

Titanium (commercial pure: grade 1-4)

Recommended machines and additional consumables (not included)

CUTTING	Equipment ATM Brillant	Consumables Cut-off wheel: silicon carbide, resin bond Anti-corrosion coolant
MOUNTING	Equipment ATM Opal	Consumables Hot mounting: EPO black, EPO-Max, Cold mounting: KEM 20, KEM 15 plus Hot or cold mounting
GRINDING/ POLISHING	Sample size 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	SiC-paper/foil P320 (280)	H ₂ O	250-300	▶ Synchronous Rotation	25	Until plane
Pre-polishing	BETA	Dia-Complete Poly, 9 µm	120-150	◀ Counter Rotation	30	10:00
Final polishing	LAMBDA	Eposil F, 0.1 µm**	120-150	◀ Counter Rotation	40	10:00-15:00*** (H ₂ O during final 0:30)
Optional: Etching (chem.)	Kroll 's reagent*					Approx. 0:45

* 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

CUTTING	<ul style="list-style-type: none"> Use suitable cut-off wheels for titanium (e.g. ATM Ti-A wheels) Constant cutting speed max. 0.25 mm/s
MOUNTING	<ul style="list-style-type: none"> Use mounting material with high edge retention Hot or cold mounting possible
GRINDING	<ul style="list-style-type: none"> Grind with SiC paper/foil P320 (280) Thoroughly wash samples and holder under running water after each grinding step
POLISHING	<ul style="list-style-type: none"> 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 Rinse the OMEGA disc with water and spin dry after use Use the consumables only for titanium and not for other materials Rinse the cap of the Eposil F bottle after use, put cap back on

Notes:

SAMPLE MICROGRAPHS

OK Sample polished

10x micrograph of titanium after LAMBDA polishing

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



NOK Sample polished

10x micrograph of titanium after LAMBDA polishing

- Sparse scratches from 0.1 µm polishing after LAMBDA
 - » Clean all polishing discs with clean brush under running water
 - » Clean sample and sample holder
 - » Repeat LAMBDA step



10x micrograph of titanium etched with Kroll 's reagent

- No traces of scratches
- Clear structure



Notes: