

# Fault analysis of reaming



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Influencing factors and sources of error	Relevant measures to remedy the situation
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## 1. Diameter of the reamed bore hole too large (excessive width = rejects!)

1.1 Material "widens" as result of lower density or non-rigid structure	1.1.1 Reduce reamer diameter
1.2 Concentricity of tool or machine spindle inadequate	1.1.2 Avoid widening working (see below)
1.3 Chamfer too short or highly uneven	1.2.1 Track or clamp reamers centrally; Use floating tool holder
1.4 Chip removal too high	1.3.1 Extend chamfer or reduce effective cutting angle
1.5 Lubricating agent used contains too little grease dry-reaming performed	1.3.2 Grind chamfer exactly cylindrically
1.6 Cutting velocity too high	1.4.1 Reduce machining allowance
1.7 Excessive feed	1.5.1 Use lubricants
	1.6.1 Reduce cutting velocity
	1.7.1 Decrease feed

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## 2. Diameter of the reamed bore hole too small

2.1 Highly dense material or rigid structure	2.1.1 Increase reamer diameter
2.2 Material causing increased wear	2.1.2 Avoid constricting working conditions as follows:
2.3 Tool blunt	2.2.1 Use hard metal reamers
2.4 Chamfer too long	2.2.2 Lubricate and cool carefully
2.5 Insufficient chip removal	2.3.1 Check cylindrical grinding process
2.6 Lubricant too effective	2.3.2 Remove cutting waste caused by abrasion of the face
2.7 Cutting velocity too low	
2.8 Inadequate feed	

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## 3. Reduced width at the hole exit

3.1 Feed too high where reamer emerges	3.1.1 Reduce feed just before pass
	3.1.2 Use even, controlled feed

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## 4. Cross-section of the bore hole uneven, not centered

4.1 Concentricity of tool inadequate	4.1.1 Chuck reamers centrally
4.2 Lead angle too wide	4.1.2 Guide (use reamers with pilot guide)
4.3 Chip removal too high	4.1.3 Use floating tool holder
4.4 Chamfer irregular (untrue)	4.1.4 Ensure cylindrical running of work spindle
4.5 Insufficient guidance	4.2.1 Reduce lead angle on repointing
	4.3.1 Reduce machining allowance
	4.4.1 Always grind chamfer sharp and cylindrically
	4.5.1 Accurate guidance (use reamers with pilot guide)

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## 5. Not precisely cylindrical (conical widening)

5.1 Tool-chucking not truly aligned	5.1.1 Align (spindle and tool) axis with machining with axis of spindle and work piece (bore hole) axis
5.2 Concentricity of spindle and tool inadequate	5.1.2 Use guide with lining
5.3 Chamfer inappropriate	5.2.1 Align axis
5.4 Tool-holding too strong	5.3.1 Use front reamers ( 90° chamfer)
	5.4.1 Use floating tool holder

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## 6. Surface quality not smooth enough or uneven (striation)

6.1 Tool tends to jam (formation of built-up edges)	6.1.1 Increase lead angle 6.1.2 Increase effective cutting angle 6.1.3 increase cutting velocity 6.1.4 Use suitable lubricant with low viscosity 6.1.5 Ensure good chip removal by using wide chip grooves and powerful rinsing
6.2 Reamer tooth-profile blunt (cutting waste)	6.2.1 Remove cutting waste by grinding the chipping surfaces
6.3 Chamfer defective, polished surface imperfect, transition to guide section sharp-edged	6.3.1 Precision-grind or lap chamfer 6.3.2 Rounden transition to guide section and smooth
6.4 Cutting run-out sharp-edged	6.4.1 Rounden and smooth cutting run-out
6.5 Lubricating agent used contains too little grease or dry-reaming performed	6.5.1 Use lubricants with high grease content
6.6 Uneven cutting depth (the chipping work is only performed by a few cutting edges. Often immediately gauge in recognizable due to varying chip hangings)	6.6.1 Grind chamfer and guide section evenly rounded or taper. Adjust knife-edged reamers evenly and check using setting ring accordance with DIN 369. Ensure close fit of the knives in the grooves

## 7. Chatter marks in bore hole

7.1 Lead angle too high especially at chamfer level	7.1.1 On regrinding, reduce lead angle
7.2 Chamfer unsuitable	7.1.2 Select smaller lead angle
7.3 Chucking of tool or work piece inadequate well-fitting tap wrench or secure chuck)	7.2.1 Use front reamer (90° chamfer) 7.3.1 Chuck tightly (reliable slaving using
7.4 Guide inadequate	7.4.1 Use floating tool holder or pilot-guided reamer
7.5 Inadequate concentricity	7.5.1 Ensure accurate spindle-running, chuck reamer cylindrically 7.5.2 Use reamers with pilot guides 7.5.3 Use floating tool holder
7.6 Chip removal insufficient or irregular	7.6.1 Increase machining allowance
7.7 Cutting velocity too high	7.7.1 Reduce cutting velocity
7.8 Feed too small	7.8.1 Increase feed
7.9 Feed irregular or interrupted	7.9.1 Imperative that rotational and feed movements are executed evenly and simultaneously, especially when hand-reaming