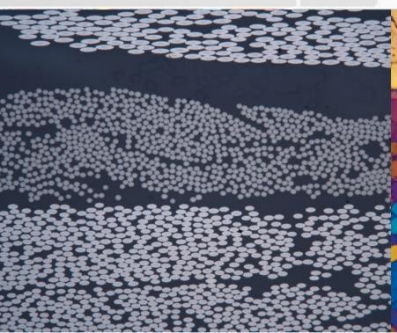
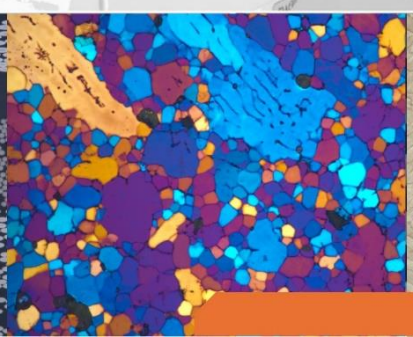
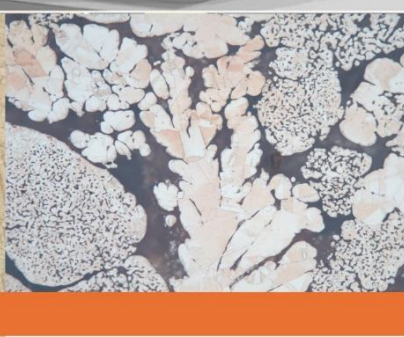
QATM
QUALITY ASSURED

Application lab report

Preparation/ electrolytic polishing of aluminum samples







QATM-Preparation method

Objective:

This report shows the electrolytic polishing of unmounted aluminum samples (Figure 1) with our device **Qetch 1000**. The weld seam area should be made visible in order to be able to evaluate the weld seam. The preparation steps in gray fond are only a recommendation for cutting, mounting and grinding/polishing.

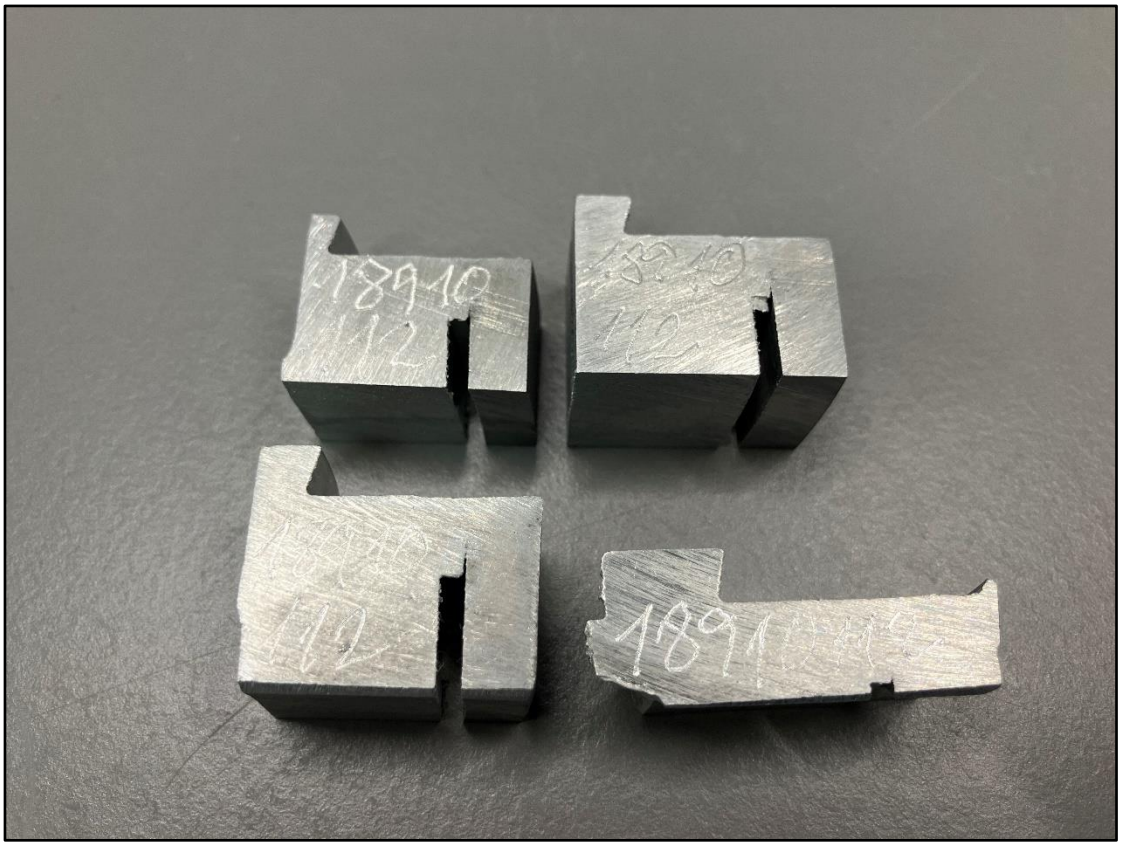


Figure 1: As-received samples.

QATM-Preparation method

Cutting

Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 250 A	NF-A-250SC, 95012531	ATM CoolCut, 95004146	- Qtool 80 Vario Z2231200
Cutting method			
Automatic horizontal cutting method (with X-Axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
0,3 mm/s	Without pulse	3015 RPM	
Notes			

Cold mounting

Mounting				
Consumable	Mixing ratio	Curing time	Mold	Additional equip.
KEM 20	Volume Powder : Liquide 2 : 1	15 Minutes	PP, ø 40 mm	- Dosing spoon - Mixing cup - Mixing stick
Notes				
- we recommend to mount the sample/s in the way that the sample backside is not covered with the mounting resin. The free backside of the sample will allowed direct contact of the mounted aluminum piece				

QATM-Preparation method

Grinding/Polishing

Device	Samples holder	Pressure mode				
Qpol 300 A1 Eco+	Z5446023	Single				
Step	**MEDIUM**		**RPM**		**N**	**min**
Planar grinding	SiC-Paper P320	H_2O	150	100 ◄ ►	15	Till flat (0:30 – 0:45)
Grinding	SiC-Paper P600	H_2O	150	100 ◄ ►	15	0:45
Grinding	SiC-Paper P1200	H_2O	150	100 ◄ ►	15	0:45
Polishing	SIGMA	Diamond susp. Wb. Poly, **3 µm** + wb. Lubricant	150	100 ►►	30	6:00
Fine polishing	OMEGA	Eposil F **0,1 µm**	100	90 ◄ ►	20	4:00 (Rinsing time: 10 s)

Notes

- Pre-dosing for 3 µm: 3 s
  Dosing interval and dosing duration for diamond susp. 3µm:
  Every 35 s for 1,5 s
- Dosing interval and dosing duration for lubricant:
  Every 75 s for 1,5 s
- Dosing interval and Dosing duration for fine polishing suspension:
  Every 20 s for 1,0 s

QATM-Preparation method

Electrolytic polishing and etching

Device					
Qetch 1000					
Step	**Electrolyte**	**Voltage [V]**	**Pumping power [%]**	**Mask [cm²]**	**Duration [min]**
Electrolytic polishing					
Polishing (electrolytic)	Electrolyte K1	10	50	1,5	0:20
Electrolytic Etching					
Etching (electrolytic)	-	-	-	-	-

Notes

- before using the Qetch 1000 the sample/s must be pre-grind with SiC-Paper, P600

QATM-Preparation method

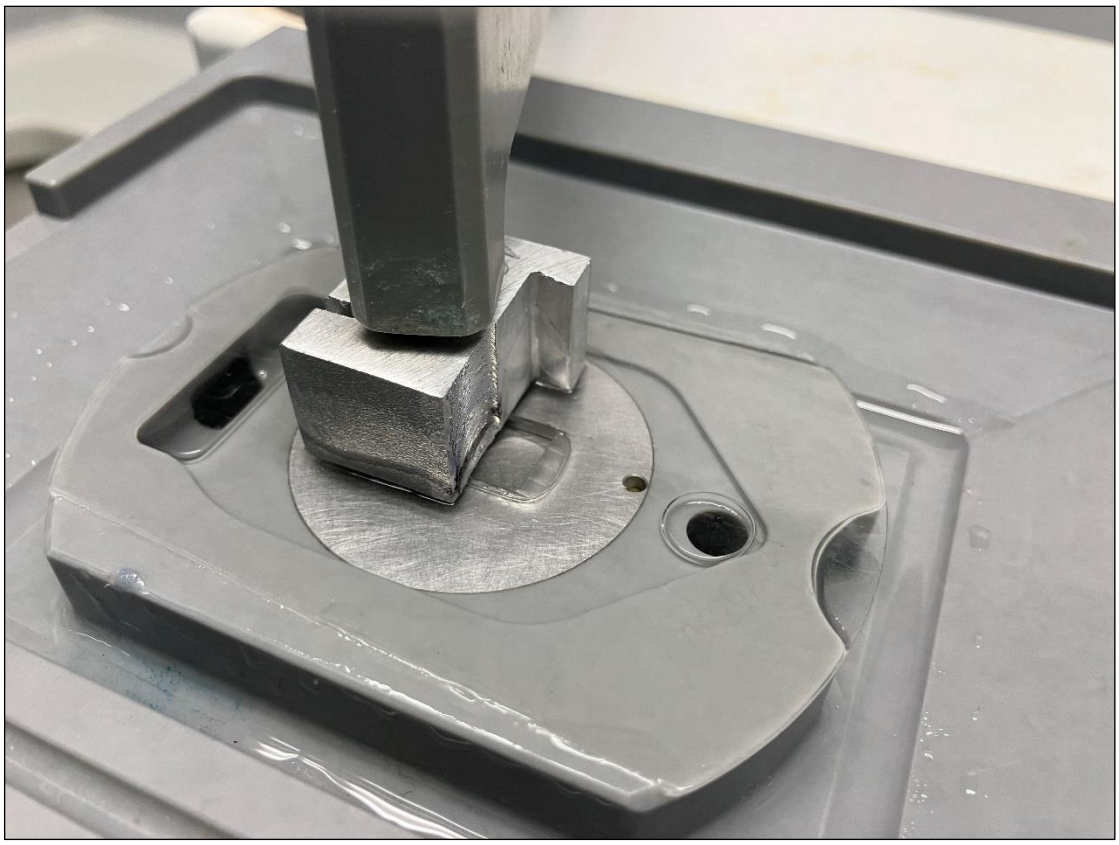


Figure 2: Overview of the sample placed on the mask.

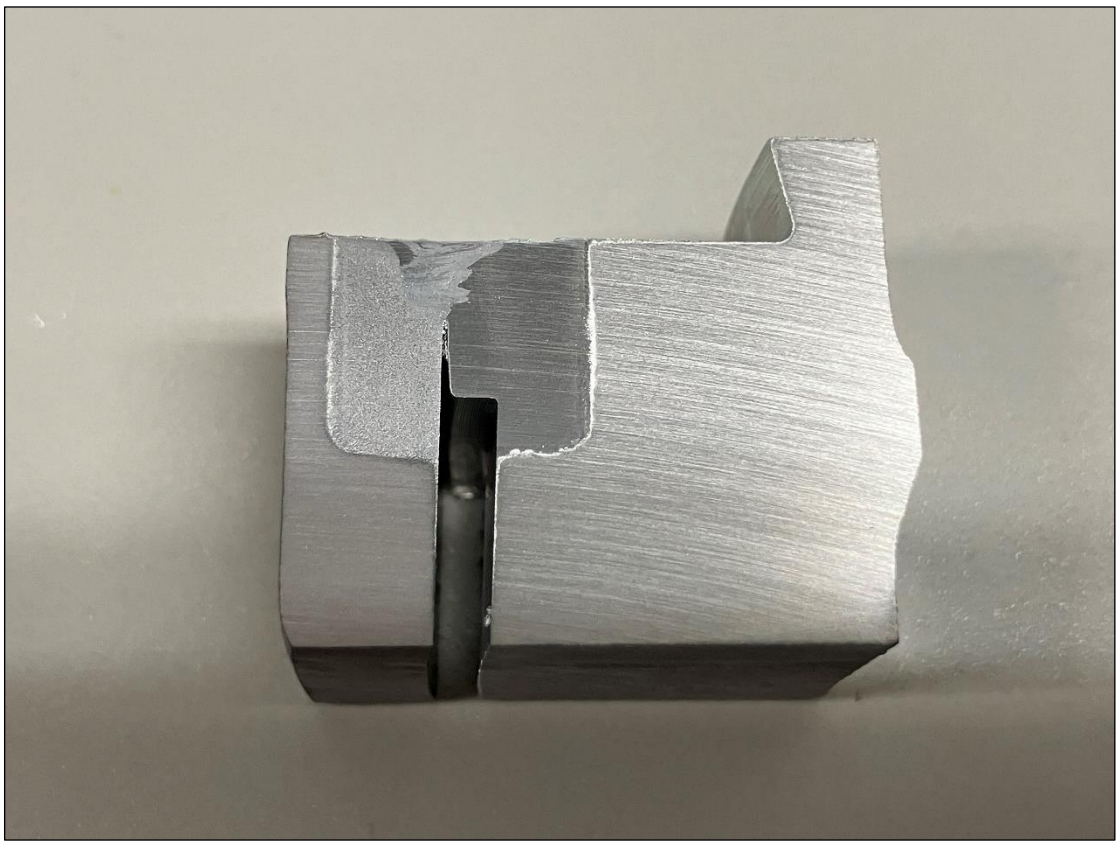


Figure 3: Sample after the electrolytical polishing process with visible indent area.

QATM-Preparation method

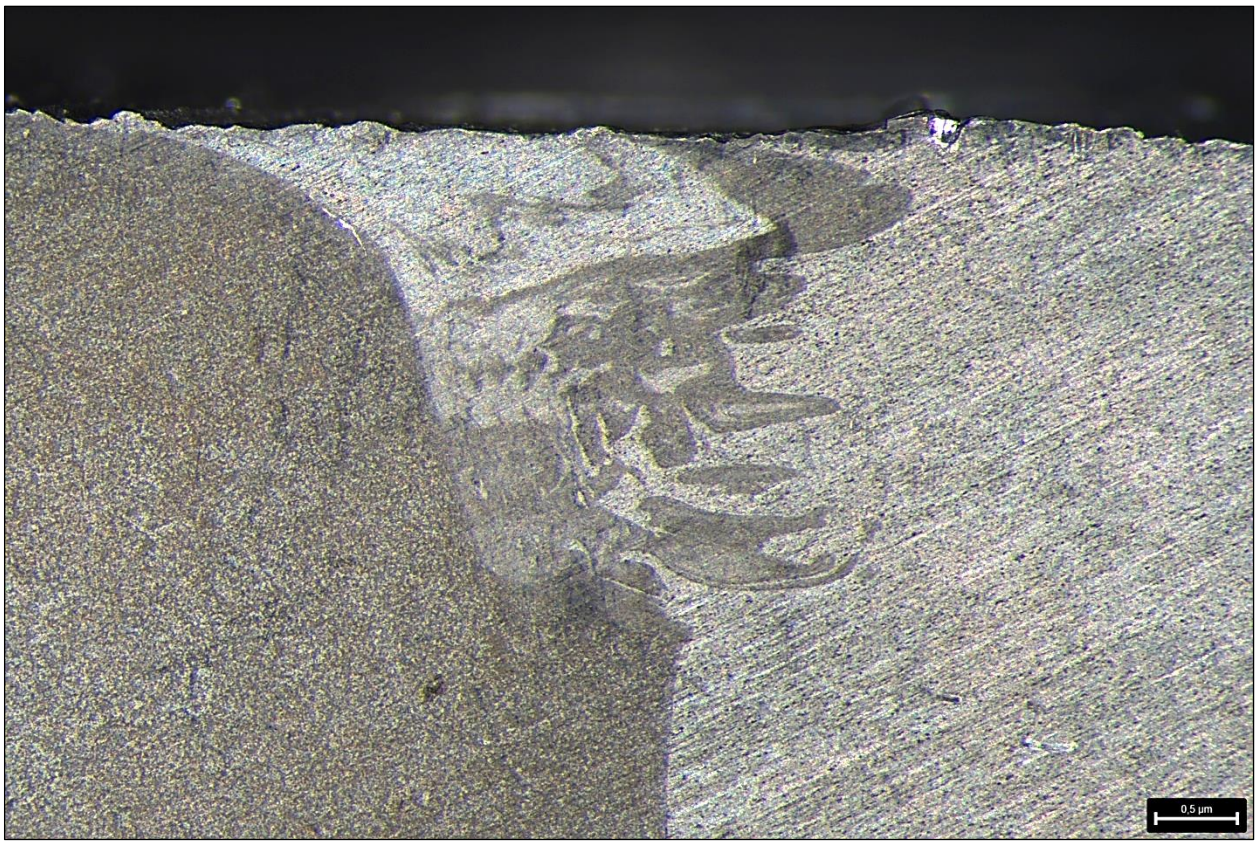


Figure 4: Sample A – like we have received – 25 x

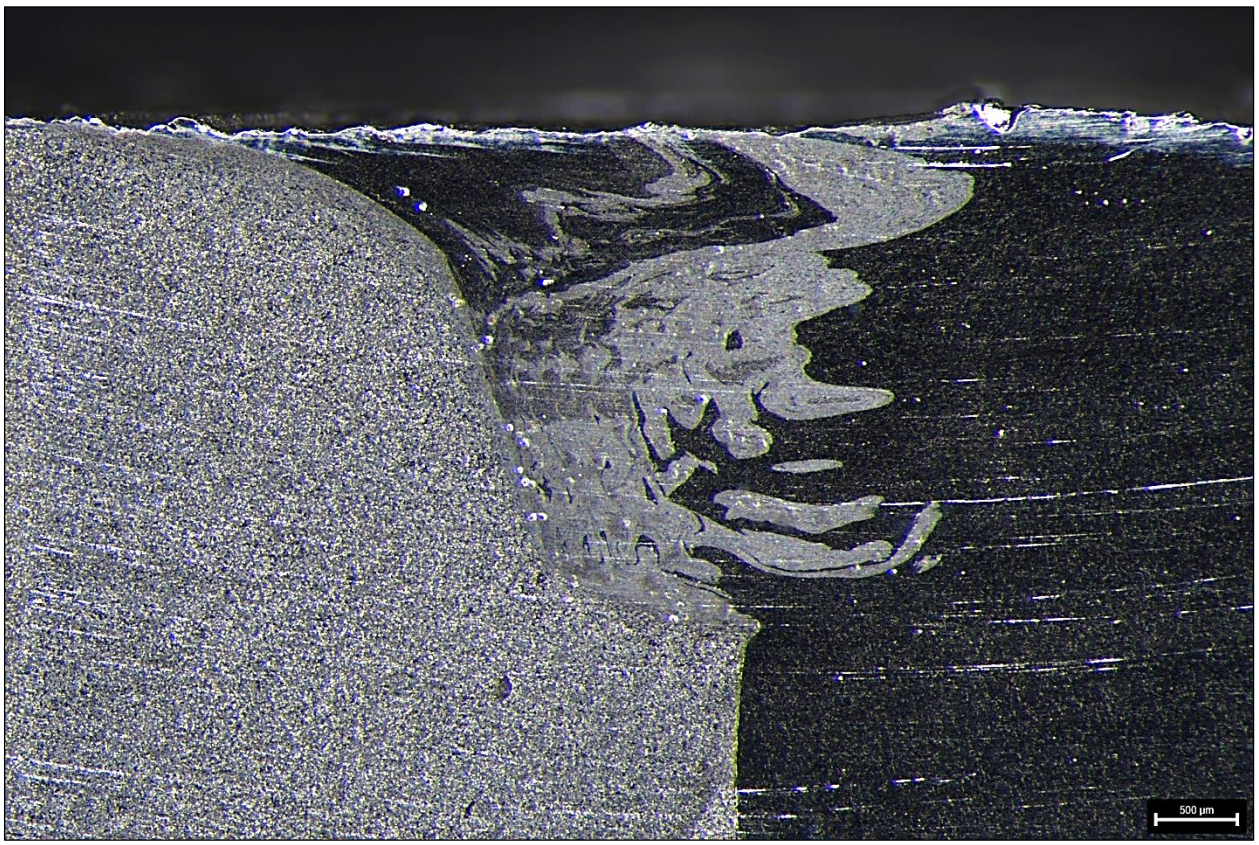


Figure 5: Sample A - after Qetch 1000 – 10V 20s (pre-grinded with SIC 600) – 25 x

QATM-Preparation method

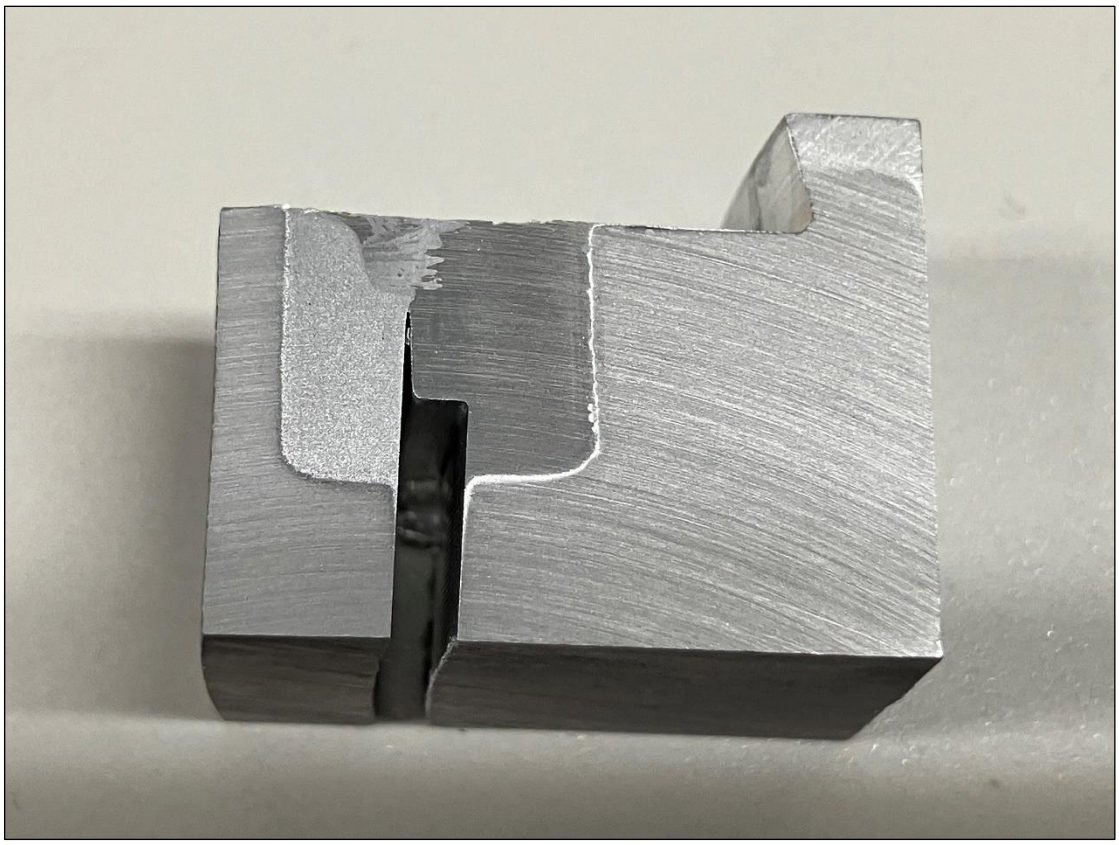


Figure 6: Overview of sample B after electrolytical polishing process with Qetch 1000

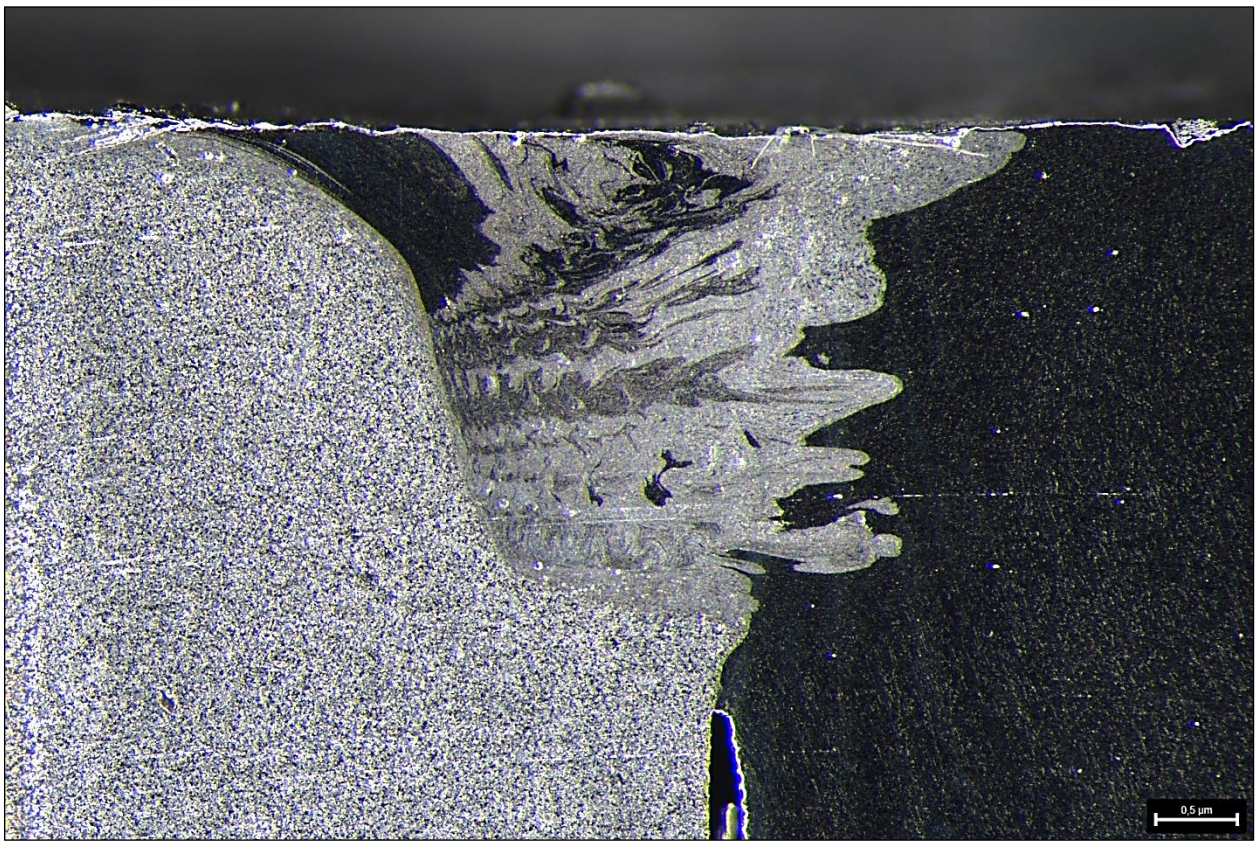


Figure 7: Sample B - after Qetch 1000 – 10V 20s (pre-grinded with SIC 600) – 25 x

QATM-Preparation method

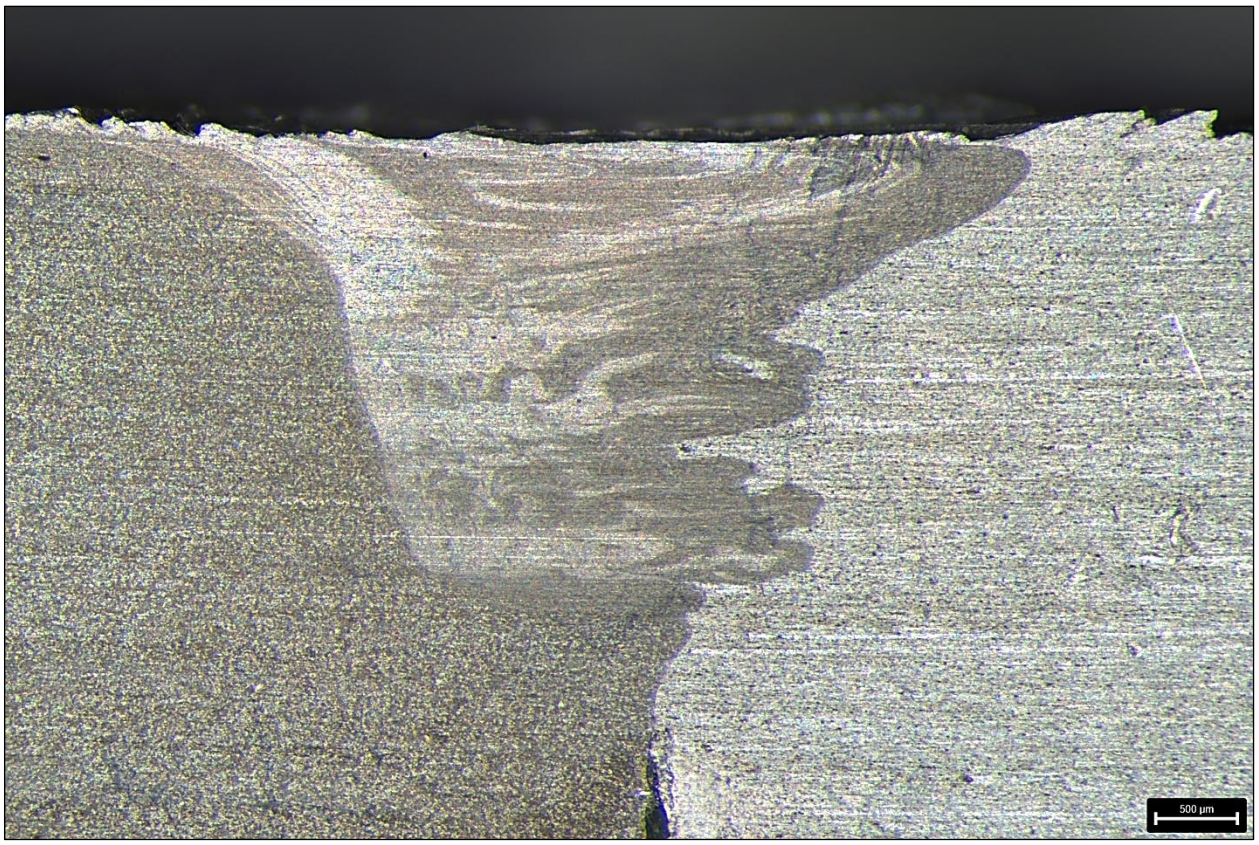


Figure 8: Sample C – like we have received – 25 x

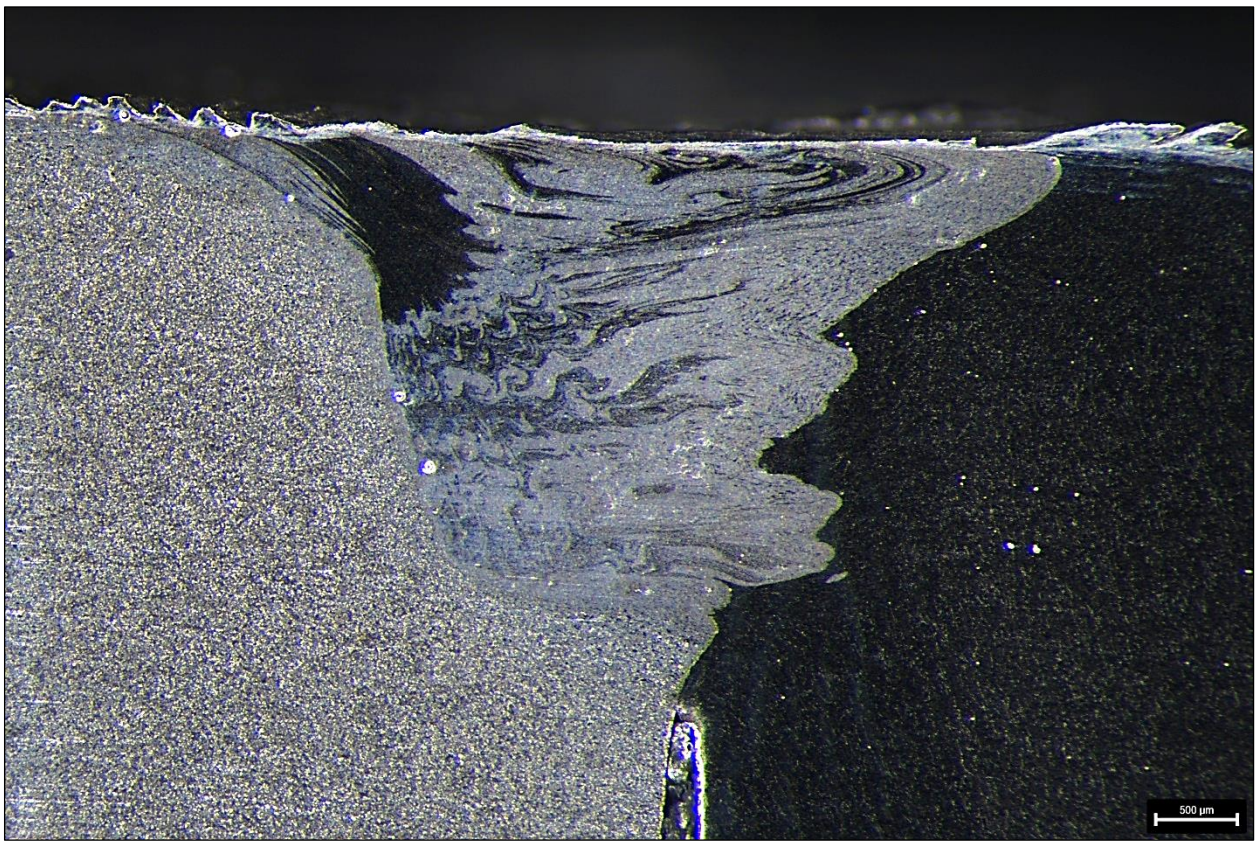


Figure 9: Sample C - after Qetch 1000 – 10V 20s (pre-grinded with SIC 600) – 25 x

QATM-Preparation method

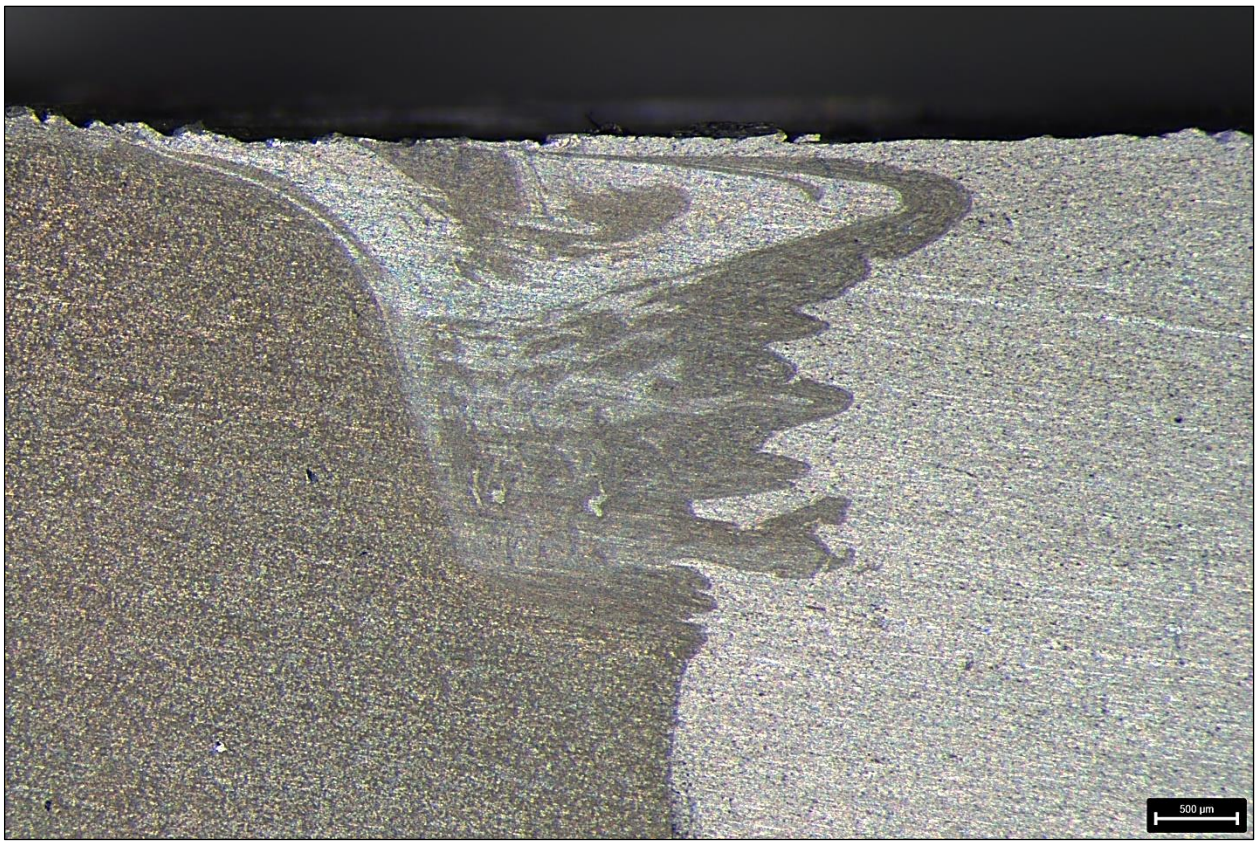


Figure 10: Sample D – like we have received – 25 x

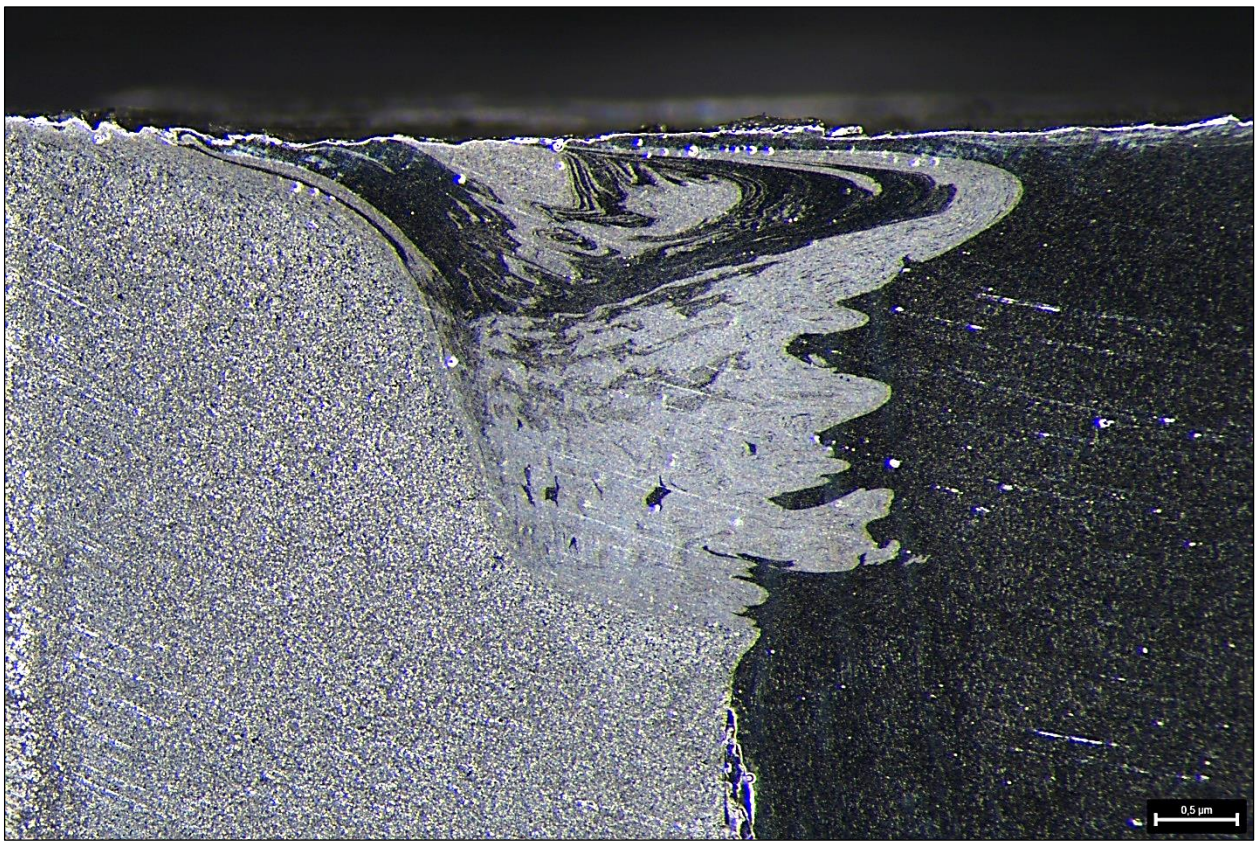


Figure 11: Sample D - after Qetch 1000 – 10V 20s (pre-grinded with SIC 600) – 25 x

QATM-Preparation method

Conclusion:

The Qetch 1000 can be used very well for the preparation of the weld seam area. The weld seam is very clearly visible. A macroscopic analysis could be performed. Before starting the process with the Qetch 1000 – the sample must be pre-grind with SIC-Paper, P600.

The preparation steps marked in grey are recommendations without having carried them out.