

## Cobalt based alloys

### Recommended machines and additional consumables (not included)

<b>CUTTING</b>	<b>Equipment</b> ATM Brillant	<b>Consumables</b> Cut-off wheel: corundum, resin/rubber bond Anti-corrosion coolant
<b>MOUNTING</b>	<b>Equipment</b> ATM Opal	<b>Consumables</b> Hot mounting: EPO black, EPO-Max Cold mounting: KEM 30 <b>Hot or cold mounting</b>
<b>GRINDING/ POLISHING</b>	<b>Sample size</b> Ø 40 mm	

### Pressure parameters and specimen size

Specimen diameter [mm]	25	30	40	50	60
Divergence in pressure used in the preparation methods	-(5 N...10 N)	-5 N	0	+5 N	+(5 N...10 N)

Notes:

STEP	MEDIUM	H <sub>2</sub> O	rpm		Single Pressure N	min
Planar grinding	SiC-paper/foil P320 (280)	H <sub>2</sub> O	250-300	▶▶ Synchronous Rotation	30	Until plane
Grinding	SiC-paper/foil P600 (400)	H <sub>2</sub> O	250-300	▶▶ Synchronous Rotation	30	1:00
Grinding	SiC-paper/foil P1200 (600)	H <sub>2</sub> O	250-300	▶▶ Synchronous Rotation	30	1:00
Polishing	SIGMA	Dia-Complete Poly, 3 µm	120-150	▶▶ Synchronous Rotation	25	5:00
Final polishing	OMEGA	Eposal 0.06 µm	120-150	◀◀ Counter Rotation	20	1:00 (H <sub>2</sub> O during final 0:30)
Optional: Etching (chem.)	Nital 3%*					Approx. 0:01-0:10

\* ATM Item No. 92002597

### BEGINNERS GUIDE

<b>CUTTING</b>	<ul style="list-style-type: none"> <li>Use suitable cut-off wheels for cobalt based alloys (e.g. ATM FS-A or FS-B wheels)</li> <li>Constant cutting speed max. 0.25 mm/s</li> </ul>
<b>MOUNTING</b>	<ul style="list-style-type: none"> <li>Use mounting material with high edge retention</li> <li>Cold and hot mounting both possible</li> </ul>
<b>GRINDING</b>	<ul style="list-style-type: none"> <li>Start grinding with SiC-paper/foil P320 (280)</li> <li>Continue with P600 and P1200</li> <li>Thoroughly wash samples and holder under running water after each grinding step</li> </ul>
<b>POLISHING</b>	<ul style="list-style-type: none"> <li>Do not stack discs with different diamond sizes</li> <li>Clean samples, holders and hands under running water before each polishing and grinding step Attention: keep cleaning time with water shortly as you can: corrosion-prone!</li> <li>Use ethanol and blow dryer to avoid water stains and corrosion</li> <li>Check after each step under the microscope if polishing marks are of equal size and randomly oriented</li> <li>Rinse the OMEGA disc with water and spin dry after use</li> <li>Use the consumables only for cobalt based alloys and not for other materials</li> <li>Rinse the cap of the Eposal bottle after use, put cap back on</li> <li>Use cosmetic tissues to clean possible traces of Eposal after the last polishing step</li> </ul>

Notes:

### SAMPLE MICROGRAPHS

#### OK Sample polished

10x micrograph of cobalt based alloy after OMEGA polishing

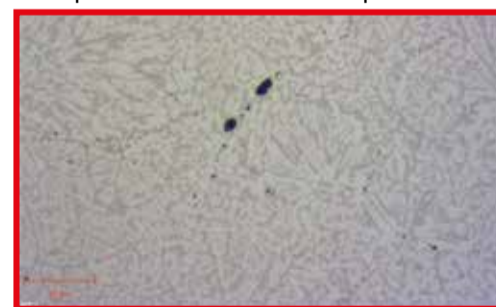
- No traces of scratches
- Clear structure/contour of the different phases



#### NOK Sample polished

10x micrograph of cobalt based alloy after OMEGA polishing

- Outbreaks from inclusions 0.06 µm Eposal after OMEGA
  - Clean all polishing discs with clean brush under running water
  - Clean sample and sample holder
  - Repeat SIGMA and OMEGA step



#### OK Sample etched

20x micrograph of cobalt based alloy etched with Kalling II (wiping for 3 sec)

- No traces of scratches
- Clear structure



Notes: