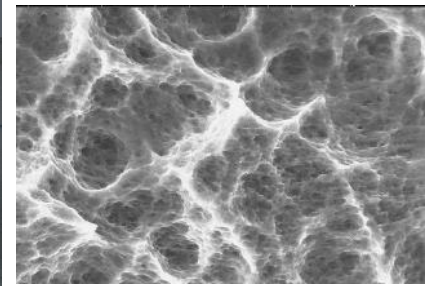
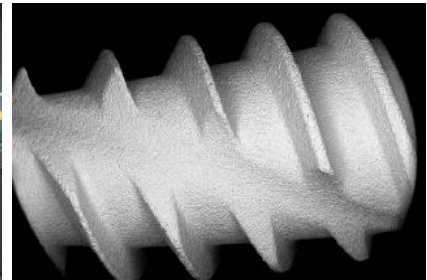


## RE-116 Robotic acid etching machine for dental implants



### 1. General

The RE-116 robotic acid etching machine implements acid etching process for dental implants according to the SLA protocol.

The machine can be modified and tailored to any other process protocol according to customer needs.

The machine uses 4 or 5 process tubs within a fume hood and a robot arm (option) to manipulate implants trays through the process.

The RE-116 robotic acid etching machine is fully programmable and enables more productivity, flexibility and constant results.

All machine components are built from chemical resist materials like PP, PPS, PVDF and PTFE.

## 2. theory of operation

Implants are manually mounted on dedicated trays and positioned at the right-side machine magazine.

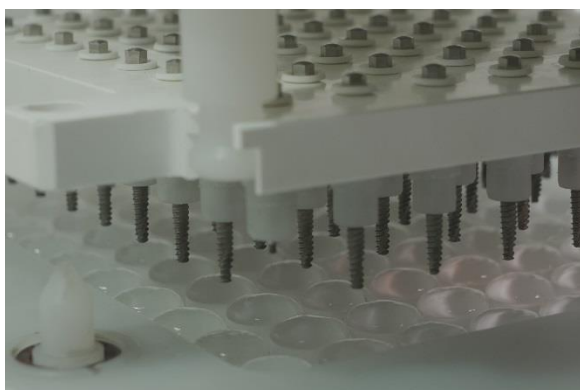
The machine working area is built around a fume hood that is constantly ventilated

Robotic arm picks the trays and handle them in parallel through the process.

Finished trays are picked from the left side machine magazine



Acids are stored in a dedicated tank at the back of the machine and are fed to a mixing tank using dosing pump. At the mixing tank acids and water are mixed and heated according to user parameters. The mixing tank is constantly feeding the etching tub in which each implant has its own chamber that is constantly overflows.

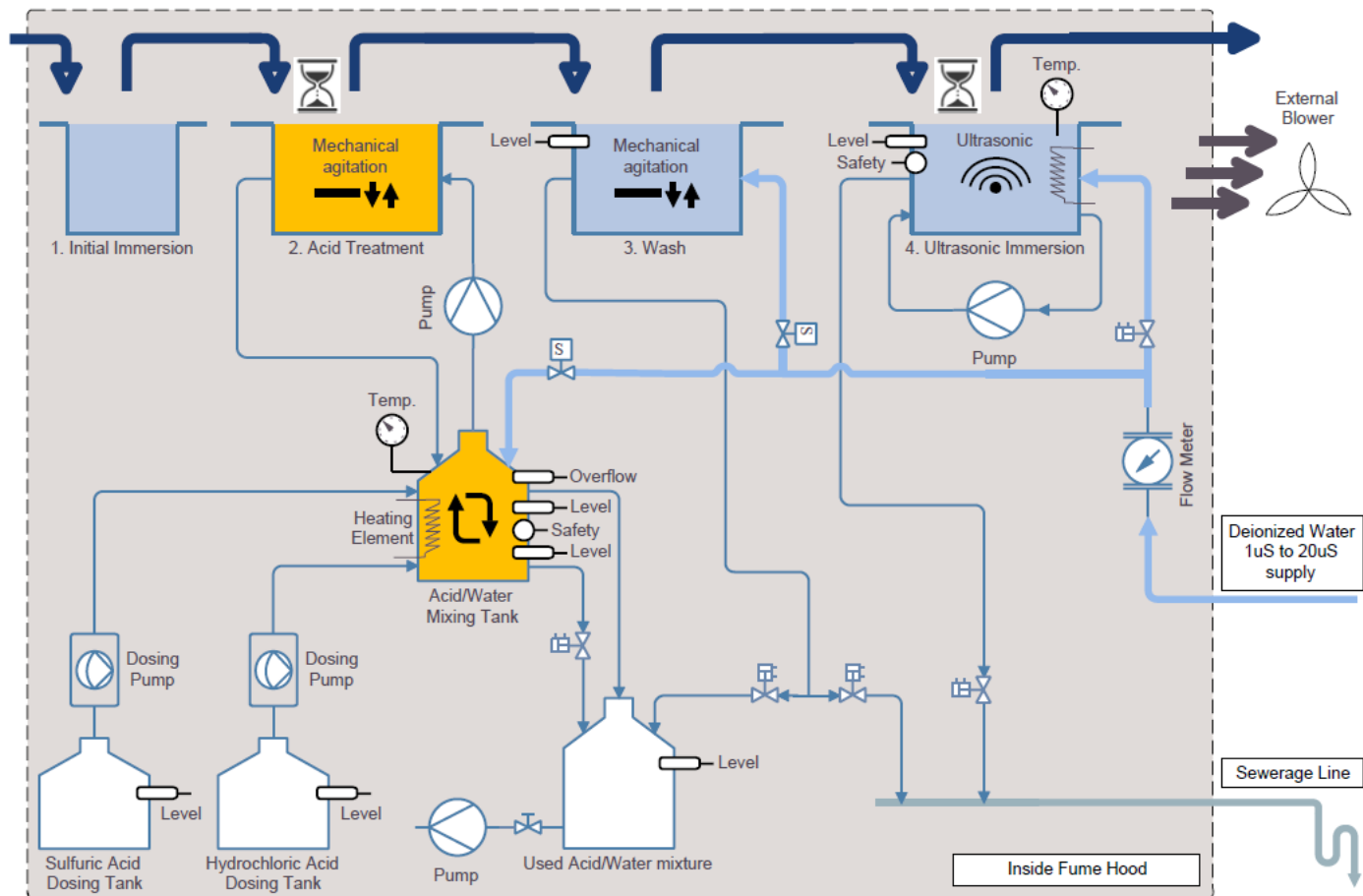


The etching tub has a dedicated programmable shaking mechanism to eliminate bubbles that are generated through the process and effects the surface quality.

Washing of the implants is done in two tubs, first a rough wash is done with DI water at room temperature using overflow method and a dedicated programmable shaking mechanism.

The second wash is a fine washing using an ultrasonic device at 40°.

used acids are automatically drained for storage into a 60-liter waste tank inside the machine, used washing water are automatically drained to the waste tank or sewerage according to user parameters.



System basic layout

### 3. program and control

The RE-116 use a colored 21" touch panel for programing and controlling the process.



Programing options:

etching

- Acid mixing ratio
- Acid mixing temperature
- Etching time
- Dosing pumps calibration
- Water sensor flow calibration
- Acids automatic boosting compensation during process.
- Shaking time, shaking speed and shaking intervals during etching.
- Mini drain of acid mixture (empty the etching tub and refill again)
- Double etching (etch-> rough wash -> etch again)

- Handle Acid mixture life time.
- Automatic draining of used acids.
- Automatic washing of mixing tank, acid tub and acid lines.

## Rough Washing

- Washing liters
- Washing time
- Shaking time, shaking speed and shaking intervals
- Washing cycles of the tray plate
- Draining path (waste tank or sewerage.)

## Fine washing (ultrasonic)

- Washing time
- Washing temperature (up to 40°)
- Water refreshing cycles

## Robot programing

- A push button "snap shot" for position recording.
- Zero position teaching.
- "Go to position" option
- Manual positioning
- Automatic test run for trays handling
- Automatic process test run

## Viewing screens

- Process parameters and process status.
- "getting ready" screen – step by step instructions before running the machine.
- Alarm messages
- Machine status (inputs & outputs) for maintenance trouble shooting

- Robot status and position.
- Easy to use Setting screens (setting process parameters)
- Easy to use command screens for manual operations
- Users level and password definitions.

## 4. process recipe examples

4.1 process using HF solution for cleaning and H<sub>2</sub>SO<sub>4</sub> & HCL for etching:

No	Process/tank	Time(min)	temperature	media
1	cleaning	programmable	Room temp	DI water & HF solution
2	cleaning	programmable	Room temp	DI water
3	etching	programmable	75-85°C	H <sub>2</sub> SO <sub>4</sub> &HCL
4	cleaning	programmable	Room temp	DI water
5	cleaning	programmable	40°C	Ultrasonic DI water

4.2 process using H<sub>2</sub>SO<sub>4</sub> & HCL only:

No	Process/tank	Time(min)	temperature	media
1	wetting	programmable	Room temp	DI water
2	etching	programmable	75-85°C	H <sub>2</sub> SO <sub>4</sub> &HCL
3	cleaning	programmable	Room temp	DI water
4	cleaning	programmable	40°C	Ultrasonic DI water

## 5. machine installation

Dimensions: 2691X2027X1338 WXHDXD

Weight: 850Kg empty, 950kg full with fluids

The following power, air, DI water, sewerage connection and ventilation are needed:

- Power connections: 3X380V 16A, Power consumption: about 3KW
- Air supply: 6 bar dry air 0.05 m<sup>3</sup>/hr consumption, 10mm air tube.
- DI water supply: at least 1000 liters/ hr DI water system, G1/2" female connection, water consumption up to 35liters per hour.
- 1.5" sewerage connection.
- 250mm diameter ventilation tunnel with an 1500-2000 m<sup>3</sup>/hr blower.



## 6. machine dimensions

