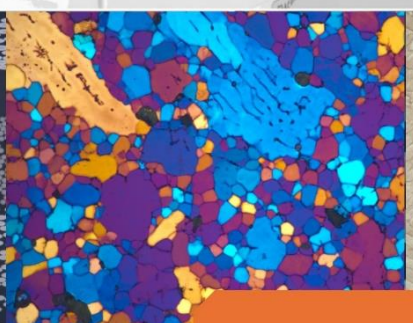
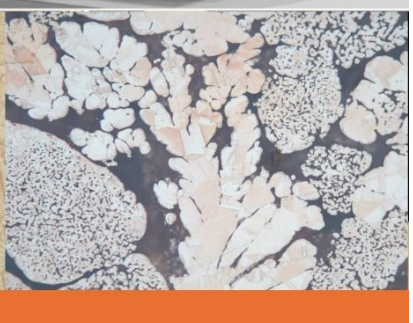
QATM
QUALITY ASSURED

Application lab report

Preparation of a double coated steel sample



QATM-Preparation method

Objective:

This report includes a preparation method for a double coated steel sample (Figure 1). The steel bar was coated first with copper. The outer coating is made of nickel. The aim of the investigation is to measure the hardness of the two coating layers with Rockwell HRC. Therefore, the sample needs to be prepared properly. Please find details and pictures below.

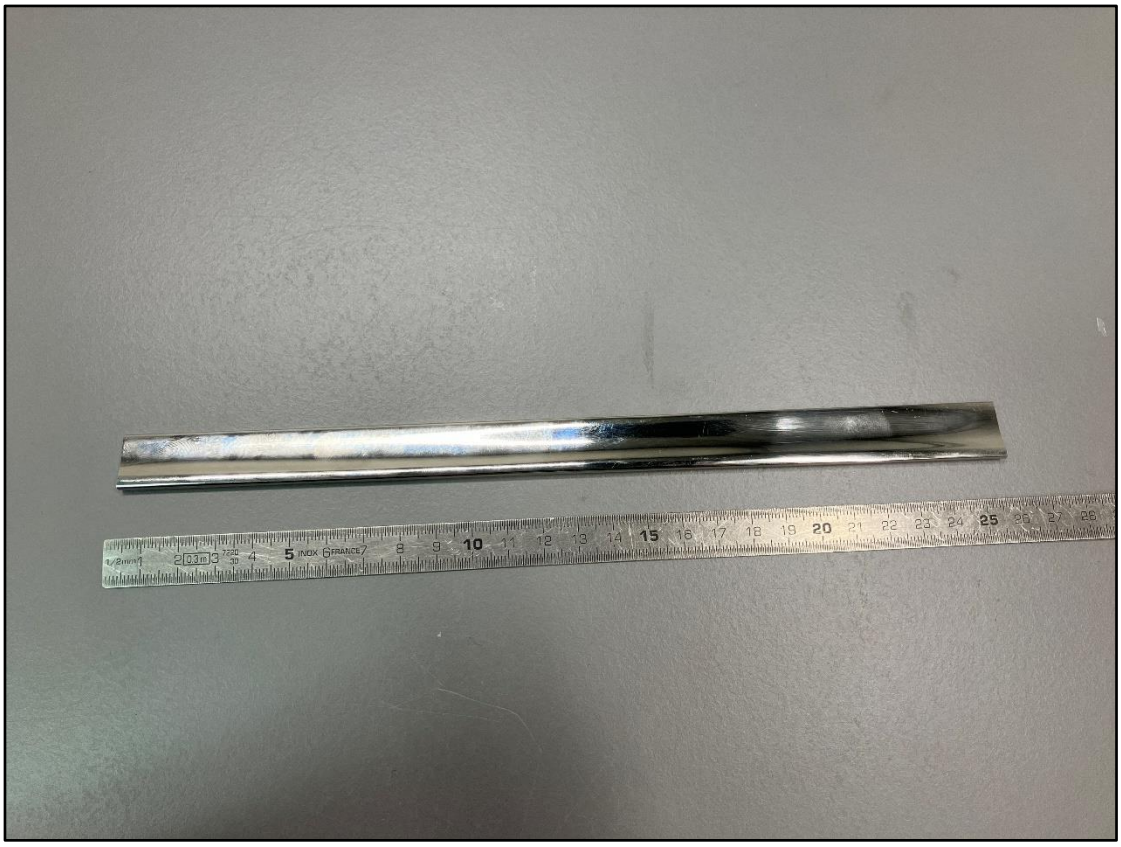


Figure 1: As-received sample.

QATM-Preparation method

Cutting

Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 200 A	Corundum cut-off disc 92002770	ATM CoolCut, 95004146	- Qtool 40 Z2270200 - Easy Clamping Plate S Z2236030
Cutting method			
Automatic vertical cutting method (with Y-Axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
0,2 mm/s	Without pulse	3000 RPM	
Notes			

Hot mounting

Mounting					
Device	Consumable	Heating time	Temperature	Pressure	Cooling time
Qpress 50	EPO black or EPO Max	5 Minutes	190° C	250 bar	4 Minutes
Filler or additional consumables	Heating power	Pressure mode	Cooling power		
Bakelit green or red	100 %	Pressure from the beginning	100 %		
Notes					
- this recommendation is for sample diameter 40 mm					

QATM-Preparation method

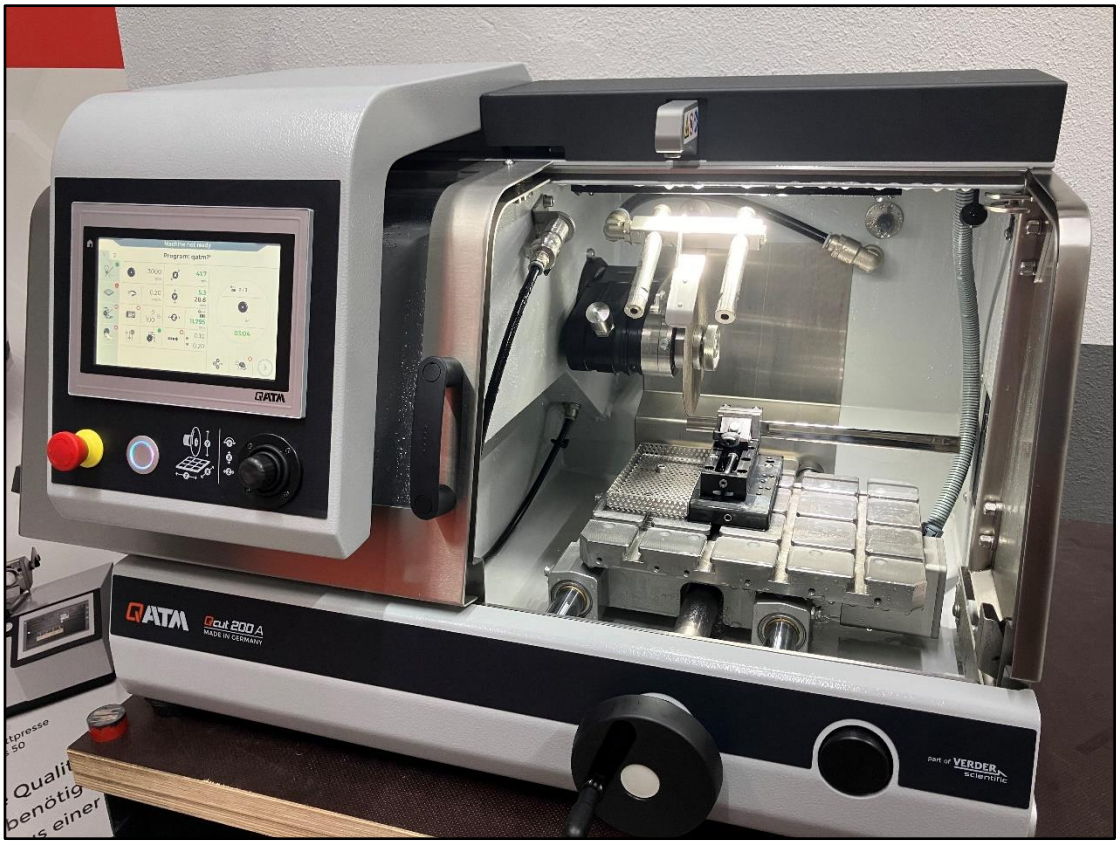


Figure 2: Overview of the cutting machine Qcut 200 A and recommended clamping tool.

Figure 3: Samples after hot mounting with Qpress 50 (ø 40 mm).

QATM-Preparation method

Grinding/Polishing

Device	Samples holder	Pressure mode				
Qpol 250 A1 Eco	Z5445025	Single				
Step	**MEDIUM**		 **RPM**		 **N**	 **min**
 Planar grinding	SiC-Paper, self-adhesive, P600 + X-Tap	H_2O	150	100 ◄ ►	20	Till flat (1:00)
 Grinding	SiC-Paper, self-adhesive, 1200 + X-Tap	H_2O	150	100 ◄ ►	20	0:45
 Pre-Polishing	GAMMA	Diamond susp. Poly, **3 µm** + alc.-based Lubricant	150	100 ►►	30	3:00

Notes

- We recommend using the X-Tap for the self-adhesive SiC-Paper
- Pre-dosing for 3 µm: 3 s
  Dosing interval and dosing duration for Dia. Suspension 3 µm:
  Every 35 s for 1,5 s
- Dosing interval and dosing duration for lubricant:
  Every 60 s for 1,5 s

QATM-Preparation method

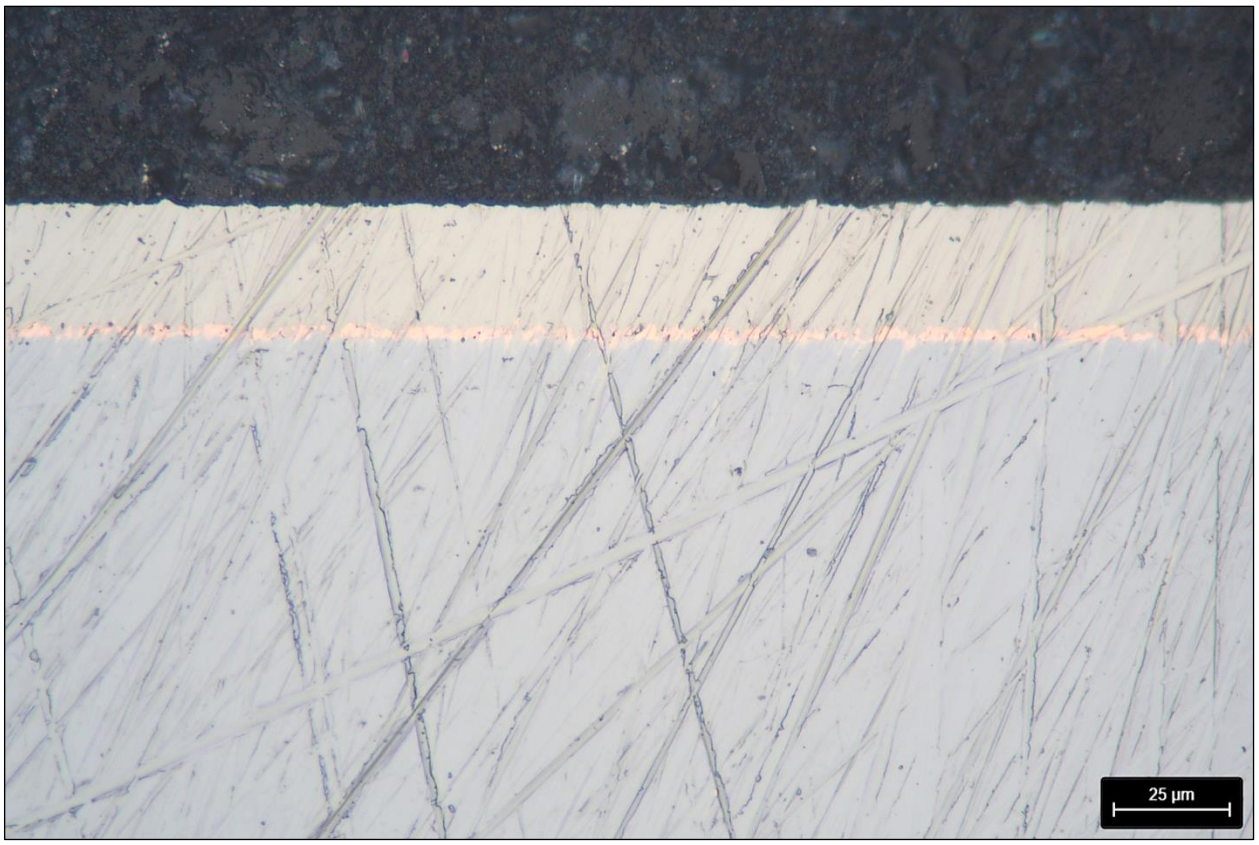


Figure 4: Surface layers after grinding with SiC-Paper, P1200 – **EPO black** – 500 x

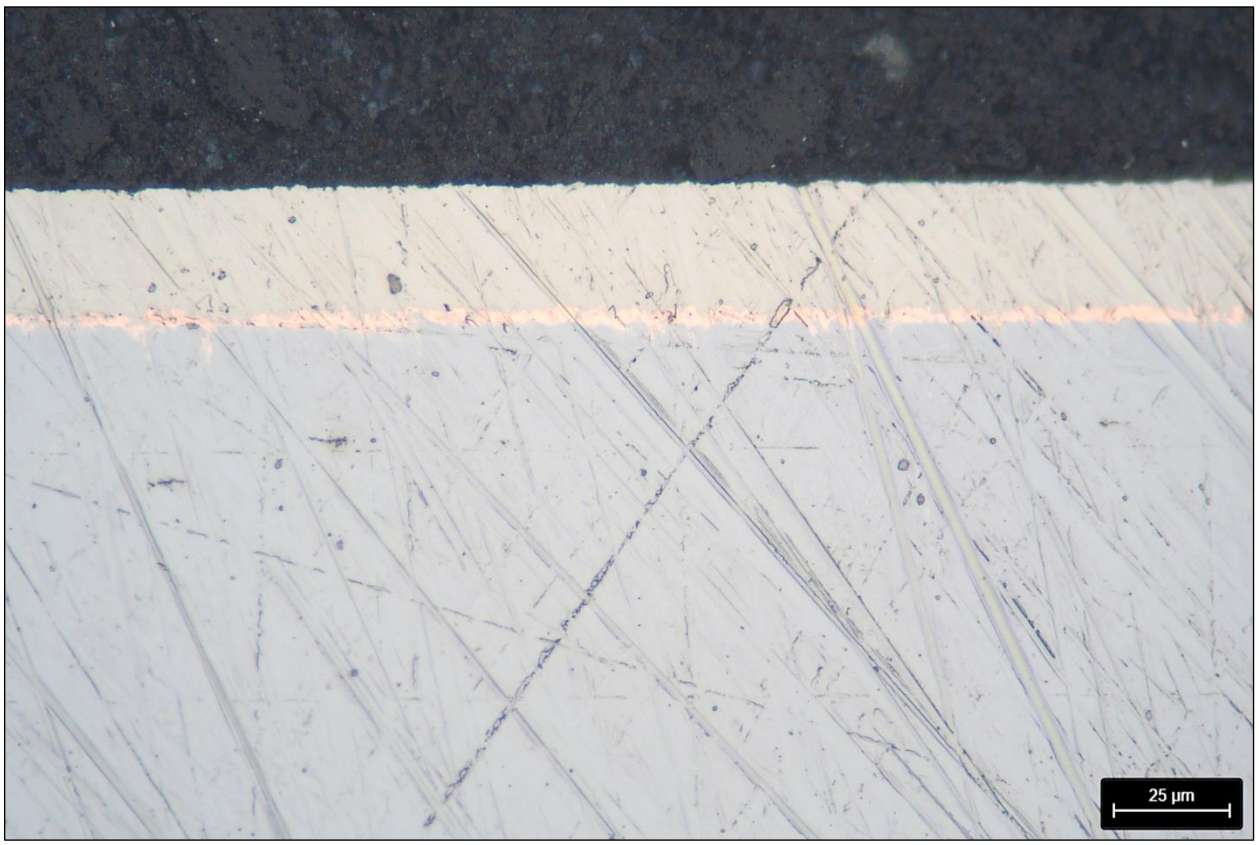


Figure 5: Surface layers after grinding with SiC-Paper, P1200 – **EPO Max** – 500 x

QATM-Preparation method

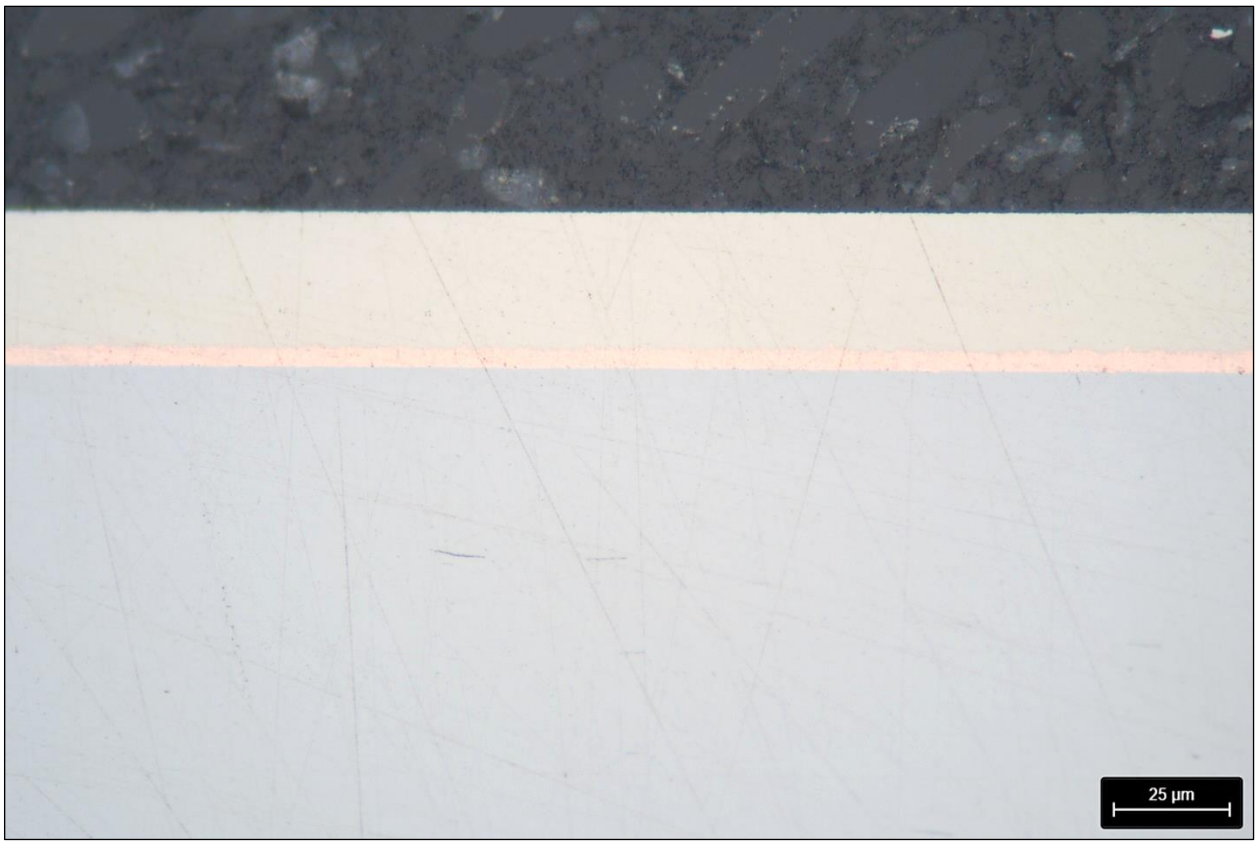


Figure 6: Surface layers after polishing with GAMMA 3 µm – **EPO black** – 500 x

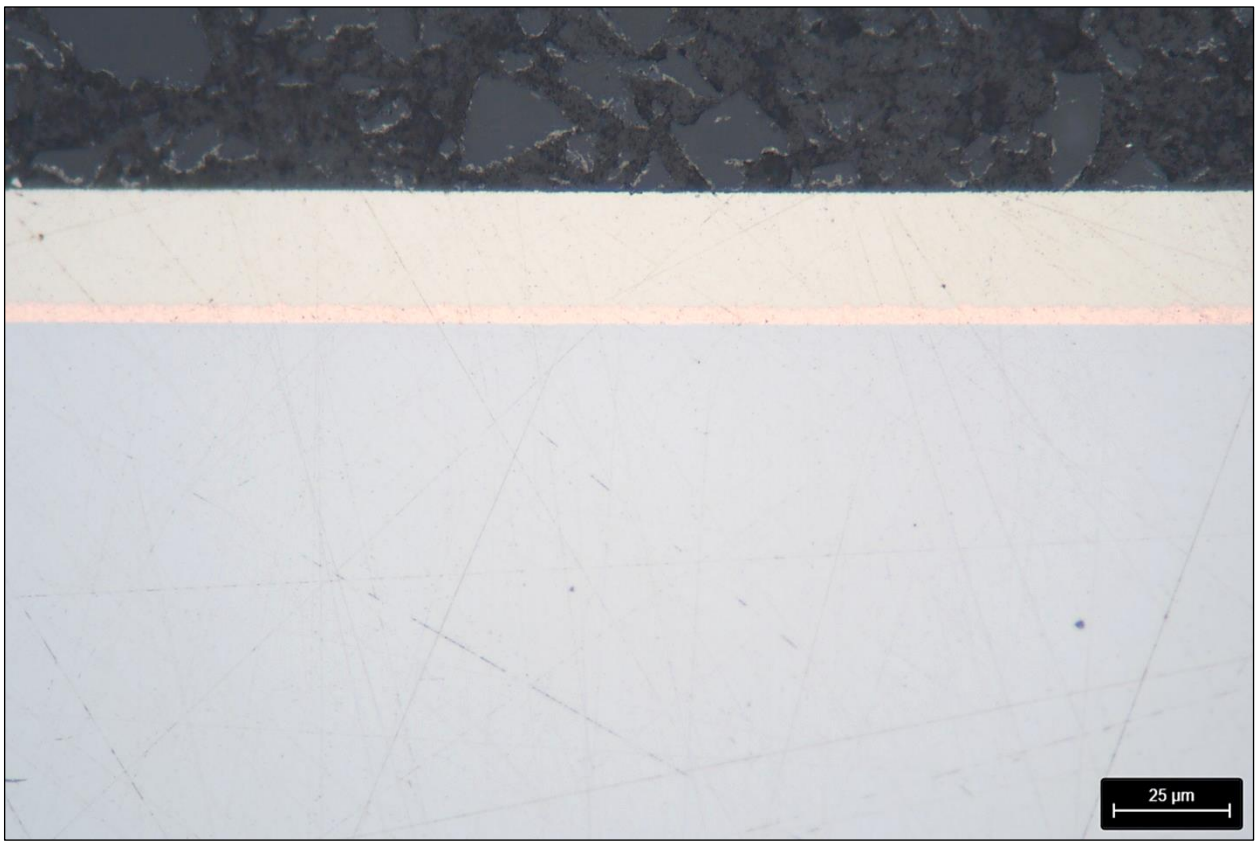


Figure 7: Surface layers after polishing with GAMMA 3 µm – **EPO Max** – 500 x

QATM-Preparation method

Conclusion:

Due to the sample size, the Qcut 200 A cutting machine is very well suited.

There is no major difference between using either EPO black or EPO Max. Both hot mounting resins are suitable to use for the mounting process. Gaps or edge rounding are not observed.

As the hardness test is the main objective of the investigation the final polishing step can be 3 µm. If a scratch-free surface is needed a polishing step with 1 µm could be added. For the 1 µm polishing step we recommend using the cloth ZETA.