piece material
Chip Impaction	Incorrect Feed Rate	Reduce feed rate
	Incorrect Speed	Check recommendations and adjust accordingly
	Incorrect Tool Geometry	Utilize tool recommended for work piece material
	Insufficient Coolant	Increase coolant volume - Increase coolant pressure
Poor Surface Finish	Incorrect Feed Rate	Reduce feed rate
	Incorrect Speed	Check recommendations and adjust accordingly
	Tool Wear	Replace tool or sharpen tool at earlier stage
	Incorrect Depth of Cut	Reduce depth of cut
	Chip Impaction	Increase coolant volume - Increase coolant pressure
	End Cut Smearing	Grind tool with wiper flat
	Incorrect Tool Geometry	Utilize tool recommended for work piece material
Burring	Tool Wear	Replace tool or sharpen tool at earlier stage
	Incorrect Feed Direction	Change cut path to climb milling
	Incorrect Speed	Check recommendations and adjust accordingly
	Incorrect Feed Rate	Reduce feed rate
	Incorrect Depth of Cut	Reduce depth of cut
	Incorrect Tool Geometry	Utilize tool recommended for work piece material
Dimensional Inaccuracy	Tool Deflection	Reduce tool length of cut - Place tool deeper in tool holder
	Incorrect Tool Geometry	Utilize tool recommended for work piece material
	Low Tool Holder Rigidity	Replace tool holder with higher rigidity tool holder
	Low Machine Tool Spindle Rigidity	Utilize machine with larger spindle - Tighten tool holder
	Low Work Piece Rigidity	Tighten or improve work piece holding method
	Bad Collet	Replace collet
	Machine Tool/Work Piece Set Up	Check for proper angular set up

## Troubleshooting Guide for Mastercut Tool Solid Carbide Drills

Challenge	Cause	Corrective Action
Drill Point Chipping	Incorrect Feed Rate	Lower feed rate
	Incorrect Speed Rate	Check speed recommendations, adjust accordingly
	Incorrect Tool Cut Length	Use shorter tool - place tool shank deeper in tool holder
	Low Work Piece Rigidity	Tighten or improve work piece holding method
	Loose Tool	Tighten or replace tool holding method
	Poor Coolant Conditions	Replace coolant or correct mix ratio (5/10 - 1 ratio)
Chisel/Point Center Breakage	Incorrect Initial Feed Rate	Lower initial feed rate 30%
	Poor Work Piece Surface Condition	Grind or clean work piece surface
	Drill Point Off Center	Re-point drill, Check set up in tool holder
	Insufficient Drill (web) Thinning	Re-point and thin drill point
Breakage/Chipping at Outer Cutting Edge	Incorrect Feed Rate	Lower feed rate
	Incorrect Speed Rate	Check speed recommendations, adjust accordingly
	Low Work Piece Rigidity	Tighten or improve work piece holding method
	Low Tool Holding Strength	Tighten tool holder or Use end mill holder
	Poor Tool Set Up - Concentricity	Minimize run out to less than .001"
	Poor Coolant Conditions	Replace coolant or correct mix ratio (5/10 - 1 ratio)
	Incorrect Tool Cut Length	Use shorter tool - place tool shank deeper in tool holder
Tool Wear Life	Incorrect Speed Rate	Check speed recommendations, adjust accordingly
	Poor Coolant Conditions	Replace coolant or correct mix ratio (5/10 - 1 ratio)
	Improper Drill Point	Re-point drill or use recommended drill point for material
	Abrasive/Tough Work Piece Material	Use coated tool (Check recommendations for coating)
Tool Breakage	Inconsistent Feed Rate	Maintain constant feed rate - Peck drill to change feed rate
	Incorrect Feed Rate	Lower feed rate
	Poor Tool Set Up - Concentricity	Minimize runout to less than .001"
	Low Tool Holding Strength	Tighten tool holder or use end mill holder
	Incorrect Tool	Check recommendations for proper drill and drill point
	Poor Coolant Conditions	Replace coolant or correct mix ratio (5/10 - 1 ratio)
	Low Work Piece Rigidity	Tighten or improve work piece holding method
Outside Margin Damage/ Wear	Poor Tool Set Up - Concentricity	Minimize runout to less than .001"
	Incorrect Tool Selection	Use recommended drill/drill point for work piece material
	Poor Coolant Conditions	Replace coolant or correct mix ratio (5/10 - 1 ratio)
	Insufficient Coolant	Increase coolant volume - Increase coolant pressure
	Chip Packing	Increase coolant volume - Increase coolant pressure

## Troubleshooting Guide for Mastercut Tool Solid Carbide Drills

Challenge	Cause	Corrective Action
Drill Body Damage Margin Wear (cont.)	Low Work Piece Rigidity	Tighten or improve work piece holding method
	Loose Tool	Tighten or replace tool holding method
	Incorrect Feed Rate	Lower feed rate
	Incorrect Speed Rate	Check speed recommendations adjust accordingly
Chip Impaction	Incorrect Speed Rate	Typically increase speed, Check speed recommendations
	Incorrect Feed Rate	Typically increase feed, Check feed recommendations
	Poor Coolant Conditions	Replace coolant or correct mix ratio (5/10 - 1 ratio)
	Insufficient Coolant	Increase coolant volume - Increase coolant pressure
	Incorrect Tool	Check recommendations for proper drill and drill point
Long/Stringy Chips	Incorrect Feed Rate	Typically increase feed, Check feed recommendations
	Incorrect Point Angle	Regrind Point to recommended angle, Replace drill
	Edge Sharpness	Hone cutting edge, Use pre-honed drill
	Inconsistent Feed Rate	Maintain constant feed rate - Peck Drill to change feed rate
Poor Surface Finish	Incorrect Speed Rate	Typically increase speed, Check speed recommendations
	Incorrect Feed Rate	Lower feed rate
	Poor Coolant Conditions	Replace coolant or correct mix ratio (5/10 - 1 ratio)
	Tool Wear	Regrind or Replace drill
Hole Accuracy	Edge Sharpness	Hone cutting edge, Use pre-honed drill
	Incorrect Tool	Check recommendations for proper drill and drill point
	Edge Sharpness	Hone cutting edge, Use pre-honed drill
	Incorrect Tool Cut Length	Use shorter tool - place tool shank deeper in tool holder
	Tool Size Accuracy	Replace tool
Tool Deflection	Poor Work Piece Surface Condition	Grind or clean work piece surface
	Incorrect Tool Cut Length	Use shorter tool - place tool shank deeper in tool holder
	Uneven Drill Point	Regrind drill point
	Incorrect Point Angle	Regrind Point to recommended angle, Replace drill
	Uneven Work Surface	Use self centering drill point or spot drill
Vibration/Noise	Edge Sharpness	Hone cutting edge, Use pre-honed drill
	Incorrect Tool Cut Length	Use shorter tool - place tool shank deeper in tool holder
	Incorrect Point Angle	Regrind Point to recommended angle, Replace drill
	Inconsistent Feed Rate	Maintain constant feed rate - Peck Drill to change feed rate
	Incorrect Speed Rate	Check speed recommendations adjust accordingly
	Low Tool Holding Strength	Tighten tool holder or use end mill holder

## Trouble Shooting Guide for Mastercut Tool Solid Carbide Reamers

Challenge	Cause	Corrective Action
Hole Accuracy	Misaligned Starter Hole	Inspect fixturing/work piece set up - Use floating tool holder or bushing
	Incorrect Speed Rate	Typically increase speed, Check speed recommendations
	Incorrect Feed Rate	Typically decrease feed, Check feed recommendations
	Incorrect Tool Diameter	Inspect tool diameter. Replace or reduce diameter
	Tool Wear	Sharpen or replace tool - Use coated tool
Poor Finish	Unequal Cutting Edges	Regrind tool with equal chamfer height or radius size
	Incorrect Feed Rate	Check feed recommendations, adjust accordingly
	Incorrect Speed Rate	Check speed recommendations, adjust accordingly
	Chatter	Increase speed rate or decrease feed rate
	Insufficient Material Removal	Reduce initial drill size - Leave 2-3% of finished size for reaming
	Spindle/Tool Holder Run out	Use bushing. Replace tool holder (Bushing to be .0003" larger than reamer)
	Damaged Tool	Regrind or replace tool
	Incorrect Tool	Use helical reamer for best finish
	Insufficient Cutting Clearance	Reduce clearance behind chamfer or radius
	Inconsistent Feed Rate	Maintain constant feed. Use power feed on manual machines
Angled Holes	Drill Deflection/Walk	Correct drilling operation (Check drill trouble shooting for corrective actions)
	Insufficient Material Removal	Reduce initial drill size. Leave 2-3% of finished size for reaming
	Misaligned Set Up	Inspect fixturing/work piece set up - Use floating tool holder or bushing
	Insufficient Chamfer Angle	Regrind reamer with higher included angle (100° - 180°)
Premature Tool Wear	Incorrect Material Removal	Drill initial hole size to leave 2-3% of finished size for reaming
	Incorrect Feed Rate	Typically decrease feed, Check feed recommendations
	Misaligned Starter Hole	Inspect fixturing/work piece set up. Use floating tool holder or bushing
	Hard or Abrasive Material	Use coated tool
	Poor Coolant Condition	Replace coolant or correct mix ratio (5/10 - 1 ratio)
	Chip evacuation	Increase coolant flow. Use helical reamer
Chatter	Incorrect Speed Rate	Typically increase speed, Check speed recommendations
	Incorrect Feed Rate	Typically decrease feed, Check feed recommendations
	Loose Tool	Tighten or replace tool holding method
	Low Work Piece Rigidity	Tighten or improve work piece holding method
	Low Tool Holding Strength	Tighten tool holder. Minimize float
	Poor Tool Set Up - Concentricity	Minimize run out to less than .0002"
	Low Tool Rigidity	Use shorter reamer - Place tool shank deeper in tool holder
Tool Breakage	Misaligned Set Up	Inspect fixturing/work piece set up. Use floating tool holder or bushing
	Drill Deflection/Walk	Correct drilling operation (Check drill trouble shooting for corrective actions)
	Tool Wear	Sharpen or replace tool - Use coated tool
	Damaged Tool	Regrind or replace tool
	Incorrect Material Removal	Check initial drill size - Leave 2-3% of finished size for reaming
	Incorrect Speed Rate	Typically decrease speed, Check speed recommendations
	Incorrect Feed Rate	Typically increase feed, Check feed recommendations
	Tool Bottoming in Hole	Reduce depth of cut - adjust stop depth

# Catalogs



Fractional Product Catalog



Sold Carbide Router Catalog



International Product Catalog

International metric  
Available in the following  
languages:

- Chinese
- French
- German
- Italian
- Japanese
- Korean
- Portuguese
- Russian
- Spanish



Quick Ship - Fractional



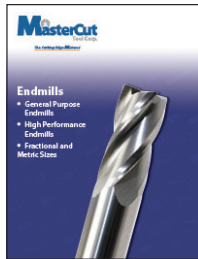
EuroQuick - Metric

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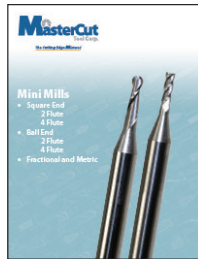
# Flyers



Overview



Endmills



Mini Mills



V4 - Variable Helix



AxMill



F45 - 45° Helix



Pro+ Performance



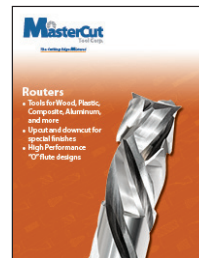
Drills



Jobber Drills



Hurricane Drills



Routers



OFX - "O" Flute Extreme



CVD Nano Routers



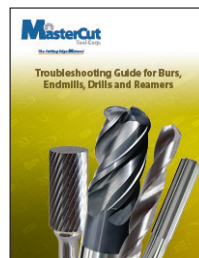
Burs



Coatings



Quality



Troubleshooting



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