Etching Station 1

... for prototyping and small batch production of printed circuit boards

The Etching Station 1 is used in laboratories and small batch production for making printed circuit boards as well as for etching metal foils.
The cuvettes are out of cristal clear acrylic glass. A powerful diaphragm pump and an aeration frame with air curtain tube is used to produce tiny air bubbles in the etching cuvette.
Further the etching device includes the glass heater for heat up the etchand temperature up to 45°C and one PCB-holder for carrying the printed circuit boards. A small thermometer is showing the bath temperature.
Beside the etching tank the Etching Station provides two additional tanks for the developer solution and rinsing water.

- *Three indepentent acrylic glass tank*
- *Diaphragm pump and air curtain tube inside the etching tank for producing small air bubbles inside the etchand*
- *Adjustable heater (glass-heater),Temperature range between +36°C to +45°C*
- *Adjustable PCB holder for mounting circuit boards of various sizes*
- *Drain cock in each tank*
- *Glass thermometer*
- *Plastic drip tray*

Technical Data	
Item no.	PA310
Dimension (WxDxH)	420 x 325 x 440 mm
Capacity of the tanks	
Tank 1	approx.: 4 l
Rinsing tank 2	approx.: 8 l
Etchung tank	approx.: 4 l
Etching sulfate needed	ca. 1000g (auf 4 Liter)
Sodium hydroxide needed	ca. 40 g (auf 4 Liter)
max. PCB dimension	310 x240 mm
Glass heater	150 W
Heat up time	approx.: 30 min
Net weight	approx.: 10 kg
Weight (with fluids)	approx.: 26 kg

ACHTUNG!

GEFAHR!

- **Etching station 1 can be used for etching printed circuit boards and metal foils of various sizes.
Any other use of the device is not permitted.**
- **The device is designed for power supply AC 230V (50- 60Hz) and may used only in perfect technical condition.
Using the etching device it is not allowed by children and people which are not instructed.**
- **The basis of the etching device (table, work bench) is supposed to be horizontally, stable, resistant to chemicals and easy to clean.
The area in which the devices are used should be well illuminated and ventilatable.
Not required tools, devices or components are to be kept away from the working area.**
- **Eating, drinking and smoking are strictly prohibited!**
- **Keep devices and chemicals out of the range of children and foods.
Store not required chemicals in the original container in a dry place.**
- **Assembly and using of the device has to be done only according the declaration of conformity.**
- **Carry corresponding protective clothing (acid and alkal-proof protection gloves, protective goggles, overall or apron) when applying the bath or when working with the device.**
- **The device must not exposed to high humidity, strong vibrations or explosive gas.**
- **Keep this manual careful. Personnal working at this equipment has to be instructed about the dangers.
If you don´t provide this manual, loss of property or risk of injury may happen.**
- **Pay attention to the disposal remarks for waste materials.**
- **Never pour water on the etching granulate! First fill the cuvettes with water and after add granulate, then mix the liquid.**

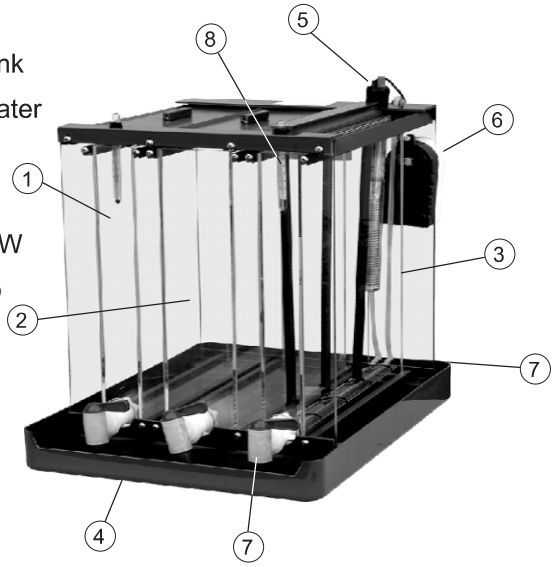
1. Start-up

1.1 Placement

The etching device is mounted completely by c. Only the glass heater and the thermometer has to plug in the holes at the top of the tank.
Place the etching device into the catch basin. Place the device on a horizontal, stable and acid-proof table.

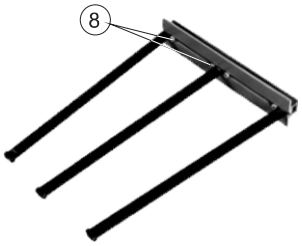
The working area should be ventilatable and well illuminated!

1. Developer fluid tank
2. Tank for rinsing water
3. Etching fluid tank
4. PVC trip tray
5. Glass heater, 150W
6. Duaphragm pump
7. drain cock
8. PVB holder
9. Thermometer



1.3 Handling of the board holder

For adjust different board sizes, loosen the screws of the board holder below the handle strip (8).
In case of single-side boards, you can double the holding capacity by clambing the boards back-to-back.



If you do not tighten the screws, you can shift the strips easily without need a tool.
For larger boards, remove the middle strip.

1.4 Etching bath

For etching, we recommend only our sodium persulfate. This etching mediums is odorless, clear, and pollutes the device only insignificantly.
Further sodium persulfate has the positive feature to get blue if solution is saturated.
It achives etching times of 6-8 minutes at 40-45°C. The etching speed is between 4 to 7µm/min with a copper reception of approx.: 30g/l.

Preparing the etching solution:
- Fill the cuvette with water (about 4 liter)
- Add the etching granulate (1000g Sodium persulfate) slowly and stir in the water.

The etching device is not suitable for ferrous chloride as an etchant!
In case of using other etching chemicals, we can not take over any guarantee for the function of the device since these chemicals may disolve the glue of the glass cuvette and let damage the cuvette.

1.5 Developer bath

A solution of 50g of sodium hydroxide (etching sodium bicarbonate) is needed for delopment in 5 liters of water.
Store the prepared solution until the granulate has been completely dissolved.
The prepared solution is a soda lye of approx. 1%.

The bath is useless, if a development time of more than 7 minutes is needed, it has to be renewed

ATTENTION!

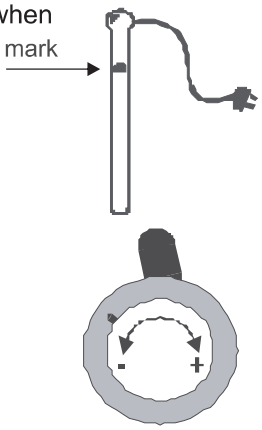
Never pour water on the etching granulate! First fill the cuvettes with water and after add granulate, then mix the liquid.

Sodium hydroxide is a heavily caustic lye and reacts under violent heat development if the granulate has contact with water!

Note all safety references and wear protective clothing

1.6 Adjustment of the temperature of the etching bath

Before etching, set the temperature of the heating regulator.



1. Switch-on the power supply of the glass heater only when the tank is filled and the pump is activated!
2. The water level should be about 20mm above the marking of the heating rod so the heater regulation can work correctly.
3. Do not heat the bath to a temperature above 50°C since this can cause a deformation of the acrylic tank and a malfunctioning of the thermometer.
4. Connect the power cord of the glass heater to mains voltage (AC 230V/50-60Hz). Turning the adjustment knob in plus-direction increases the temperature, the temperature is reduced by turning into the minus direction
5. To adjust the temperature please turn the knob to maximum (+).
   Control temperature rise while heating up. When Temperature of 45°C is reached, turn adjustment knob slowly in direction (-) until the indicator lamp ist deactivated and the glass heater is OFF.

ATTENTION!

Pay attention to the temperature of etching bath. Temperaure higher than +50°C may result in deformation of the acrylic tank and may damage the glass heater.

2. Etching procedure

1. Switch-on the membrane pump by connecting the feeder to mains voltage.
2. Plug in the power cord f the heater to mains voltage. When bath temperature of 45°C is reached you can start etching.
3. Clamp the board in the board holder and make sure, that the board is fixed well.
4. Immerse the board holder with the board into the tank.
5. After 5 to 10 minutes, the copper is removed.
6 Rinse the printed circuit board in water and dry the board

Please notice:

- The bath is saturated if the color of the liquid changes to a deep blue and the etching times extend to more than 30 minutes. It has to be renewed.
- The etching liquid can remain in the cuvette without losing it´s effect for a few days. Liquid losses due to evaporation can be compensated using water.

ATTENTION

Carry corresponding protective clothing (acid and alkal-proof protection gloves, protective goggles, overall or apron) when applying the bath or when working with the device.

At skin contact, rinse immediately with lukewarm water and soap.

If you don´t want to use the etching device for a longer time, please discharge the tank. Fill the etching fluid in a plastic canister and store them out of range of children and foods.
After this, fill water (approx.: 1l) in the tank and switch on the membrane pump for a few minutes to clean the air curtain tube.