Preparation method

**Titanium alloy**

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

**CUTTING**
- Equipment: ATM Brilliant

**MOUNTING**
- Equipment: ATM Opal

**GRINDING/POLISHING**
- Sample size: Ø 40 mm

**Consumables**
- Cut-off wheel: silicon carbide, resin bond
- Anti-corrosion coolant

**Consumables**
- Hot mounting: EPO black, EPO-Max, Cold mounting: KEM 20, KEM 15 plus
- Hot or cold mounting

**Pressure parameters and specimen size**

<table>
<thead>
<tr>
<th>Specimen diameter [mm]</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divergence in pressure used in the preparation methods</td>
<td>-5 N → 10 N</td>
<td>-5 N</td>
<td>0</td>
<td>+5 N</td>
<td>+5 N → 10 N</td>
</tr>
</tbody>
</table>

**Notes:**
- Step Medium RPM Single Pressure [rpm] min
  - Planar grinding SC-paper/foil P320 (280) H2O 250-300 Synchronous Rotation 25 Until plane
  - Grinding SC-paper/foil P600 (400) H2O 250-300 Synchronous Rotation 25 1:30
  - Pre-polishing ALPHA / BETA Dia-Complete Poly, 9 µm 120-150 Counter Rotation 30 5:00
  - Final polishing OMEGA Eposil F, 0.1 µm** 120-150 Counter Rotation 40 8:00–10:00*** (H2O during final 0:30)
  - Optional: Etching (Chem.) Kroll’s reagent* Approx. 0:45–0:55

  * ATM Item No. 92004492
  ** Eposil F has to be mixed with hydrogen peroxide (35%) in a ratio of 5:1 (safety advice: use personal protective equipment)
  *** Depends on the alloy

**BEGINNERS GUIDE**

- Use suitable cut-off wheels for titanium (e.g. ATM Ti-AS wheels)
- Cutting speed max. 0.25 mm/s
- Use mounting material for almost gap-free mounting
- Cold or hot mounting possible
- Start grinding with SC paper/foil P320 (280)
- Continue with P600
- Thoroughly wash samples and holder under running water after each grinding step
- Rinse the polishing discs with water and spin dry after use
- Do not stack discs with different diamond sizes
- Clean samples, holders and hands under running water before each polishing step
- Use ethanol and blow dryer to avoid water stains
- Check after each step under the microscope if polishing marks are of equal size and randomly oriented
- Use the consumables only for titanium-based alloys and not for other materials
- Rinse the cap of the Eposil F bottle after use, put cap back on

**SAMPLE MICROGRAPHS**

**OK Sample polished**
- 10x micrograph of titanium alloy after OMEGA polishing
  - No traces of scratches
  - Clear structure/contour of the different phases

**NOK Sample polished**
- 10x micrograph of titanium alloy after OMEGA polishing
  - Polishing marks after final polishing with OMEGA
  - Use cosmetic tissues to clean the sample
  - Clean polishing disc OMEGA with clean brush under running water
  - Clean sample and sample holder
  - Repeat OMEGA step

- 10x micrograph of titanium alloy etched with kroll’s reagent
  - No traces of scratches
  - Clear structure

**Notes:**