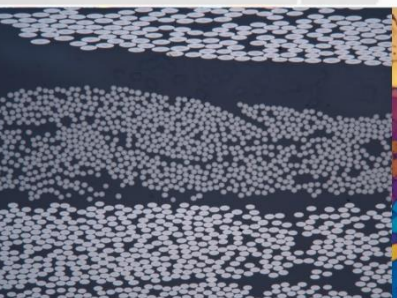
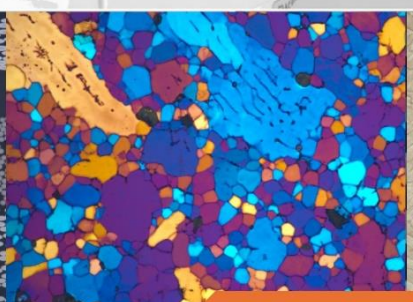
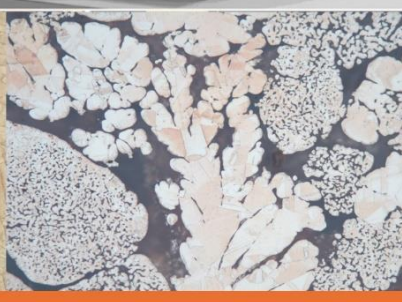
QATM
QUALITY ASSURED

Application lab report

Preparation of an aluminum weld seam







QATM-Preparation method

Objective:

This report shows how to prepare a welding seam of a battery cell housing. The housing is made of aluminum. There are two preparation methods shown in this report. One is manual and the other one is semi-automatical. The manual preparation was carried out with the Qcut 250 M, KEM 20 with pressure appliance and Qpol 250 M1. Semi-automatic preparation was carried out using the Qcut 150 A, KEM 20 with pressure appliance and Qpol 250 A1 Eco. Detailed parameters and images can be found in the report.

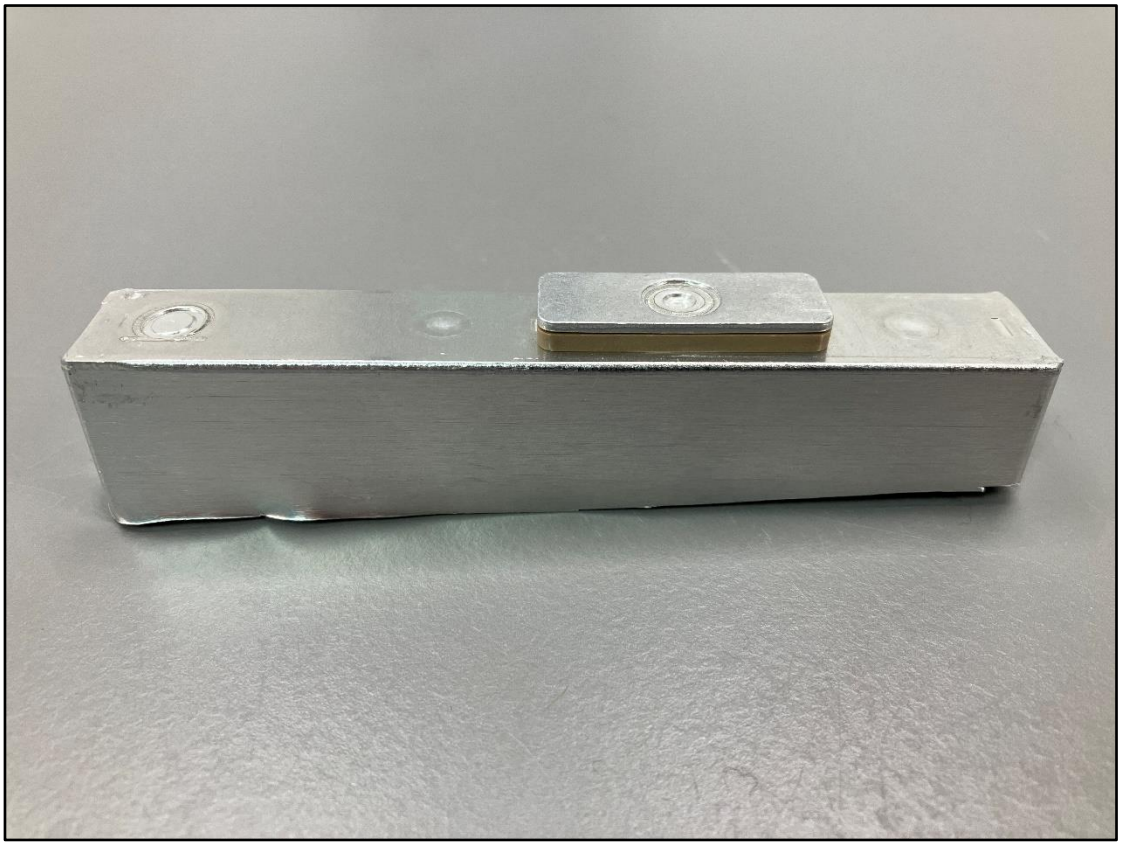


Figure 1: As-received samples.

QATM-Preparation method manually

Cutting

Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 250 M	NF-A250 (95012531)	ATM CoolCut (95004146)	-Qtool 40 S (Z2270201) -2x T-Nut M5x12 (95017406)
Cutting method			
Vertical cut (Y-axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
Manually	Manually	2850 RPM	
Notes			

Figure 2: Qcut 250 M.

QATM-Preparation method manually

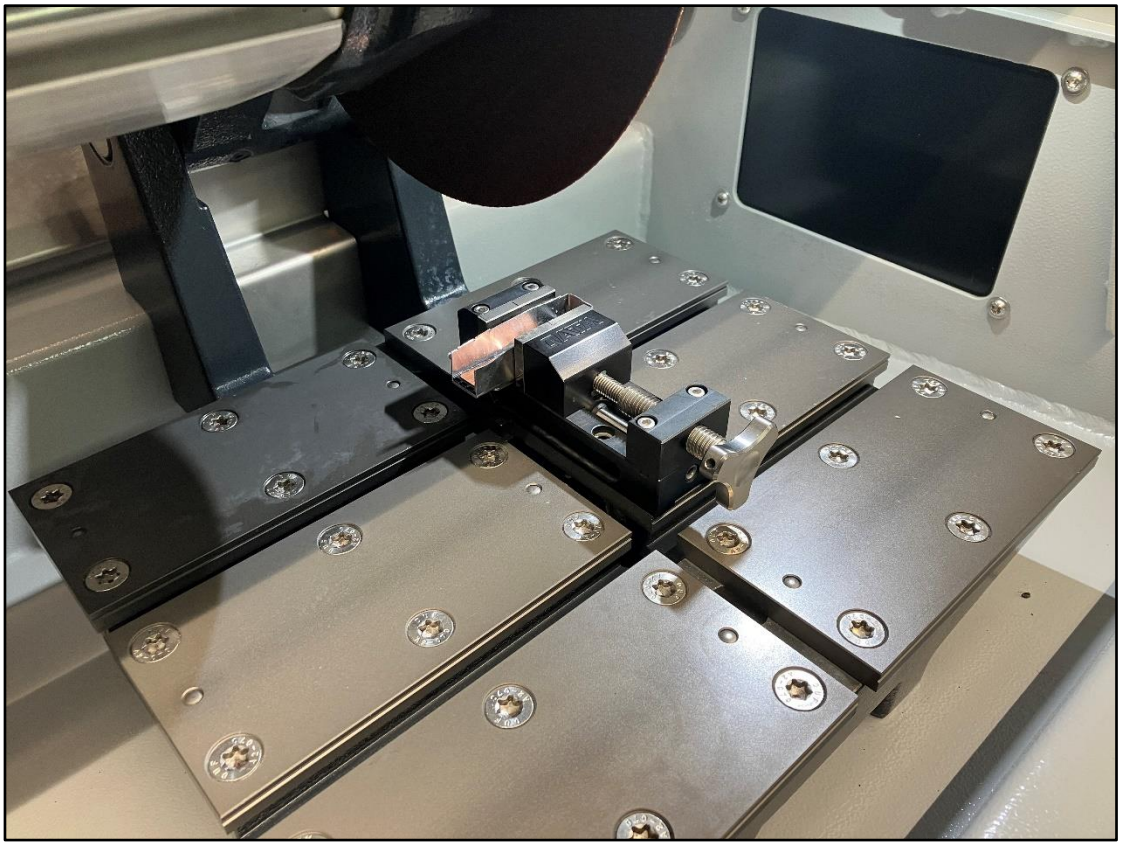


Figure 3: Clamping overview of the sample.

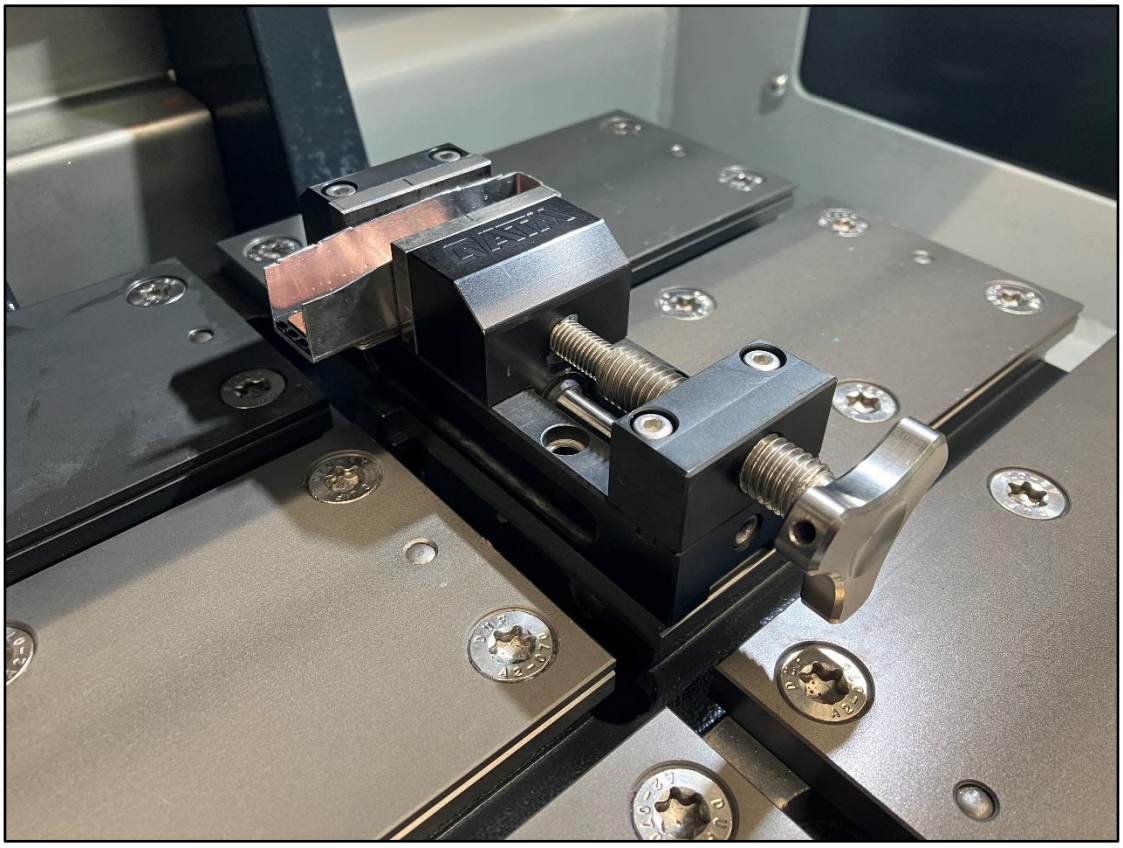


Figure 4: Detailed picture of figure 3.

QATM-Preparation method manually

Cold mounting

Mounting					
Consumable	Mixing ratio		Curing time	Mold	Additional equip.
	Volume / Weight				
KEM 20 (95013939+95013942)	2:1		Approx. 15 min	PP-ø 40 mm (95017319)	-Silicon mixing cup (92004360) -Mixing stick (92001717) -Dosing spoon (92001716) -Qprep pressure (95016569)
Notes					

Figure 5: Samples in the pressure pot.

QATM-Preparation method manually

Grinding/Polishing

Device	Samples holder	Pressure mode				
QPOL 250 M1	Manually	Single				
Step	**MEDIUM**		**RPM**		**N**	**min**
Planar grinding	SiC-Paper P320 +Quick-Tap	H_2O	200	-	-	Till flat
Grinding	SiC-Paper P1200 +Quick-Tap	H_2O	200	-	-	0:30
Pre-Polishing	SIGMA	Dia Complete Poly, 3µm	150	-	-	4:00
Fine polishing	OMEGA	Eposil F 0,1µm	150	-	-	1:15 (Rinsing time: 15 s)
Etching (chem.)	Sodium hydroxide					3:00

Notes

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

- Dosing interval and Dosing duration for fine polishing suspension:
  Every 15 s for 1,3 s

QATM-Preparation method manually

Figure 6: Qpol 250 M1.

Figure 7: Welding seam - Sodium hydroxide - 50x.

QATM-Preparation method manually

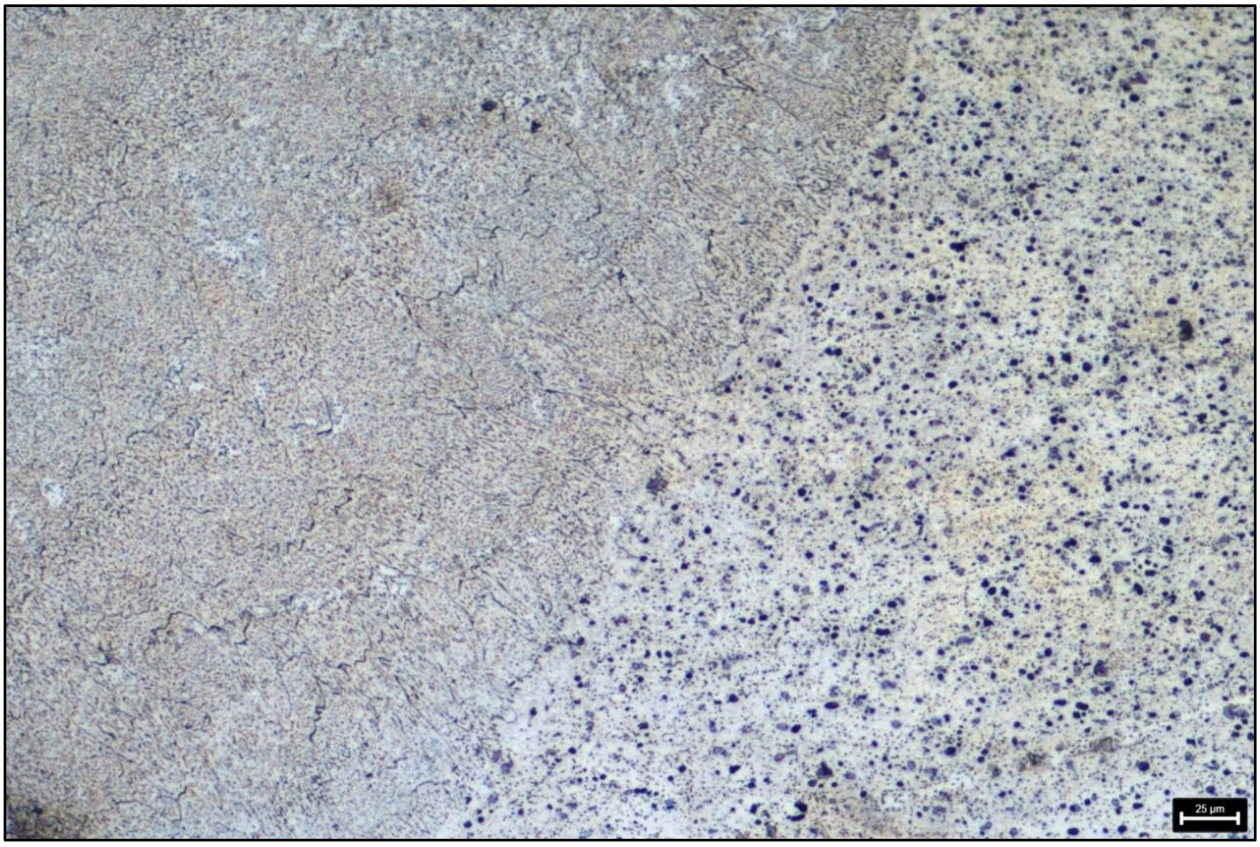


Figure 8: Welding seam - Sodium hydroxide - Transition to sheet 1 - 200x.

Figure 9: Welding seam - Sodium hydroxide - Transition to sheet 2 - 200x.

QATM-Preparation method semi-automatic

Cutting

Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 150 A	Silicon Carbide Resin bonded (92004998)	ATM CoolCut (95004146)	-Clamping arm L (Z1870031) -Sample holder parallel clamping vice (open) (Z1870043)
Cutting method			
Vertical cut (Y-axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
0,3 mm/s	Without puls	2500 RPM	
Notes			

Figure 10: Qcut 150 A.

QATM-Preparation method semi-automatic

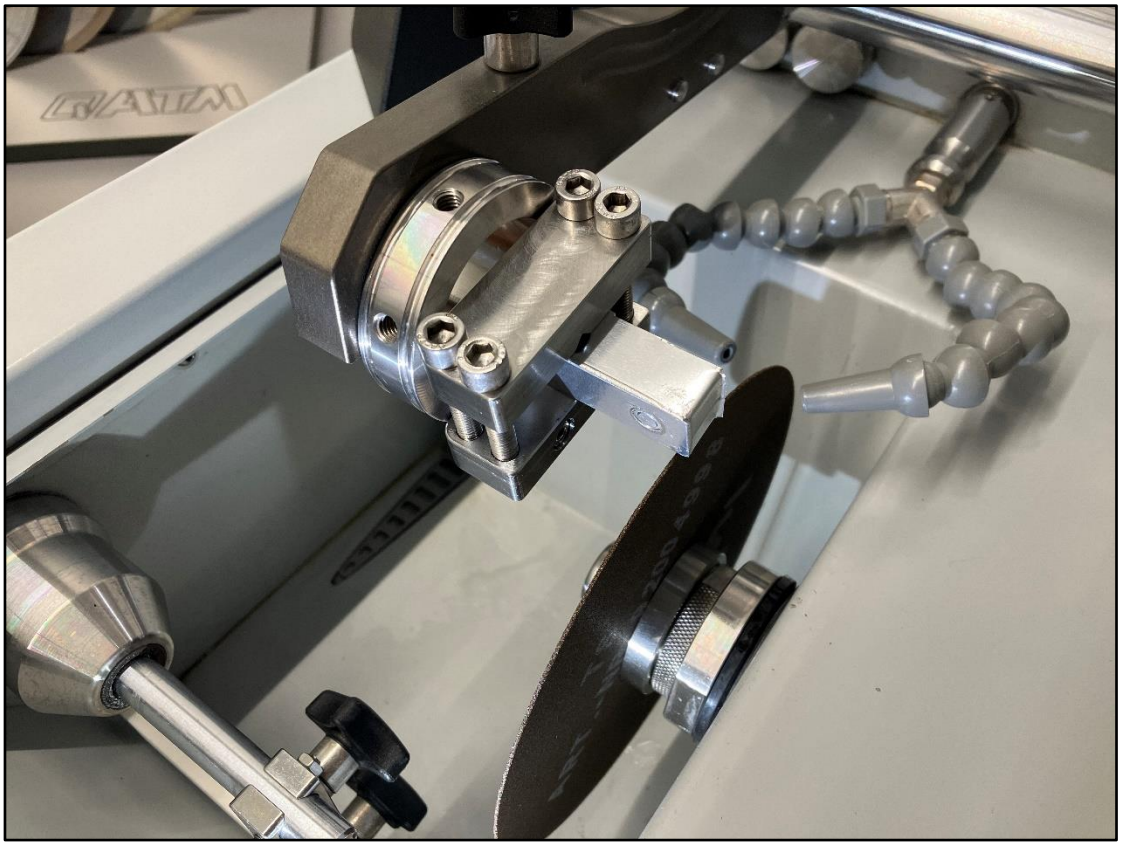


Figure 11: Clamping overview of the sample.

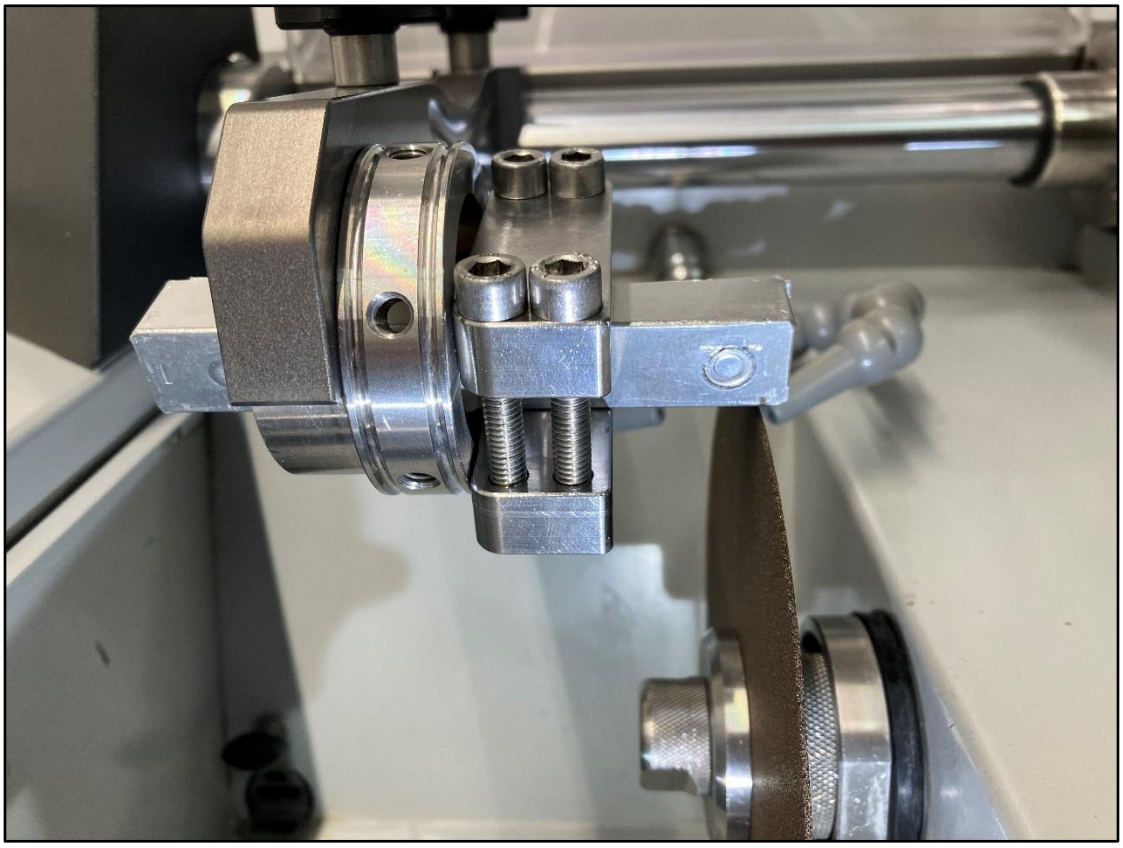


Figure 12: Detailed picture of figure 11.

QATM-Preparation method semi-automatic

Cold mounting

Mounting					
Consumable	Mixing ratio		Curing time	Mold	Additional equip.
	Volume / Weight				
KEM 20 (95013939+95013942)	2:1		Approx. 15 min	PP-ø40 mm (95017319)	-Silicon mixing cup (92004360) -Mixing stick (92001717) -Dosing spoon (92001716) -Qprep pressure (95016569)
Notes					

Figure 13: Samples in the pressure appliance.

QATM-Preparation method semi-automatic

Grinding/Polishing

Device	Samples holder	Pressure mode				
QPOL 250 A1 Eco	Z5445025	Single				
Step	**MEDIUM**		**RPM**		**N**	**min**
Planar grinding	SiC-Paper P320 +Quick-Tap	H_2O	200	120 ►►	15	Till flat
Grinding	SiC-Paper P1200 +Quick-Tap	H_2O	200	120 ►►	15	0:30
Polishing	SIGMA	Dia Complete Poly, 3µm	150	120 ►►	20	4:00
Fine polishing	OMEGA	Eposil F 0,1µm	150	120 ◄ ►	20	1:15 (Rinsing time: 15 s)
Etching (chem.)	Kroll Etchant					0:30

Notes

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

QATM-Preparation method semi-automatic

Figure 14: The height of the images is more important and must always be 11.

Figure 15: Welding seam - Kroll - 50x.

QATM-Preparation method semi-automatic

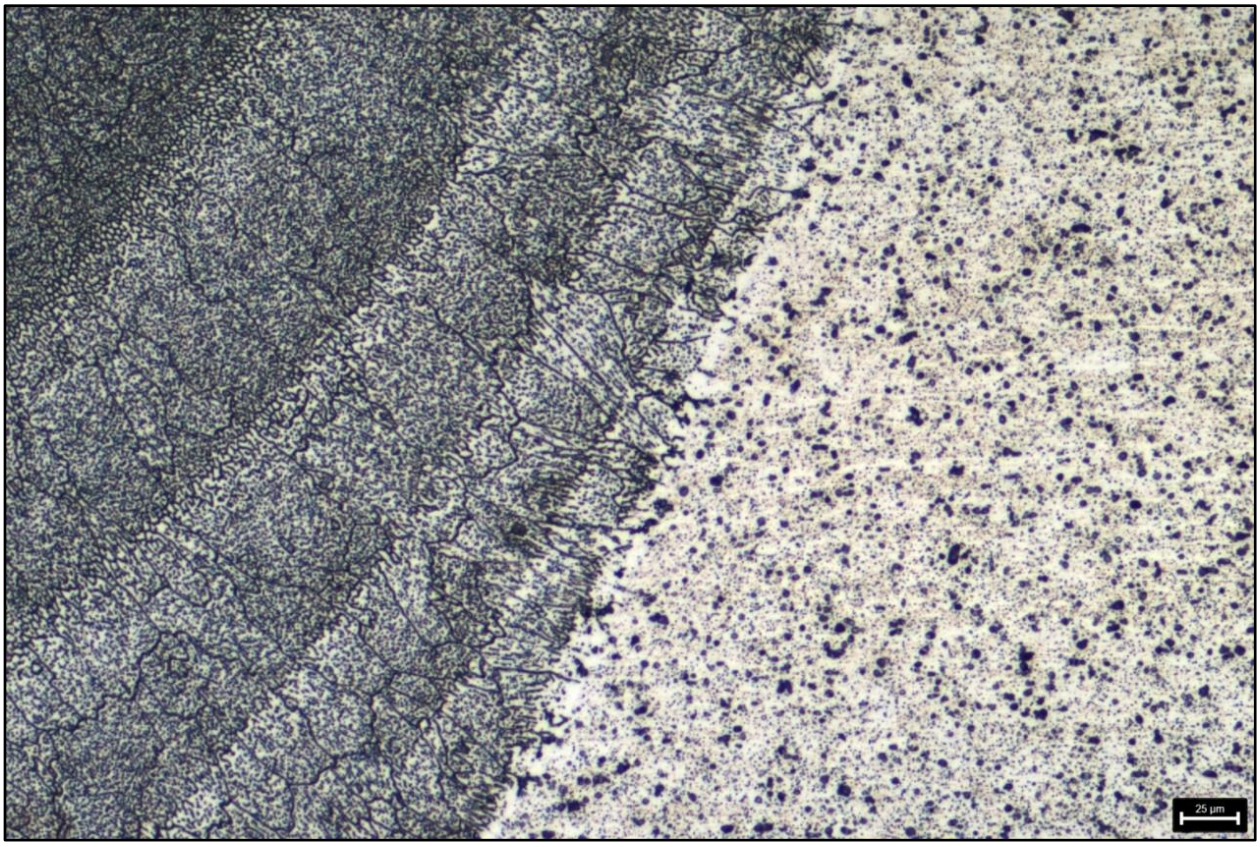


Figure 16: Welding seam - Kroll - Transition to sheet 1 - 200x.

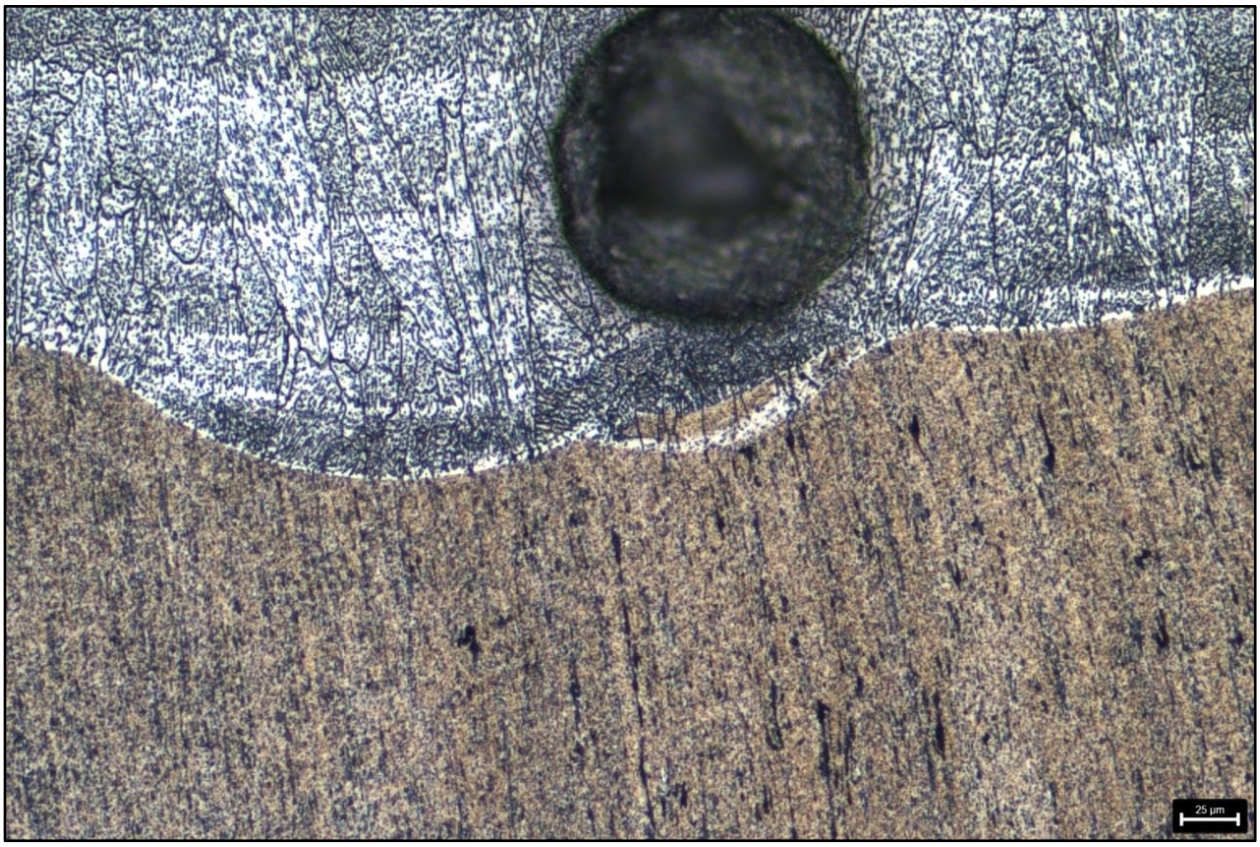


Figure 17: Welding seam - Kroll - Transition to sheet 2 - 200x.

QATM-Preparation method

Conclusion:

1. With the semi-automatic separation process, there are no abnormalities using the correct parameters.

When cutting manually, the user should dose the pressure well, as otherwise the sample may quickly become deformed, or the cut-off wheel may run off.

2. It is important to ensure that the KEM 20 is not poured into the mould too quickly during assembly, as this may cause the samples to be washed away.

3. Do not apply too much pressure when polishing. Too much pressure will cause rounding of the edges.

4. Exercise caution and use appropriate protective equipment when handling Kroll etchant.