

FINE BORING TROUBLESHOOTING GUIDE



Finish boring got you flustered? Print this handy cheat sheet and hang it around the shop. When issues arise, you'll be ready.

Issue 1: Poor Tool Life

Wrong Insert Grade

- Change to higher wear-resistant grade

Excessive Speed

- Reduce SFM

Poor Cooling Of Insert

- Apply through-tool coolant if possible, or increase flood coolant flow

Excessive Stock Allowance

- Decrease depth of cut

PRO TIP

Especially with harder-to-machine materials, it pays to reduce the depth of cut on final finishing paths to around 8-10 thousandths—essentially removing more material during roughing to reduce the risk of work-hardening and to save tool life.

Issue 2: Chatter & Vibration

Excessive Speed

- Reduce SFM, check cutting data tables

Extreme Length/Diameter Ratio

- Shorten tool to increase stiffness
- Increase boring bar diameter to larger size
- Change boring bar to carbide or SMART DAMPER

Wrong Insert

- Reduce nose radius of insert
- Use ground geometry inserts (e.g.: TAN18 grade)

Incorrect Stock Allowance

- Check cutting data tables

PRO TIP

A simple Length-to-Diameter (L:D) calculation for your tooling assembly can tell you if you're in the danger zone for vibration. Usually, ratio values under 4 are optimal. Anything higher and you may have to reduce speeds and feeds.

Issue 3: Poor Size Repeatability

Inaccurate Tool Changes

- Worn and/or damaged tool shank; replace
- Clean spindle and tool shank

Variation Of Stock Allowance

- Semi-finish with twin insert boring head

Excessive Spindle Looseness

- Use ground geometry inserts (e.g.: TAN18 grade)

PRO TIP

A presetter can be invaluable for inspection to help determine if tool wear is compromising hole quality.

Issue 4: Unacceptable Roundness or Position

Excessive Boring Tool Imbalance

- Change to auto-balance or balanceable head
- Balance tool assembly
- Reduce speed

Excessive Cutting Forces

- Check stock allowance and feed rate

Insufficient Workpiece Clamping

- Check for uniform workpiece clamping

Original Bore Off Position

- Semi-finish with twin insert boring head

Workpiece Non-Symmetrical

- Reduce cutting forces; change to ground insert
- Increase cutting speed, reduce feed

PRO TIP

Make sure your hole is in-spec before moving on to finishing. If your holes are out-of-round after roughing, a finish pass won't fix the problem. Fine boring heads aren't supported by inserts on both sides like rough boring heads, and they're designed to remove only a small amount of material.

Issue 5: Poor Surface Finish

Wrong Insert Radius

- Use larger insert radius

Excessive Feed Rate

- Reduce feed; maximum 25% of insert radius

Poor Chip Evacuation

- Increase bore-to-boring bar clearances
- Apply through-tool coolant; adjust nozzles
- Change insert to higher rake angle
- Check depth of cut

PRO TIP

Surface finish improves as you decrease the feed rate (keeping speed the same) and increase the size of the nose radius. But be careful not to decrease the feed rate too much, as the reduced axial depth of the cut can cause chatter.

Issue 6: Taper

Premature Insert Wear

- Change to higher wear-resistant insert grade
- Increase insert radius
- Change from ground to pressed geometry insert
- Increase coolant flow

PRO TIP

Quality, high-pressure coolant with extra lubricity matters in deep-hole boring and/or with hard-to-machine materials. This can help you get better results and save tool life.

**STILL HAVING FINE BORING ISSUES?
CALL IN THE EXPERTS.**

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