

## Nickel 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 15 plus <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		rpm		Single Pressure N	min
Planar grinding	GALAXY green	H <sub>2</sub> O	250-300	▶▶ Synchronous Rotation	35	Until plane
Pre-polishing	BETA	Dia-Complete Poly, 9 µm	120-150	◀◀ Counter Rotation	30	6:00
Polishing	GAMMA	Dia-Complete Poly, 3 µm	120-150	▶▶ Synchronous Rotation	30	3:00
Final polishing	OMEGA	Eposal, 0.06 µm	120-150	◀◀ Counter Rotation	20	1:30 (H <sub>2</sub> O during final 0:30)
Optional: Etching (chem.)	V2A reagent*					Approx. 0:05-0:30

\* ATM Item No. 92002605; if etching doesn't work heat up (V2A) to 50 °C

### BEGINNERS GUIDE

<b>CUTTING</b>	<ul style="list-style-type: none"> <li>Use suitable cut-off wheels for nickel based alloys (e.g. ATM FS-E 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>Hot or cold mounting possible</li> </ul>
<b>GRINDING</b>	<ul style="list-style-type: none"> <li>Grind with GALAXY green</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>Rinse the polishing discs with water and spin dry after use</li> <li>Do not stack discs with different diamond sizes</li> <li>Clean samples, holders and hands under running water before each polishing step</li> <li>Use ethanol and blow dryer to avoid water stains</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 nickel 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 nickel based alloy after OMEGA polishing

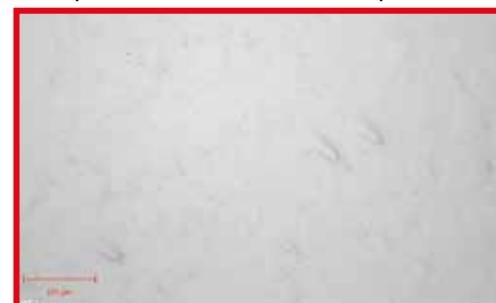
- No traces of scratches
- Clear structure/contour of the different phases



#### NOK Sample polished

10x micrograph of nickel based alloy after OMEGA polishing

- Relief marks from 0.06 µm Eposal after OMEGA
  - » Shorten polishing time
  - » Clean all polishing discs with clean brush under running water
  - » Clean sample and sample holder
  - » Repeat GAMMA and OMEGA step



20x micrograph of nickel based alloy etched with V2A reagent (60 °C/20 sec)

- No traces of scratches
- Clear structure



Notes: