Etching Device 1 and 2

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

Etching Device 1

Etching Device 2

Etching Devices 1 and 2 are 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. They are mounted on a plastic tube, in which a diaphragm pump is mounted. Further the etching device includes one heater element for heating up the etchand temperature up to 45°C, a PCB-holder for carrying the printed circuit boards while etching and a thermometer.
During etching, the membrane pump together with the air curtain tube inside the cuvette produce tiny air bubbles. This reduces the etching time.

- *Super slim acrylic glass tank*
- *Membran pump and air curtain tube inside the tank for producing small air bubbles inside the etchand*
- *Adjustable heater (glass-heater), Temperature range nearly +36°C to +45°C*
- *Adjustable PCB holder to carry circuit boards of various sizes*
- *Glass thermometer*
- *Plastic drip tray*
- *Dimension (LxWxH)*
  - *Etching device 1 285 x 105x 320mm*
  - *Etching device 2 445 x 105 x 320mm*

Technical data		
Part number	PA104	PA**
Top opening	210 x 25 mm	365 x 25 mm
max. board size	235 x 170 mm	235 x 330 mm
Capacity of the tank	1,75 l	2,25 l
Heater	150 W	150 W
PCB holder	single slot	double slot
Weight	2,2 kg	2,8 kg
Etching sulphate needed	400 g	600 g

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GEFAHR!

- **Etching device 1 and 2 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 alcal-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. Personal working with this equipment are to be instructed about the dangers.
If you don´t provide this manual, loss of property, risk of injury may can happen.**
- **Pay attention to the disposal remaks for waste materials.**

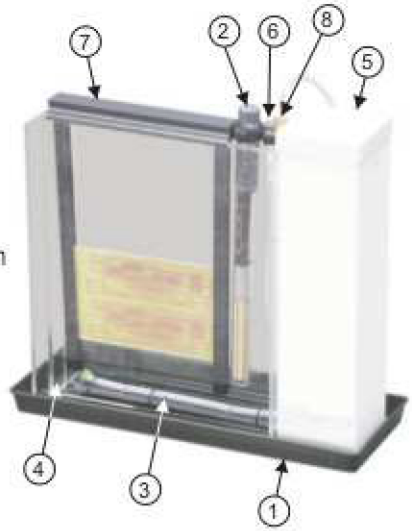
1. Start-up

1.1 Placement

The etching device will be delivered mounted completely. Only the glass heater and the thermometer has to plug in into 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 basis (e. g. tiled table).

The working area should be ventilatable and well illuminated!

1.2 Assembly



1. Place the etching device into the catch basin (1). Place the device on a horizontal, stable and acid-proof basis.
2. Plug in the glass heater(2) into the hole, top of the tank
3. Fill water into the tank (4) (see technical data). Please note: The water level should about 2-3 cm below the maximum high of the cuvette.
4. Connect the membrane pump (5) to power supply (AC 230V /50-60Hz). Please check, if small air bubbles are comming out of the air cusion tube (3), which is laying inside the glass acrylic tank.
5. Thermometer (6)
6. Board holder (7)
7. Safety valve (8)

1.3 Handling of the board holder

You can adjust the board holder by loosening the screws (8) below the handle strip.
In case of one-sided boards, you can double the holding capacity by clambing the boards back-to-back.

If you do not tighten the screws, you can also shift the strips without having to operate the screws.
For larger boards, remove the middle strip.

1.4 Etching bath

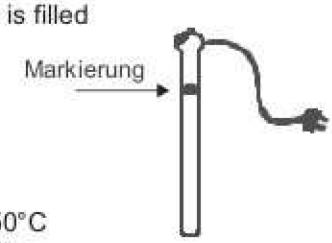
For etching, we recommend only our sodium persulfate. This etching mediums is odorless, clear, and pollutes the device only insignificantly.
Further sodium persulfate has the positive feature to get blue if solution is saturated.
It achives etching times of 6-8 minutes at 40-45°C. The etching speed lies between 4 and 7 µm/min with a copper reception of approx.: 30g/l. The batch amount ist 200 - 250 g/l of water.

- Unplug all mains plugs before filling in the etching sulfate.
- Fill water into the tanks (see technical data) and then pour the etching sulfate into the water.
- Place the borad holder into the tank as a cover
- Connect the membrane pump and the glass heater to mains again.

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.

1.5 Adjust the heating regulator

1. Switch-on the glass heater only when the tank is filled and the pump is activated!



2. The water level should be a few millimeters 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 (cw) increases the temperature, the temperature is reduced by turning into the minus direction (ccw)

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.

ATTENTION

The etching device is designed for using sodium persulfat.
Don´t fill in iron-III-chloride or other chemicals!

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.

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According the water law of Germany (BGBl (186/1996) dated 19.04.1996), the remainder content of copper is limited to 0,5mg/l that may be dispose to the seewer.
Because of new limits appointed by the goverment, it is suitable to inquire corresponding information of the appropriate government agencies.

ATTENTION

Before cleaning the air curtain tube, switch-off the glass heater.

Use only plastic container for storage etching fluid.

Make sure that no etching fluid get inside the non-reverse valve. Running back etching medium destroys the diaphragm pump.

Not required tools, equipment and parts take away from working area. Switch-off the device after use. Cover the cuvette with the board holder.

3. Sewage treatment

To drain the etching liquid (saturated solution or by prolonged non-use of the etching bath), plug the supplied PVC pipe into the hole provided in the cuvette.

For storing the etching liquid, only use closable PVC or glass bottles.
The etching solution is saturated hazardous waste (trichloroethane). Please dispose of this according to the regulations locally applicable.

Etchants Keep always out of reach of children!

4. Maintenance and cleaning

- According to the application frequency, you should regularly clean the etching device in order to guarantee a perfect working. This specially affects the part pump, connecting tube, board holder etc.
- For cleaning the etching device, empty the cuvette by using the drainpipe. After fill in again about 0.5 l hot water. Now switch on the pump.

  Make sure that the heater is not switched on!

  Blowing in air the pores of the highly porous air curtain tube are largely cleaned. If pores are clogged by crystals you can try gently them with a small wooden / PVC bar.
- For cleaning the cuvette you can use a wooden or PVC strip with a foam stripe on top (eg. Tesa Moll).
- When not using the etching tank for a long time it makes sense to release the connection hose from the non-reverse valve.

5. Spare parts

Glass heater for etching device, (150W)
Item no.: 411186

PCB holder for etching device PA104
Item no.: 149165 1000

PCB holder for etching device PA**
Item no.: 149167 1000

Glass thermometer (0 - 50°C)
Item no.: 141900

Aerating frame, etching device PA104
Item no.: 149175 3000

Aerating frame, etching device PA**
Item no.: 149177 1000

Membrane pump, etching device
Item no: 411156