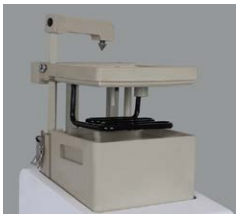
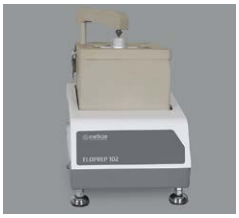
metkon
Technology behind Specimen

ELECTROLYTICAL SAMPLE PREPARATION

ELOPREP 102





QUARTER CENTURY OF EXPERIENCE

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EXPERIENCE

ELECTROLYTIC

POLISHING & ETCHING

ELOPREP 102

ELOPREP 102 is an automatic and programmable electrolytic polishing and etching equipment for the preparation of metallographic specimens.

- Fully automatic electrolytic polisher / etcher
- Programmable with HMI touch screen controls
- Automatic determination of polishing and etching voltage
- Fast & effective polishing results
- Highest safety standards
- External Etching Unit
- Ability to operate two Polishing & Etching unit from the same control unit
- Suitable for both normal and low temperature electrolytic polishing

POLISHING & ETCHING

Fully automatic electrolytic polishing and etching equipment with independent control unit.Shorter preparing time is needed for electrolytic polishing and etching process compared to traditional mechanical preparation.

The ELOPREP 102 has advanced techniques and software with programmable colored HMI touch screen controls, increasing the productivity, sample consistency and operator comfort. All parameters; temperature, time, current, pump speed, etc. can be monitored during the process. The speed of the amount to be pumped is also variable.

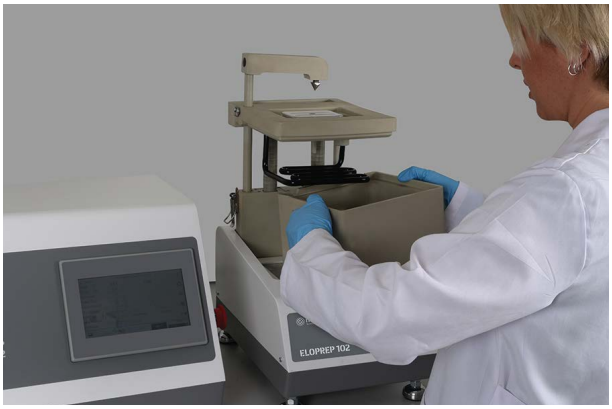
A library of 99 different polishing programs with related specimen name or number can be saved with all parameters which can be recalled at any time.

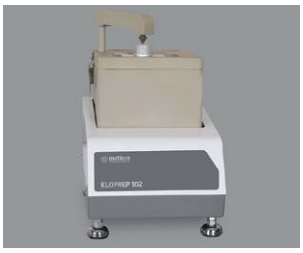
ELOPREP 102 has two separate units, the control unit and the polishing unit.Separate polishing and etching unit can be placed away from the control unit and can be installed under a fume extraction system. The electrolyte cartridge is easily exchangeable and inserted into the polishing and etching unit.

Additional polishing and etching unit can be connected the same control unit. Thus, two polishing & etching unit can be operated individually. This is very useful feature especially for specimens which require different electrolytes for polishing and etching.

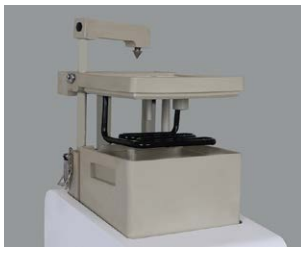
With the scanning function of ELOPREP, correct voltage of polishing as well as etching can be defined automatically.

The sample is placed on the polishing and etching table where optional masks are available as 0,5 cm^2 – 5 cm^2. The cooling tube is fixed to the lid and directly lowered into the container. ELOPREP 102 has the highest safety standards. The cooling water is automatically switched on as soon as the set temperature is reached.The cooling water consumption is minimized where the cooling water is activated with a solenoid valve.





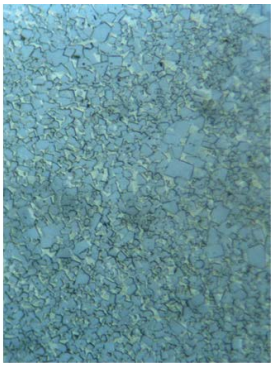
Polishing & Etching Unit



Exchangeable Electrolyte Cartridge

ELOPREP 102 is suitable for both normal and low temperature electrolytic polishing. The water connection and circulation system is specially designed for both purpose. The polishing & etching unit can be connected to either city water for normal polishing or external cooling unit for low temperature polishing at subzero temperatures. No separate or additional equipment is necessary for this purpose.

Etial 160 Aluminum
Magnification: 100 x



WC-Co Sinter Metal
Magnification 800x (DIC)

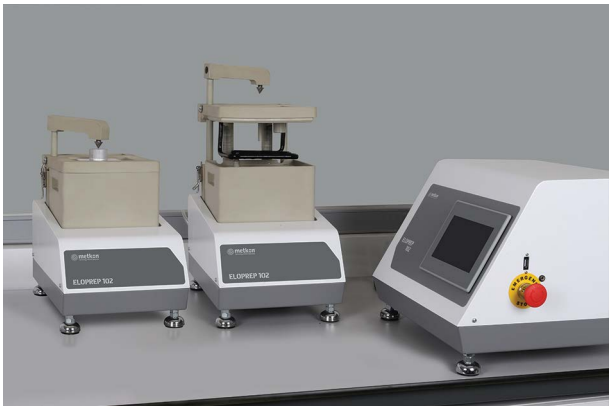
If ELOPREP 102 is not connected to water source or the temperature increases above pre-defined temperature limit, an audible warning signal notifies the operator and the process will automatically shut down.

ELOPREP 102 has 3 different operation modes; Polishing or Etching, Automatic Etching after Polishing and External Etching.

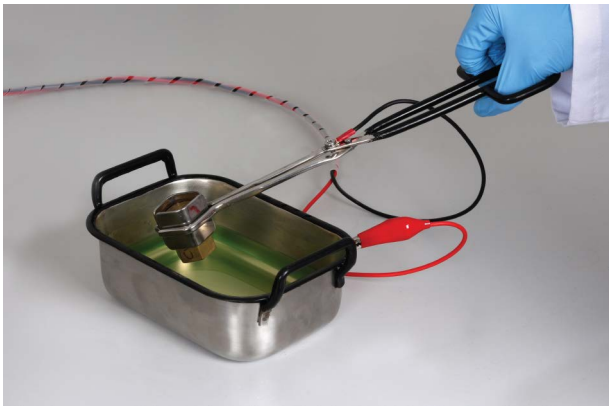
Optional External etching is available incase different electrolytes have to be used for polishing and etching. ELOPREP will automatically start as soon as the specimen contacts to the electrolyte in the external etching unit. The process automatically shuts down when the set etching time is reached.

All preparation parameters can be stored in memory under a specific program number. Each program can be saved for a material specific name such as "Cast Iron, Bronze, Al-Si Alloy, etc." The parameters which can be saved are; Polishing voltage, time and Flow rate, Etching Voltage and time. These parameters are entered and stored in memory and displayed on the coloured LCD screen as preset values. All the operator needs to do is to call up a specific program and press the "Start" key. It is possible to transfer parameters from an USB memory stick (export or import programs).

Programmable HMI Touch Screen Controls



Dual Polishing & Etching



External Etching Unit

SPECIFICATION

ORDER NO		46 02
MODEL NO		ELOPREP 102
Temperature limiter, C		30 - 50
Pump		Magnetic Stirrer
Electrolytic Container Volume, mL		1000 ml
External Etching Volume, mL		1200 ml
Cooling System		Integrated
Low Temperature Polishing		Yes
Mask Dimensions, cm2		0 - 0,5 - 1 - 2 - 5
Scanning Function		Automatic
Control Panel		7" HMI Touch Screen
Program Memory		99
Output Voltage / Current		
	Polishing	0-120 V
	Etching	0-35 V
	External Etching	0-25 V
Power Supply		1x 110/120 V 1 x 230 V
Dimensions, WxDxH, mm		
	Control Unit	404 x 370 x 305
	Polishing Unit	210 x 370 x 305
Weight, kgs		
	Control Unit	20
	Polishing Unit	5

46 02 — **ELOPREP**
Electrolytic Polishing&Etching System
Automatic and programmable electrolytic polishing and etching of metallographic specimens, with Siemens PLC control unit, user friendly coloured 7" LCD touch screen controls, short polishing times and maximum reproducibility, seperate polishing unit equipped with drain pipe and integrated cooling system, optional external etching unit, 0-100 V output voltage for polishing, 0-25 V for etching and 0-25 V for external etching. Variable polishing time and current, with current limitation, built in safety features with continuous control of electrolyte, scanning function for easy determination of parameters, variable speed controlled pump with magnetic stirrer for electrolyte flow.
Ready for operation. Included: Stainless steel cathode(1pc.)
230 V, 1-phase, 50 Hz.

Optional Accessories for ELOPREP

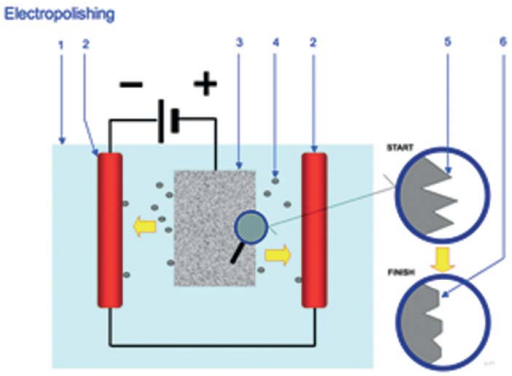
46 09 — Additional Polishing & Etching Unit
(Suitable for both normal and low temperature electrolytic polishing) (Dual Polishing & Etching units operatable by the same control unit) (To be ordered simultaneously together with the ELOPREP 102 order)

46 10 — External Etching unit
46 08 — Electrolyte container with lid
46 12 — 1 set of 5 masks 0.5 cm2
46 13 — 1 set of 5 masks 1 cm2
46 14 — 1 set of 5 masks 2 cm2
46 15 — 1 set of 5 masks 5 cm2
46 16 — 1 set of 5 masks without aperture
46 17 — 1 set of masks (0.5, 1, 2, 5 cm2 and 1 without aperture.)

YM 6904-00 — Stainless Steel cathode
YM 6937-00 — Cupper cathode
YM 6936-00 — Titanium cathode
GR 1397-00 — Water Filtering and Pressure Regulator System for city water inlet. Keeps the water pressure at the appropriate level and protects from sudden pressure spikes. Filtering out impurities in the water and prevents calcification.
YM 3824-00 — Spare Siliphos Cartridge Filter
(for Water Filtering and Pressure Regulator System (GR 1397-00))

*** Other voltages and frequencies available upon request. Please state when ordering. All specifications are subject to change without notice.**

ELECTROLYTIC SAMPLE PREPARATION



Electrolytic polishing is the best way to polish very soft materials which are prone to smearing and deformation. It can be easily applied to objects of complex shape.

Materials that work well for electropolishing or etching include soft austenitic stainless steels, aluminum and aluminum alloys, copper and copper alloys, among others.

Shorter preparing time is needed for electrolytic polishing and etching process compared to traditional mechanical preparation.
The primary requirement for electropolishing is that the specimen be conductive.

Electropolishing is also commonly applied to the preparation of thin metal samples for transmission electron microscopy because electropolishing does not cause mechanical deformation of surface layers usually observed when mechanical polishing is used.

METKON offers ELOPREP Electrolytic Polishing & Etching Unit for fully automatic electrolytic sample preparation. Electrolytic sample preparation process consist of several steps. See step by step electrolytic sample preparation as follow:

STEP 1: Preparing Electrolyte

Each specimen may require different types of electrolytes. Proper electrolyte should be selected for specimen. Please see instruction manual of ELOPREP to see common electrolytes.

Fill electrolyte container of ELOPREP with correct electrolyte and place it on polishing unit. If you have different specimens which required different electrolytes, you can use additional electrolyte containers. Thus, you do not have to change electrolyte for different types of specimen, you only need to change electrolyte container.

STEP 2: Choosing Masks

Acid resistant masks are used for determining polishing area of specimen. There are specific aperture on the masks. Electrolyte will contact the specimen surface from this aperture thus only this area will be polished. Masks are available with 0,5-1-2 and 5 cm2 aperture size. Mask should be placed on cathode and specimen should be placed on the mask.

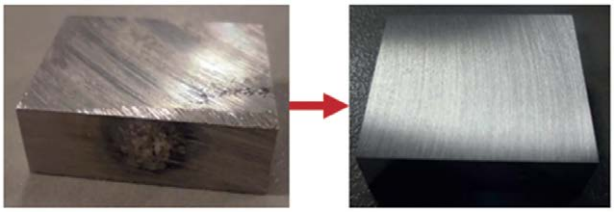
STEP 3: Adjusting Flowrate

Flowrate of electrolyte should be adjusted before operation. In other words, electrolyte should be reached upper level of the mask without any turbulance. Otherwise, polishing operation cannot be done properly.

To adjust flowrate, press Pump button without placing sample. If the flow rate is not enough, increase the set value until the flow is sufficient.

STEP 4: Preparing Specimen

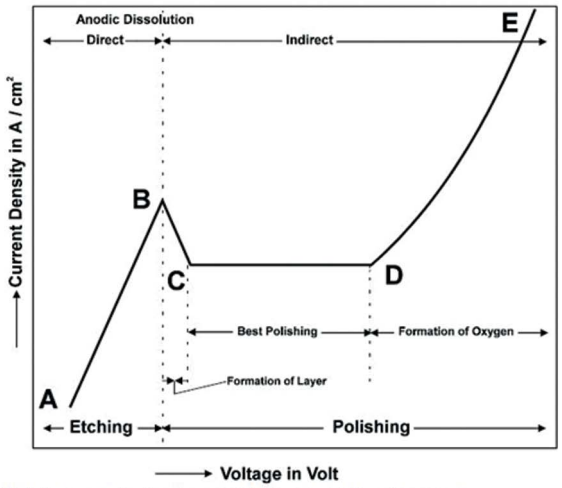
Surface of specimen should not be rough for electrolyic preparation. Specimen should be grinded with 600 grit SiC grinding paper before electrolytic preparation.



STEP 5: Determining Correct Voltage

Voltage is one of the most important parameter for electrolytic polishing. ELOPREP has scanning function for easy and exact determination of the parameters. With the scanning function of ELOPREP, correct voltage of polishing can be defined automatically. If you do not have the knowledge for the polishing voltage to be set for your sample, you can use the scanning function to determine exact voltage. You do not have to make time consuming trials and error testing for the correct voltage.

*Place specimen on the mask. Be sure that the aperture is covered and closed completely.
*Place the anode arm on the top of the sample to ensure good contact.
*Enter Scan menu, set scanning voltage and flowrate parameters and press Start.
*After a while, ideal polishing voltage for your specimen will be seen on the screen.



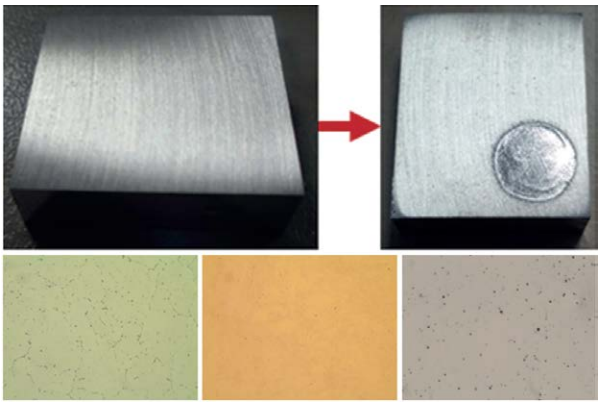
This is a graph showing an ideal current density curve.

STEP 6: Electrolytic Polishing & Etching

ELOPREP has 4 different operation modes; only polishing, only etching, automatic etching after polishing and external etching.

*Place specimen on the mask. Be sure that the aperture is covered and closed completely.
*Place the anode arm on the top of the sample to ensure good contact.
*Enter Polishing&Etching menu. Set parameters: Voltage, flowrate, mask type and time.

For only polishing:
Set only polishing time and polishing voltage. Do not set etching time and etching voltage, these should be zero "0". Press start and operation will be completed automatically. The specimen must be washed after polishing operation is completed.
Polished surface and microstructure can be seen as below:


(Microstructure of Al-Cu-Steel)

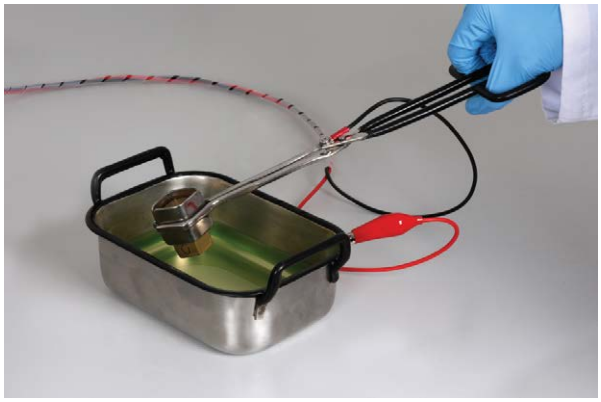
For only etching:
Set only polishing time and polishing voltage. Do not set etching time and etching voltage, these should be zero "0". Press start and operation will be completed automatically. The specimen must be washed after etching operation is completed. Microstructure of etched surface can be seen as below:


(Microstructure of Al-Cu-Steel)

For automatic etching after polishing:
Set polishing voltage, polishing time, etching voltage and etching time. Do not set etching time and etching voltage. Press start. Etching will be done automatically after polishing operation is completed. The specimen must be washed after etching operation is completed.

For external etching:
If polishing and etching electrolytes different than each other, in this case external etching unit can be used.

*Fill external etching unit with electrolyte.
*Connect cables of external etching unit to control unit.
*Enter External Etching menu. Set etching voltage and time.
*Hold the sample with scissors.
*Plunge the sample into the external etching unit. As soon as the sample contacts with the electrolyte the process will start automatically.
*As soon as the set etching time is reached an audible signal notifies the operator that the process is completed. Wash your specimen after etching is completed.



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Technology behind Specimen

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