

*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 |

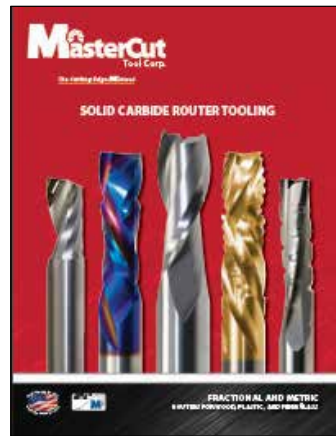
Trouble Shooting Guide for Mastercut Tool Solid Carbide Reamers

| 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 |

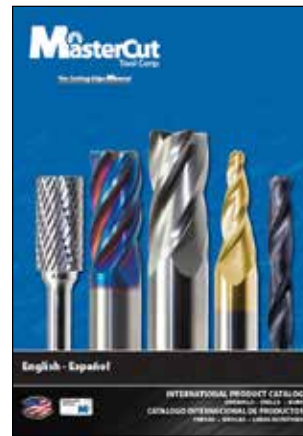
Catalogs



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



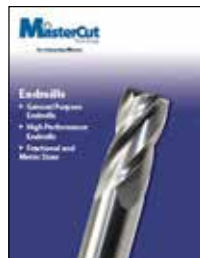
EuroQuick - Metric

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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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