Preparation method

**Soft to medium-hard steel (<35 HRC/350HV)**

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

**Equipment**
- **CUTTING**
  - ATM brillant
- **MOUNTING**
  - ATM Opal
- **GRINDING/Polishing**
  - Sample size Ø 40 mm

**Consumables**
- **Cut-off wheel**: corundum, resin bond (Anti-corrosion coolant)
- **Mounting**: EPO black, EPO-Max, Bakelite red/black
- **Cold mounting**: KEM 15 plus

**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></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;5 N…10 N</td>
<td>-5 N</td>
<td>0</td>
<td>+5 N</td>
<td>+5 N…10 N</td>
<td></td>
</tr>
</tbody>
</table>

**STEP MEDIUM rpm N min**

1. **Planar grinding**
   - **SiC-paper/foil**: P320 (280) H 2 O 250-300
   - **Rotation**: Synchronous 30 Until plane

2. **Pre-polishing**
   - **BETA Dia-Complete Poly, 9 µm**: 120-150
   - **Rotation**: Counter 35 5:00

3. **Polishing**
   - **GAMMA Dia-Complete Poly, 3 µm**: 120-150
   - **Rotation**: Synchronous 30 6:00

4. **Final polishing**
   - **OMEGA Eposal 0.06 µm**: 120-150
   - **Rotation**: Synchronous 20 1:00
   - **(H 2 O during final 0:30)**

5. **Optional:**
   - **Etching (chem.):** Nital 3%**
   - **Adler’s reagent (macro)*****
   - Approx. 0:03-0:10

**Notes:**
- For weld analysis
- **ATM Item No. 92002597**
- **ATM Item No. 92002602**

**BEGINNERS GUIDE**

**CUTTING**
- Use suitable cut-off wheels for ferrous material (e.g. ATM FS-B or FS-C wheels)
- Cutting speed max. 0.25 mm/s

**MOUNTING**
- Use mounting material for almost gap-free mounting
- Cold or hot mounting both possible

**GRINDING/Polishing**
- Grind with SiC-paper/foil P320 (280)
- Thoroughly wash samples and holder under running water after each grinding step
- 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 and corrosion
- Check after each step under the microscope if polishing marks are of equal size and randomly oriented
- Use the consumables only for cast iron and not for other materials
- Use cosmetic tissues to clean possible traces of Eposal after the last polishing step

**SAMPLE MICROGRAPHS**

**OK Sample polished**
- 10x micrograph of medium-hard iron after OMEGA polishing
  - Minimal traces of scratches
  - Clean homogeneous surface
  - Pores and inclusions with clean edges

**NOK Sample polished**
- 10x micrograph of medium-hard iron after OMEGA polishing
  - “Comets”: OMEGA step wasn't accomplished clockwise
  - Use cosmetic tissues to clean the sample
  - Repeat GAMMA and OMEGA step with the correct settings

**OK Sample etched**
- 20x micrograph of soft to medium-hard iron etched with Nital 3%
  - No corrosion
  - Etching time and etchant concentration for your analyse requirements can be divergent

www.atm-m.com | Advanced Materialography