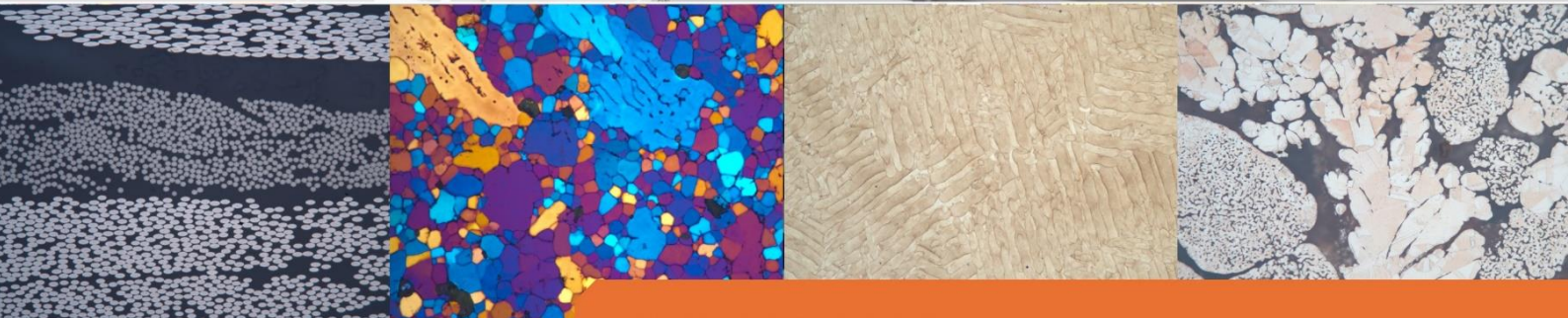
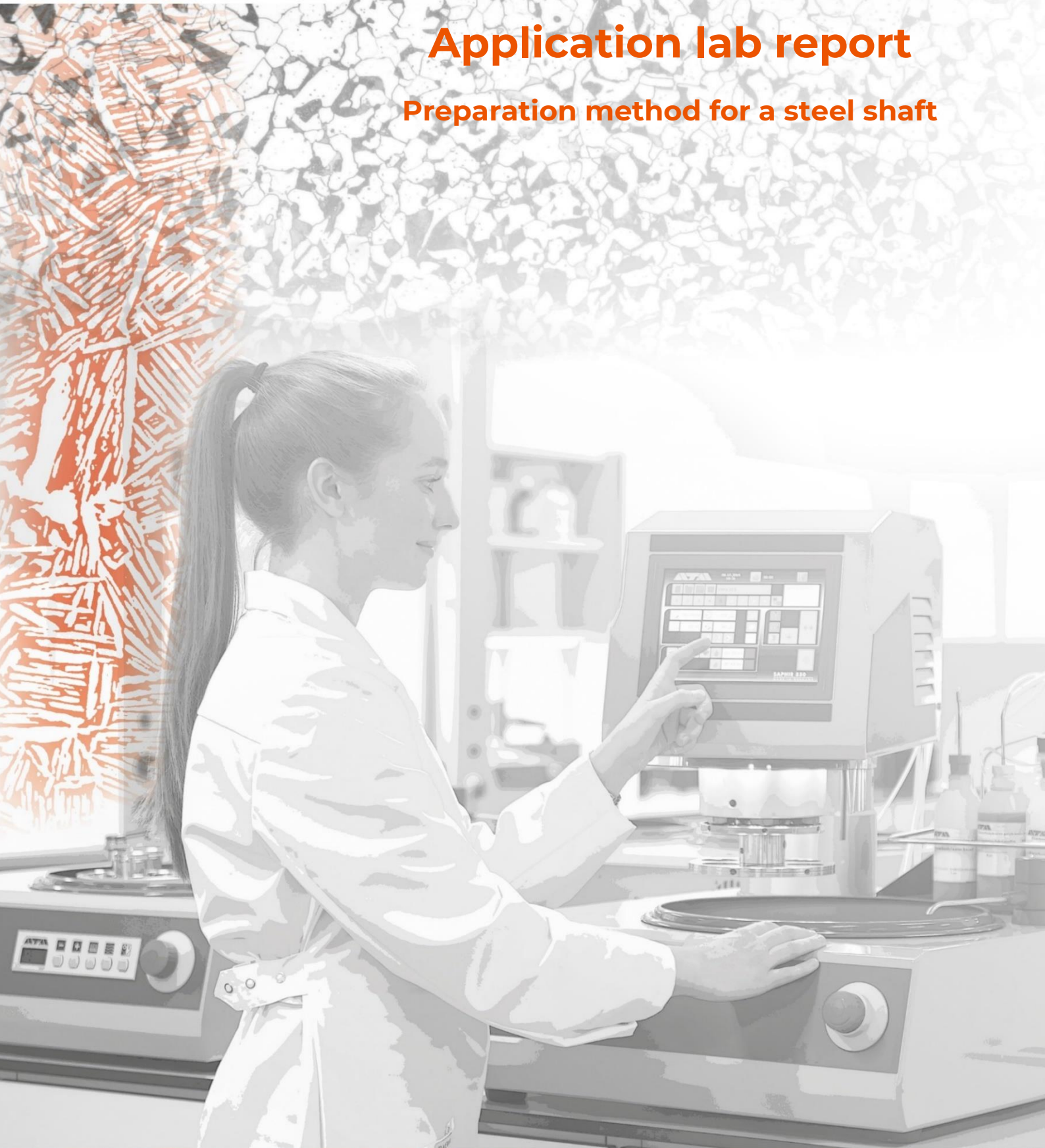


Application lab report

Preparation method for a steel shaft



QATM-Preparation method

Objective:


This report describes the cutting of a steel shaft. The Qcut 350 A was used as the cutting device. In addition, further preparation steps are described (grey colour), which were not carried out on this sample and are only given as an example.



Figure 1: As-received samples.

QATM-Preparation method

Cutting

 Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 350 A	FS-D-300A 95012533 or FS-E-300A 95012532	Coolant, QATM CoolCut, 95004146	- Qtool 80 Z2231200 - 2x Prism jaw 40 mm 02231213 - 2x Round bar jaw 70 mm slotted 02231231
Cutting method			
Cut 1 and 2 = automatic vertical cut (with Y-Axis) Cut 3 and 4 = automatic horizontal cut (with X-Axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
Cut 1 and 2 = 0,2 mm/s Cut 3 and 4 = 0,4 mm/s	Cut 1 and 2 = Without Pulse Cut 3 and 4 = >> 0,2 / << 0,4 mm	2800 RPM	
Notes			
<ul style="list-style-type: none"> - Cutting time for cut 1 = 3 minutes - Cutting time for cut 2 = 3 minutes - Cutting time for cut 3 = 26 minutes - Cutting time for cut 4 = 19 minutes - Wear of the cut-off wheel FS-D-300A per cut = 1 mm (used for cut 1,2 and 3) - Wear of the cut-off wheel FS-E-300A per cut = 13 mm (used for cut 4) 			

QATM-Preparation method



Figure 2: Overview of the cutting machine "Qcut 350 A".



Figure 3: Overview of the clamping tool "Qtool 80".

QATM-Preparation method

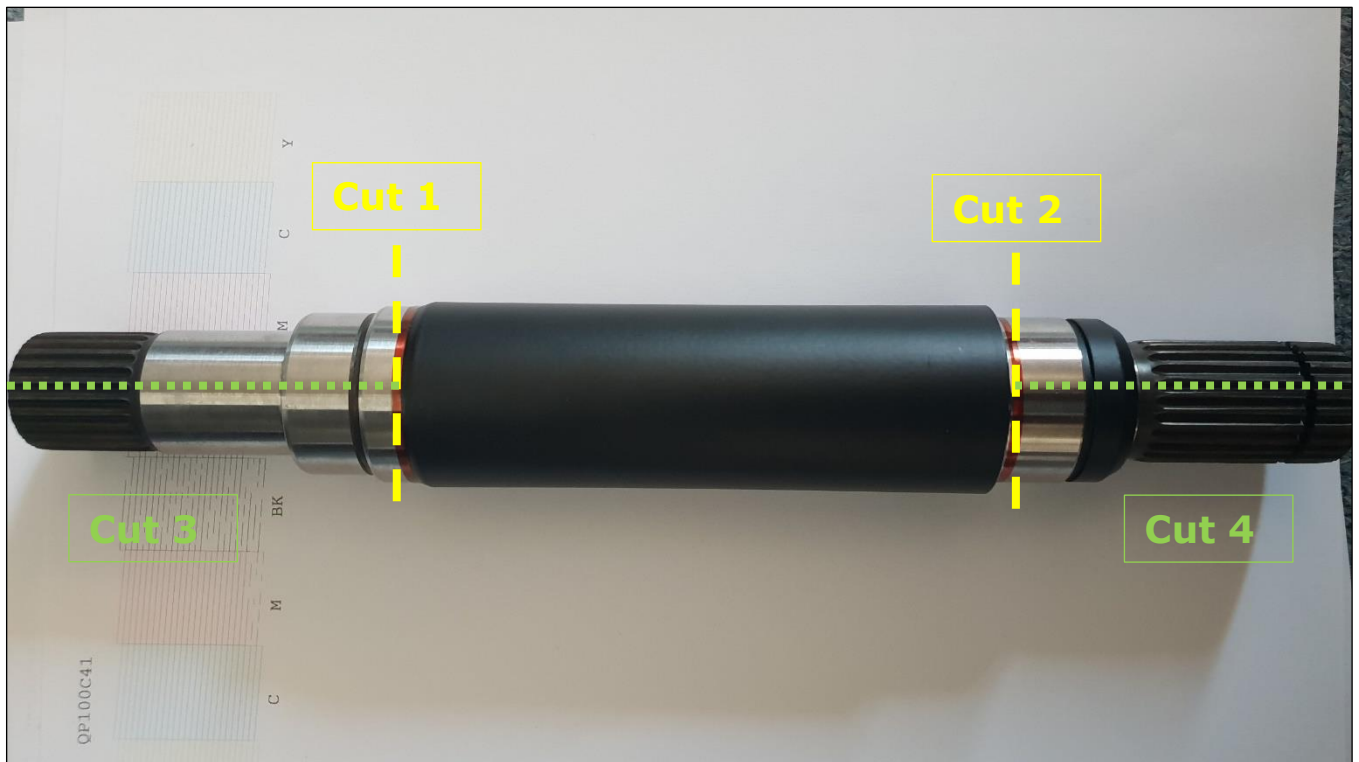


Figure 4: Overview of the cutting positions.

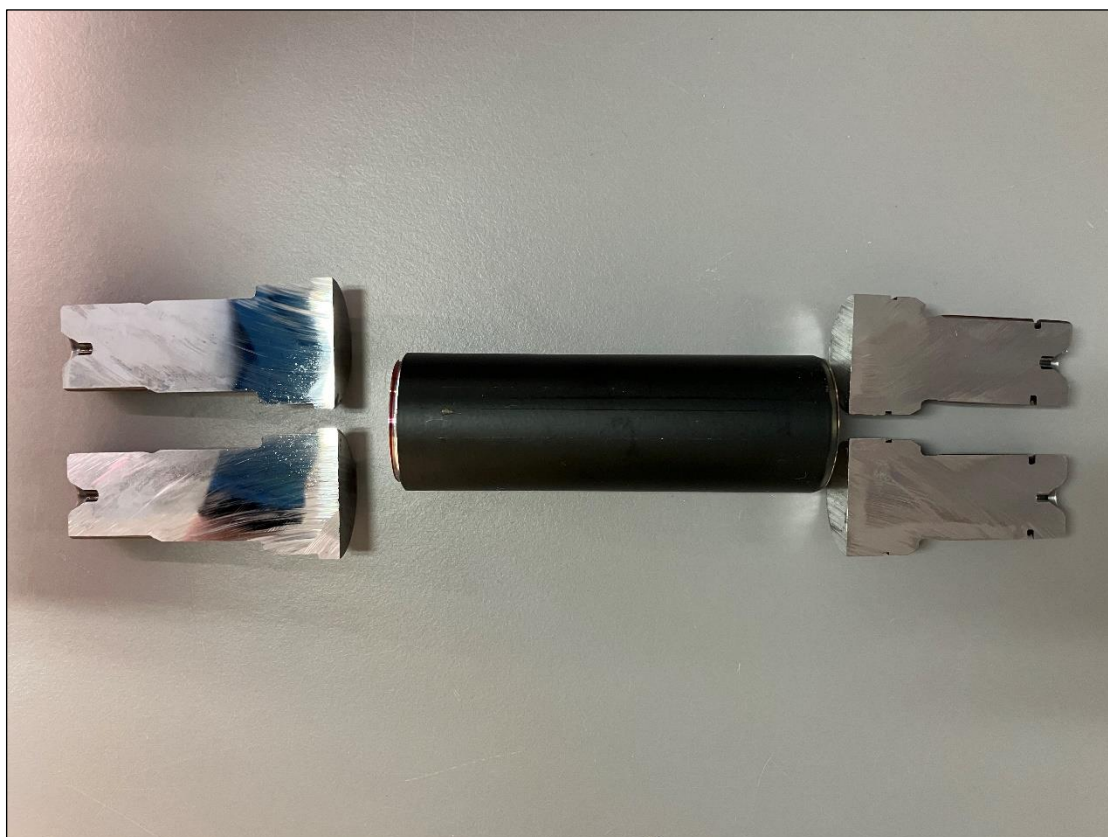


Figure 5: Overview of the sample after all cutting steps.

QATM-Preparation method



Figure 6: Cutting position 1 – BEFORE cutting process (Qtool 80 with 2x prism jaw 40 mm).

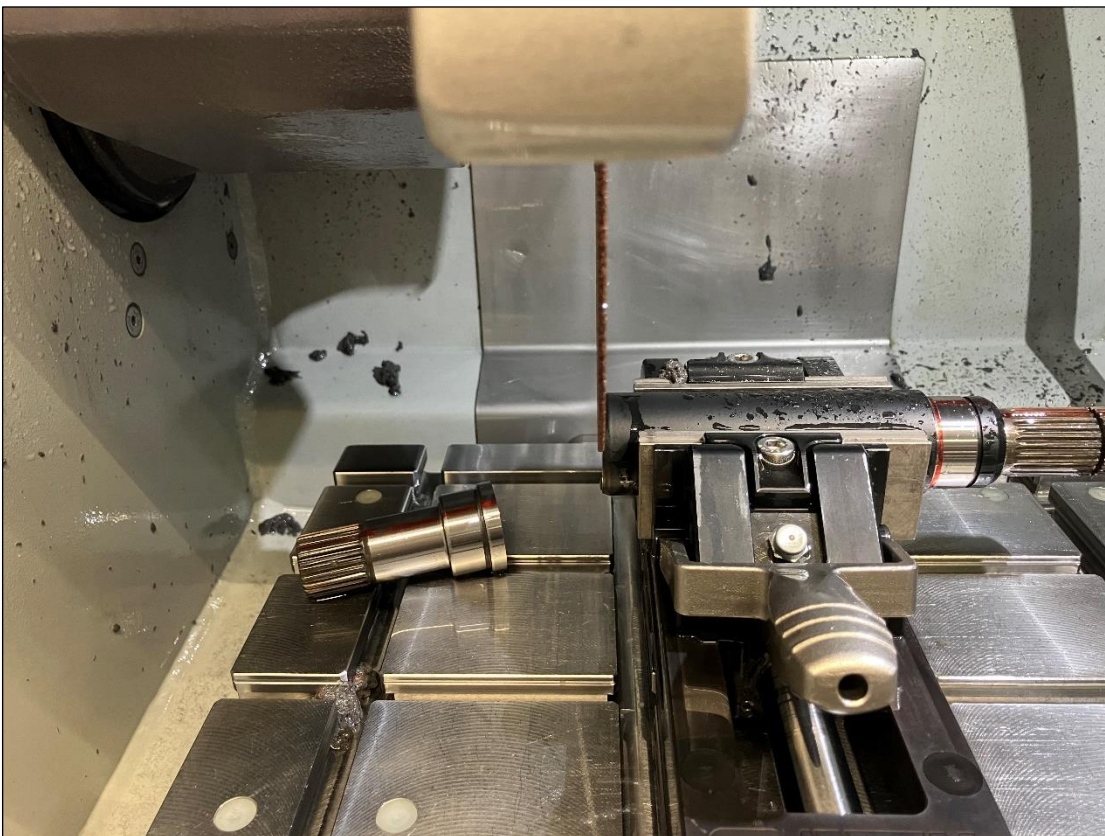


Figure 7: Cutting position 1 – AFTER cutting process (automatic vertical cut with Y-Axis).

QATM-Preparation method



Figure 8: Cutting position 2 – BEFORE cutting process (Qtool 80 with 2x prism jaw 40 mm).



Figure 9: Cutting position 2 – AFTER cutting process (automatic vertical cut with Y-Axis).

QATM-Preparation method

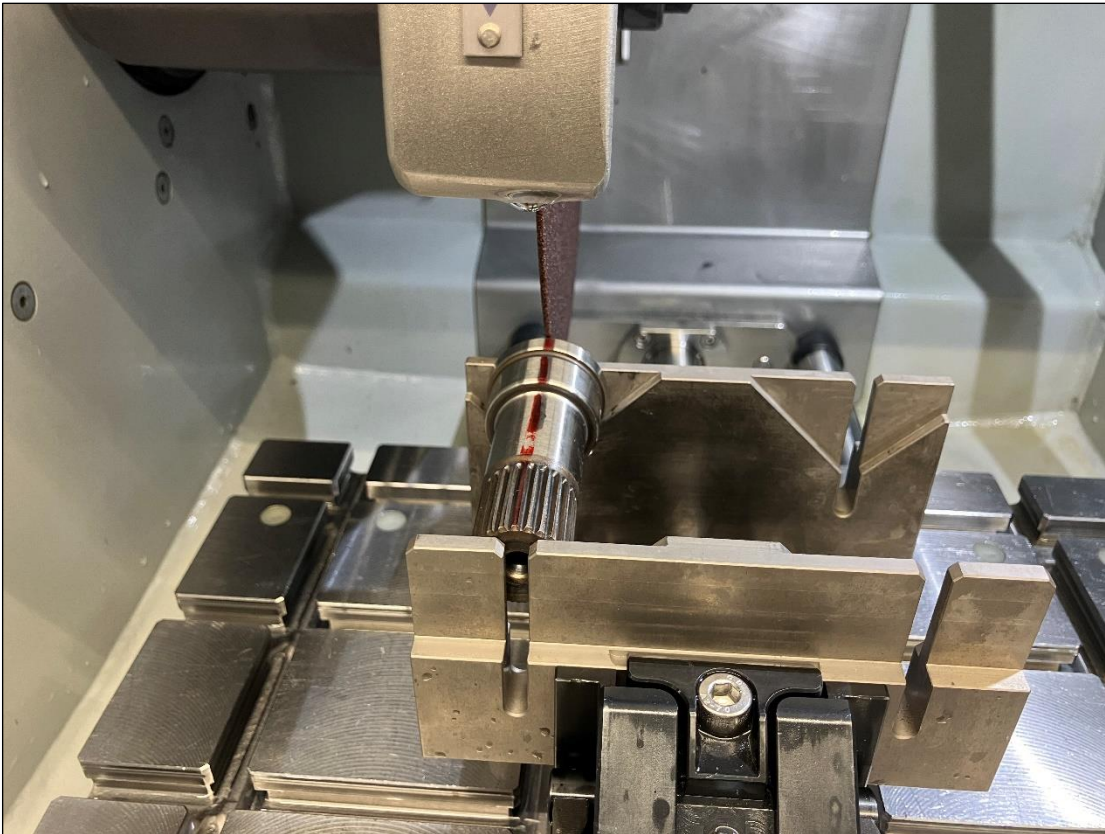


Figure 10: Cutting position 3 – BEFORE cutting process (Qtool 80 with 2x round bar jaw).

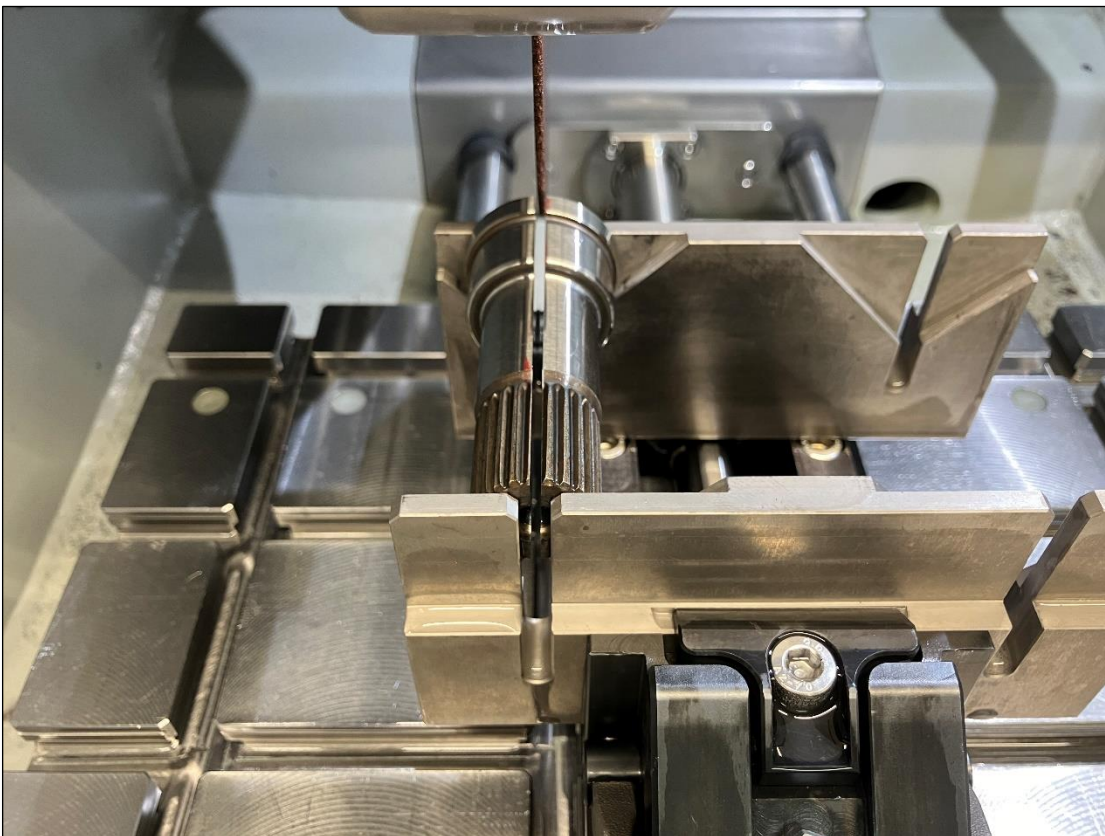


Figure 11: Cutting position 3 – AFTER cutting process (automatic horizontal cut with X-Axis).

QATM-Preparation method

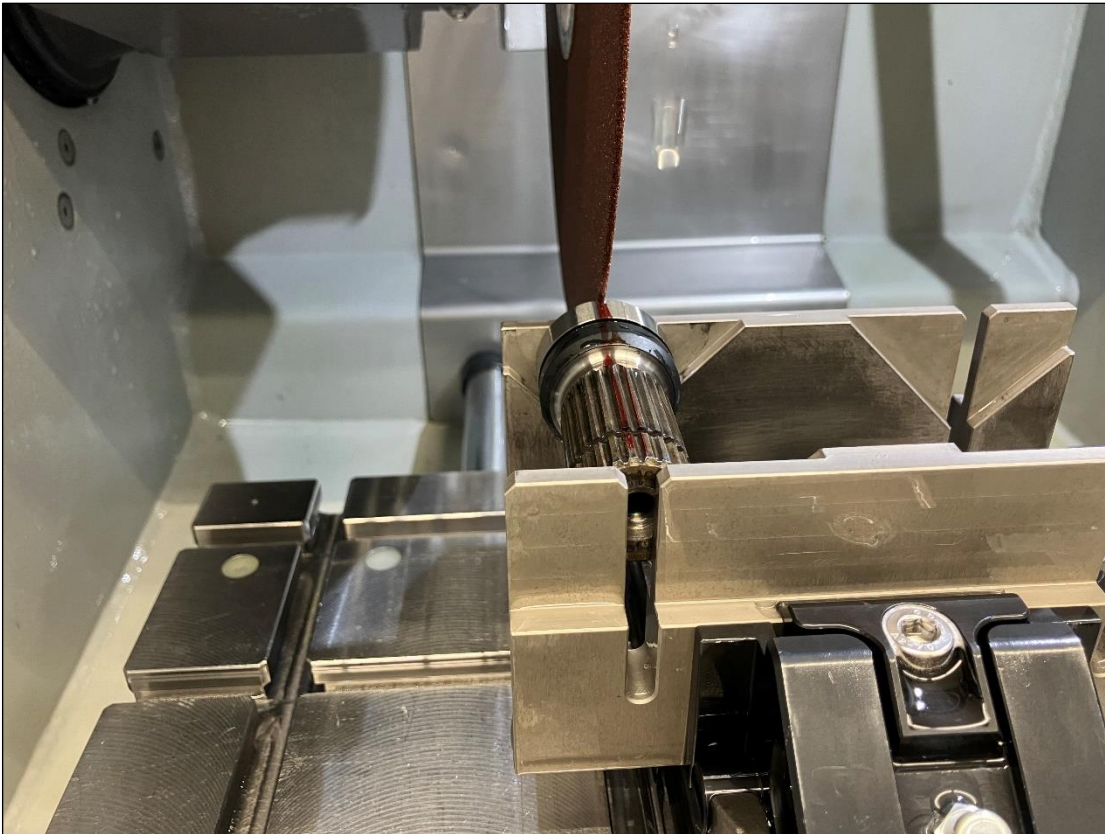



Figure 12: Cutting position 4 – BEFORE cutting process (Qtool 80 with 2x round bar jaw).




Figure 13: Cutting position 4 – AFTER cutting process (automatic horizontal cut with X-Axis).

QATM-Preparation method

Hot mounting










 Mounting					
Device	Consumable	Heating time	Temperature	Pressure	Cooling time
Qpress 50	EPO black	5 Minutes	200° C	250 bar	4 Minutes
Filler or additional consumables	Heating power	Pressure mode	Cooling power		
Bakelit	100 %	Pressure from the beginning	100 %		
Notes					
<ul style="list-style-type: none"> - Mould ø 40 mm - Use 22 g EPO black and 14 g Bakelite for one sample ø 40 mm 					

Cold mounting (alternative to hot mounting)

 Mounting					
Consumable	Mixing ratio Volume	Curing time	Mold	Additional equip.	
KEM 20	Powder : Liquide 2 : 1	15 Minutes	PP, ø 40 mm	<ul style="list-style-type: none"> - Mixing cup - Mixing stick - Dosing spoon - Pressure unit 	
Notes					
- Use 15 g Powder and 11 g Liquide for one sample ø 40 mm					

QATM-Preparation method

Grinding/Polishing

Device	Samples holder	Pressure mode				
Qpol 300 A1 Eco +	Z5445025	Single				
Step	MEDIUM		 RPM	 N	 min	
 Planar grinding	Galaxy GREEN or Quasar 46 µm	H ₂ O	200	100 ◀ ▶	35	Till flat (3:00)
 Pre-Polishing	Contero H	Dia Complete Poly, 9 µm	150	100 ◀ ▶	30	5:00
 Polishing	GAMMA	Dia Complete Poly, 3 µm	150	100 ▶ ▶	30	5:00
 Polishing	ZETA	Dia Complete Poly, 1 µm	150	100 ▶ ▶	30	2:00
 Etching (chem.)	3% alc. NITAL					0:05

Notes

- Pre-dosing for 9 µm: 3 s
Dosing interval and dosing duration for Dia. Suspension 9 µm:
Every 15 s for 1,3 s
- Pre-dosing for 3 µm and 1 µm: 3 s
Dosing interval and dosing duration for Dia. Suspension 3 µm, 1 µm:
Every 30 s for 1,3 s

QATM-Preparation method

Conclusion:

The cutting process can be done with the Qcut 350 A very well. The cutting time of 3 minutes – using the cut-off wheel FS-D-300A - for the vertical cutting steps is acceptable. Furthermore, the cut-off wheel wearing is very low.

The cutting time for the horizontal cutting steps – using cut-off wheel FS-D-300A - is long but necessary due to the heat-treated edge areas. This cutting step can be done faster by using cut-off wheel FS-E-300A. Nevertheless, one should consider that wearing of this cut-off wheel will be higher.

The preparation steps listed in **grey** could be carried out afterwards and are only a recommendation without having tested them out on the sample.