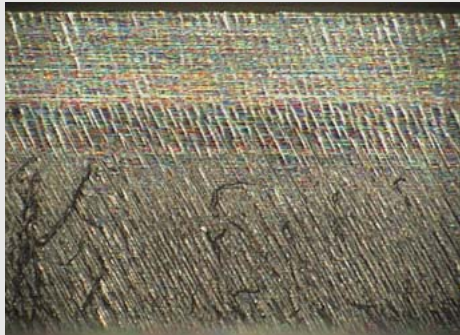
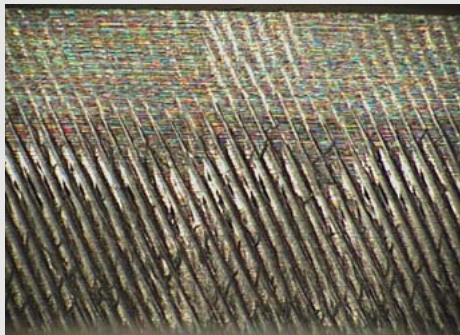


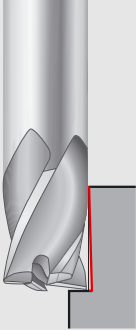
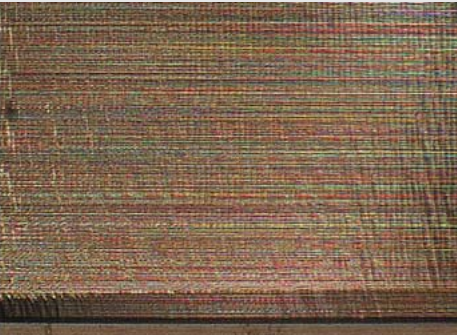


	Page
▶ Workpiece faults	355 - 356
▶ Keyway milling	357
▶ Tool faults	358 - 360


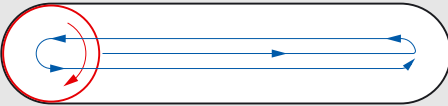
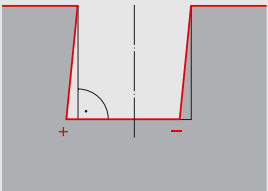
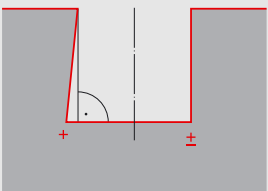
Workpiece faults

Problem	Cause	Solution
<p>Surface too rough</p> 	<ul style="list-style-type: none"> • Wrong tool selection • Wrong chipload per tooth • Work material requires coolant/lubrication/MQL 	<ul style="list-style-type: none"> • Use finish cutter Use cutter with higher spiral • Check technical data, modify chipload • Use water-soluble, oil or MQL
<p>Surface chatter</p> 	<ul style="list-style-type: none"> • Spindle not stable • Work clamping too weak • Workpiece too instable • Cutter instability • Wrong chipload per tooth • Wrong axial or radial depth of cut • Excessive run-out of tool or holder 	<ul style="list-style-type: none"> • Improve situation where possible • Use shorter cutter, and/or larger diameter • Reduce speed • Check our tech data for chiploads • Check our tech data, and optimize • Improve run-out, use shrink-fit holders
<p>Surface marks parallel to cutter axis</p> 	<ul style="list-style-type: none"> • Excessive run-out of tool or holder • Chipload per tooth too high 	<ul style="list-style-type: none"> • Improve run-out, use shrink-fit holders • Reduce chipload per tooth
<p>Surface undulating</p> 	<ul style="list-style-type: none"> • Run-out error (dominating tooth) 	<ul style="list-style-type: none"> • Improve run-out • Check cutter

Workpiece faults

Problem	Cause	Solution
<p>Surface not parallel to cutter axis</p> 	<ul style="list-style-type: none">• Cutter radially displaced	<ul style="list-style-type: none">• Reduce radial depth of cut (a_e)• Run a super-finishing cut
<p>Longitudinal marks in the work</p> 	<ul style="list-style-type: none">• Cutting edge damaged (fine wear/defects)	<ul style="list-style-type: none">• Change tool

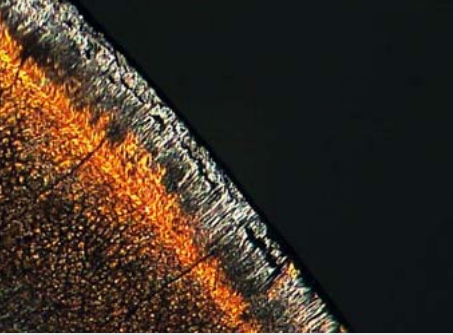

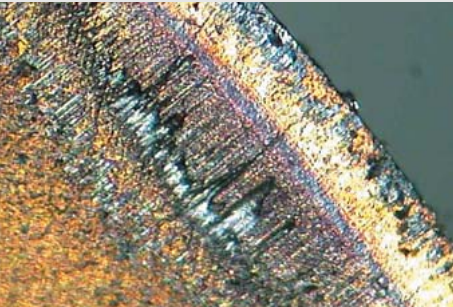
Keyway milling

Problem	Cause	Solution
<p>Keyway milling in one pass: Keyway too wide</p> 	<ul style="list-style-type: none"> • Cutters with 2 or 4 flutes may be too small due to wear • Cutters with 3 flutes • Run-out error 	<ul style="list-style-type: none"> • Use new cutter • Use 2 or 4 flute cutter • Improve run-out, use shrink-fit holder
<p>Keyway milling in frames: Keyway too tight</p> 	<ul style="list-style-type: none"> • Cutter too small (by selection or by wear) 	<ul style="list-style-type: none"> • Change size by radius correction
<p>Keyway sides not right in angle</p>  <p>Keyway sides not parallel</p> 	<ul style="list-style-type: none"> • 2 flute cutter • 3 flute cutter 	<ul style="list-style-type: none"> • Frame milling or circular milling • Frame milling or circular milling

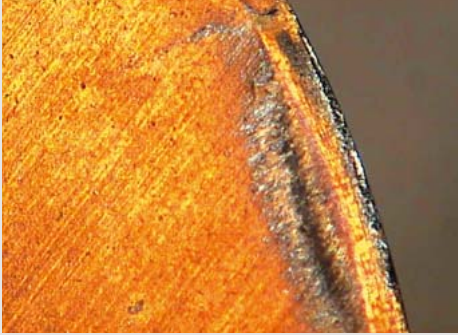

Tool faults

Problem	Cause	Solution
<p>Flank wear</p> 	<ul style="list-style-type: none"> • Insufficient cutter toughness or hardness • Too high speed • Feed rate too low 	<ul style="list-style-type: none"> • Use coated cutter • Reduce speed • Increase feed rate
<p>Notch wear</p> 	<ul style="list-style-type: none"> • Speed too high • Lack of abrasion resistance 	<ul style="list-style-type: none"> • Reduce speed • Use tougher cutter substrate
<p>Cratering (Pitting)</p> 	<ul style="list-style-type: none"> • High temperature at cutting edge • High pressure at rake face 	<ul style="list-style-type: none"> • Reduce speed • Improve coolant/cooling, use cold-air nozzle • Reduce feed rate
<p>Crater wear indexable tooling</p> 	<ul style="list-style-type: none"> • High cutting pressure at insert 	<ul style="list-style-type: none"> • Use insert with 5° positive rake

Tool faults

Problem	Cause	Solution
<p>Thermal fissures</p> 	<ul style="list-style-type: none"> • Extreme temperature fluctuation 	<ul style="list-style-type: none"> • Increase flow of coolant, use internal coolant-lubricant supply and/or high pressure supply • Do not use any coolant at all • Use cold-air nozzle
<p>Cold welding (material built-up) at the cutting edges</p> 	<ul style="list-style-type: none"> • Work material tends to be sticky • Cutting temperature too high or too small 	<ul style="list-style-type: none"> • Use coated tools • Improve coolant • Modify speed
<p>Cold welding (material built-up) at the cutting edges with indexable tooling</p> 		<ul style="list-style-type: none"> • Use inserts and holders with positive rake
<p>Short tool life indexable tooling</p>	<ul style="list-style-type: none"> • Insert too soft • Run-out error 	<ul style="list-style-type: none"> • Use tougher carbide grade • Check run out, change holder, use shrink-fit holder • Change tool shank

Tool faults

Problem	Cause	Solution
<p>Cutting edge chipping</p> 	<ul style="list-style-type: none"> • Cutting edge too brittle • Wrong tool selection • Unstable tool/holder/workpiece situation • Cutting edge too weak 	<ul style="list-style-type: none"> • Reduce feed per tooth • Use harder carbide grade • Use 0° insert instead of 5° • Use rhombic inserts
<p>Insert breaks</p>	<ul style="list-style-type: none"> • Excessive insert chipload 	<ul style="list-style-type: none"> • Reduce depth of cut and feed/speed
<p>Tool vibrates</p>	<ul style="list-style-type: none"> • Over or under stress of tool 	<ul style="list-style-type: none"> • Reduce depth of cut and/or feed/speed
<p>High wear</p>	<ul style="list-style-type: none"> • Unfavorable cutting conditions • Abrasive work material 	<ul style="list-style-type: none"> • Use climb milling • Check cutting data • Improve chip removal
<p>Vibrations at workpiece</p>	<ul style="list-style-type: none"> • Insufficient clamping 	<ul style="list-style-type: none"> • Improve clamping situation
<p>For Time-S-Cut: chip compressed</p> 	<ul style="list-style-type: none"> • a_p too large 	<ul style="list-style-type: none"> • Reduce a_p

	Page
▶ Threading Technology	362
▶ Thread Milling Technology	363
▶ Tool Clamping	364 - 365
▶ Workpiece Clamping	366 - 367
▶ Other EMUGE Catalogs	368
▶ Internet & Tool Finder	369
▶ Index of EDP Tool Identifications	370
▶ Test-A-Tool Mill Application Form	371
▶ Terms & Conditions	372