

***MBtech NC25
PCB Cleaner***



PRESENTATION OF THE EQUIPMENT

General Presentation

NC25 PCB Cleaner has been developed to deflux PCBA as well as misprinted boards. **This equipment has been designed to use water based or semi water based cleaning agent.** To reach a high level of efficiency the equipment uses **a patented filtering system.** .

General Specifications

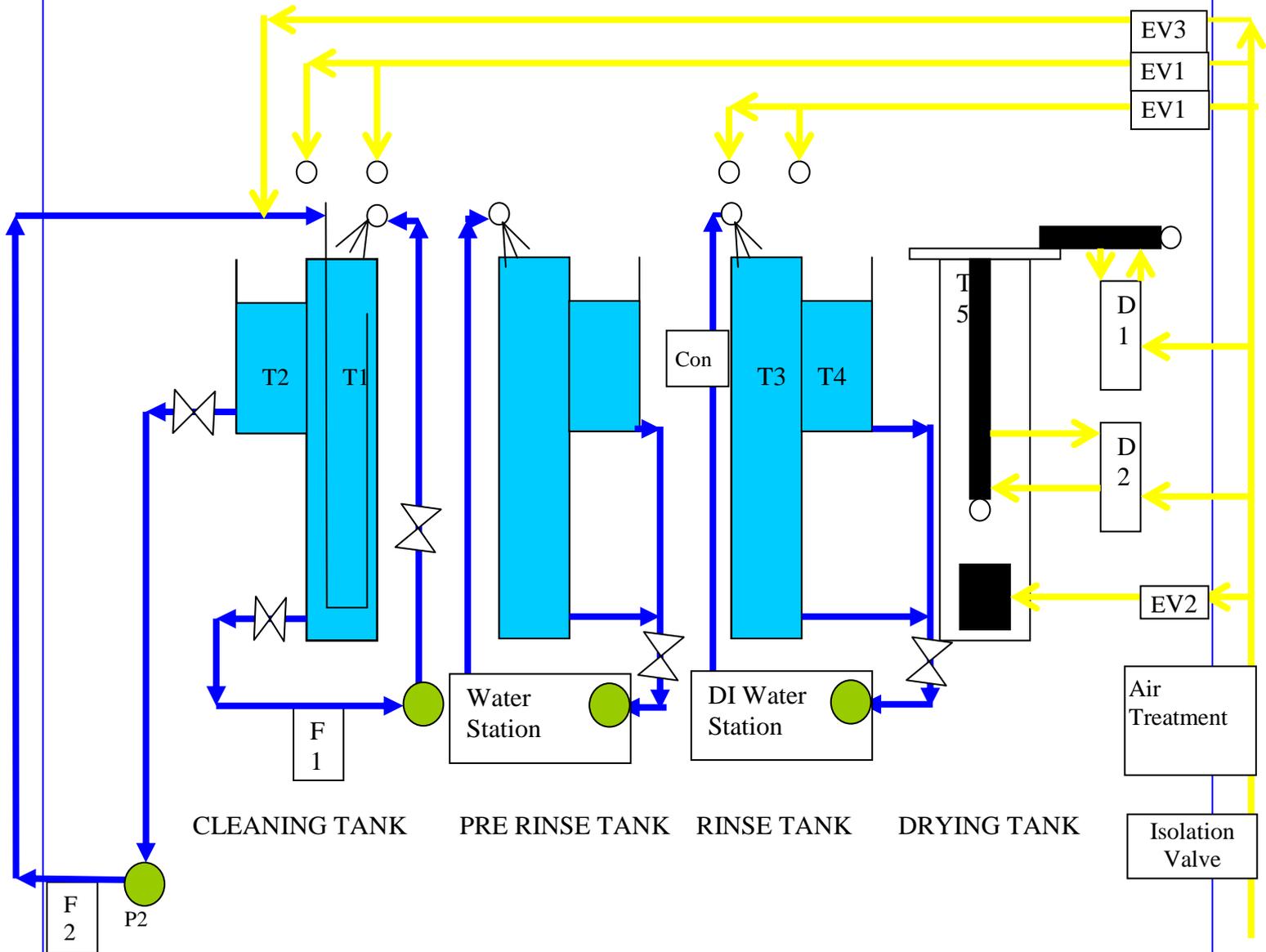
- Dimension: Width: 1,00 m; High: 2,00 m; Depth: 1,60 m.
- Empty weight: around 700 kg.
- Capacity: 80 liters cleaning liquid,
60 liters DI water,
60 liters DI water.
- Electric supply: 380/400 V – 50 Hz – 3 phases + Neutral + Ground. (Also available in 60Hz)
- Power: 8000 watts.
- Compressed air pressure: 5,5 bars, maximum flow rate: **250L/min, air without oil and water.**
- Sound level: under 75 dB.

Machine Description

NC25 is composed of:

- Chassis with 4 doors build on a containment tray:
 1. A first one on the top of the front face giving access to the loading post (Post 1),
 2. Another one on the top of the rear face giving access to the unloading post (Post 2).
 3. Two others on the bottom of the front and rear face giving access to the cleaning fluid filtration and the electric cabinet,
- A Control panel with colour display and soft panel on the right side of the machine (Post 3).
- A transfer system using synchronized chains with three phases motor and frequency converter allowing the carriage of PCB frames holder to each steps of the cleaning process.
- A conveyor system by gravity for loading and unloading.
- A double stainless steel cleaning tank (T1 and T2) with isolation valves (V1 and V2) and a draining valve (V5). Liquid comes back on top of the tank through SL1
- A stainless steel configurable tank: can be a pre-rinsing tank open or close loop.
- A double stainless steel rinsing tank (T3 and T4) with isolation valve (V4). Liquid comes back on top of the tank through SL2. Conductivity meter (Cond) check water quality when coming back.
- An aluminium drying tank (T5) with forced convection system with vacuum pump (VP).
- A filtering system combined to the cleaning tank (F1 and F2) with one centrifugal and one magnetic driven pumps (P1 and P2).
- In option, a Water and DI water production system combined to the rinsing tanks.
- A system of sprayer line creating an air curtain (SL3, SL4, SL5 and SL6).
- A pneumatic system with air treatment, electrovalves (EV1, EV2 and EV3) and distributors (D1 and D2).

The different tanks and systems linked to these tanks are represented on the diagram on the next page.



Working Principle

Posts Identification

This equipment is composed of three distinct posts and only needs one operator to work.

Post 1: Loading

The loading post is behind the top door of the front face. Boards to clean are loaded in the machine from this post.



Front face

Post 2: Unloading

The unloading post is behind the top door of the rear face. Cleaned boards are unloaded from the machine at the end of the cycle from this post.

Post 3: Control Panel

It centralizes information about the different failures that could occur while the machine is running:

- Wash tank level alarm,
- Pre rinse tank level alarm,
- Final DI water rinse tank level alarm,
- DI Water conductivity alarm,
- Air pressure and vacuum alarm,
- Pump P2 pressure alarm,
- Frame position alarm,
- Door open or cycle not launch,
- Sprayer wrong positioning,
- Unloading conveyor full alarm,
- Conveying system positioning alarm,
- Vacuum tank cover alarm,
- Conveying sensors alarm.

The display also allows to parameter the machine (See programming manual). Are also present all the command of the machine:

- ON / OFF button,
- Start button,
- Emergency Stop button.



PCB Frame holder

Very easy to use, without any tools, it allows transferring boards stored on the frame through each step of the cleaning process.

These frames offer an up to 580x530mm modular area to store PCB with maximum width of 50mm in standard and 90mm in option.



Loading Conveyor

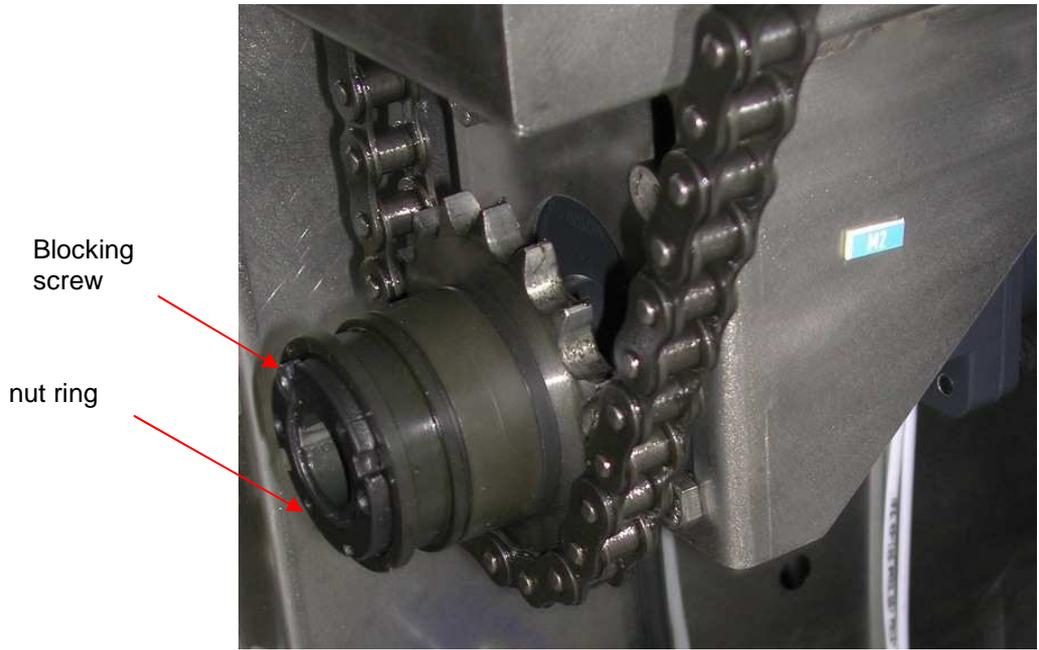
They allowed storing up to 5 frames. **They are adjusted in the factory and do not have to be modified.**

Conveying System

This system is composed of a dual speed motor / a torque limiter / a system of synchronized chains / two carriers. The two carriers take frames on the loading conveyor and transfer them in the cleaning tank. At the end of the cycle, the cleaned frame is transferred to the rinsing tank while the next frame, waiting on the loading conveyor, is taken to go to the cleaning tank. And so on, after the rinsing, the frame is transferred in the drying tank and then on the unloading conveyor.

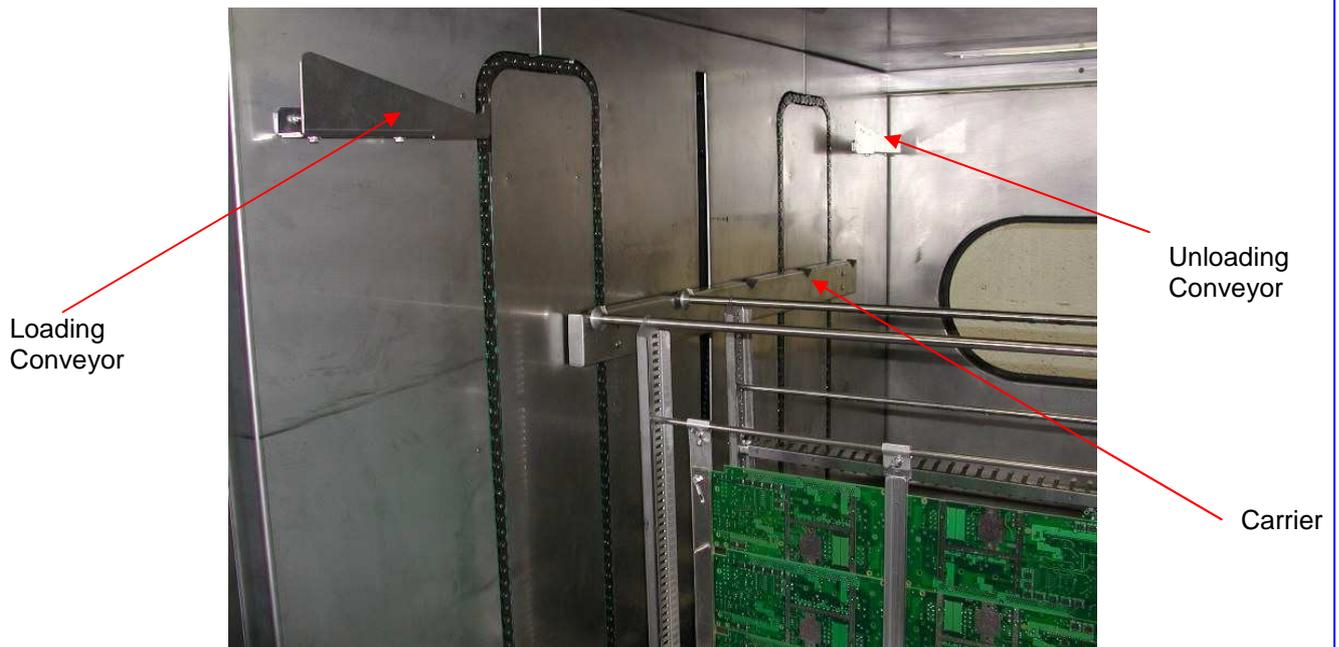
Carriers are equipped of inductive sensors that allow knowing the position of the frames during the transfer phases and also to identify bad positioning of the frames.

The torque limiter is adjusted in our plant at 30.5 N.m



Unloading Conveyor

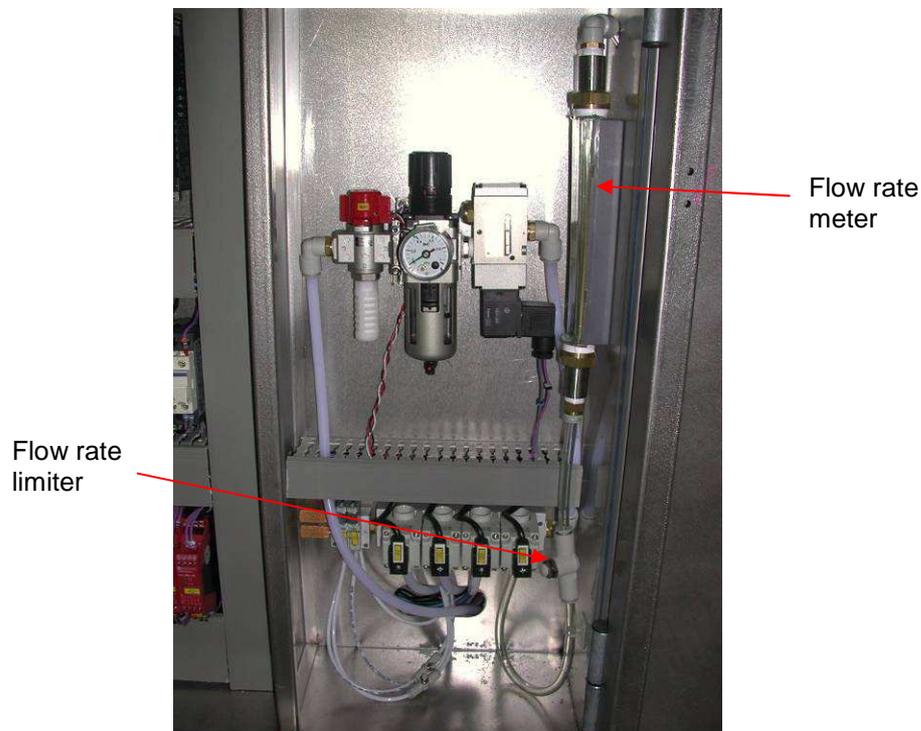
They received frames from the drying operation. They allowed storing up to 5 frames and for the safety of the machine an alarm stops the cycle when there are 5 frames on it. **They are adjusted in the factory and do not have to be modified. Modifying the conveyor position could lead to a bad frame transfer and could even damage the machine.**



Cleaning Tank

Made in stainless steel, it is divided into two tanks by a partition: a principal tank T1 that permanently overflows in the T2 tank. This system allows separating the residues by getting the floating residues from T1 to T2.

An agitation system gives an up right movement to the frames. A bubble sprayer pipe moving all along the width of the tank creates a turbulent flow closed from the boards. The combined action of agitation and turbulence help to easily remove the residues. This bubble sprayer is equipped with a flow rate limiter and flow rate meter to adjust the cleaning parameters. These 2 elements are located inside the pneumatic box



At the top of the tank, there are two air sprayers lines SL3 and SL4 with calibrated nozzles that create an air knife to keep in the tank most of the cleaning liquid remaining on the boards.

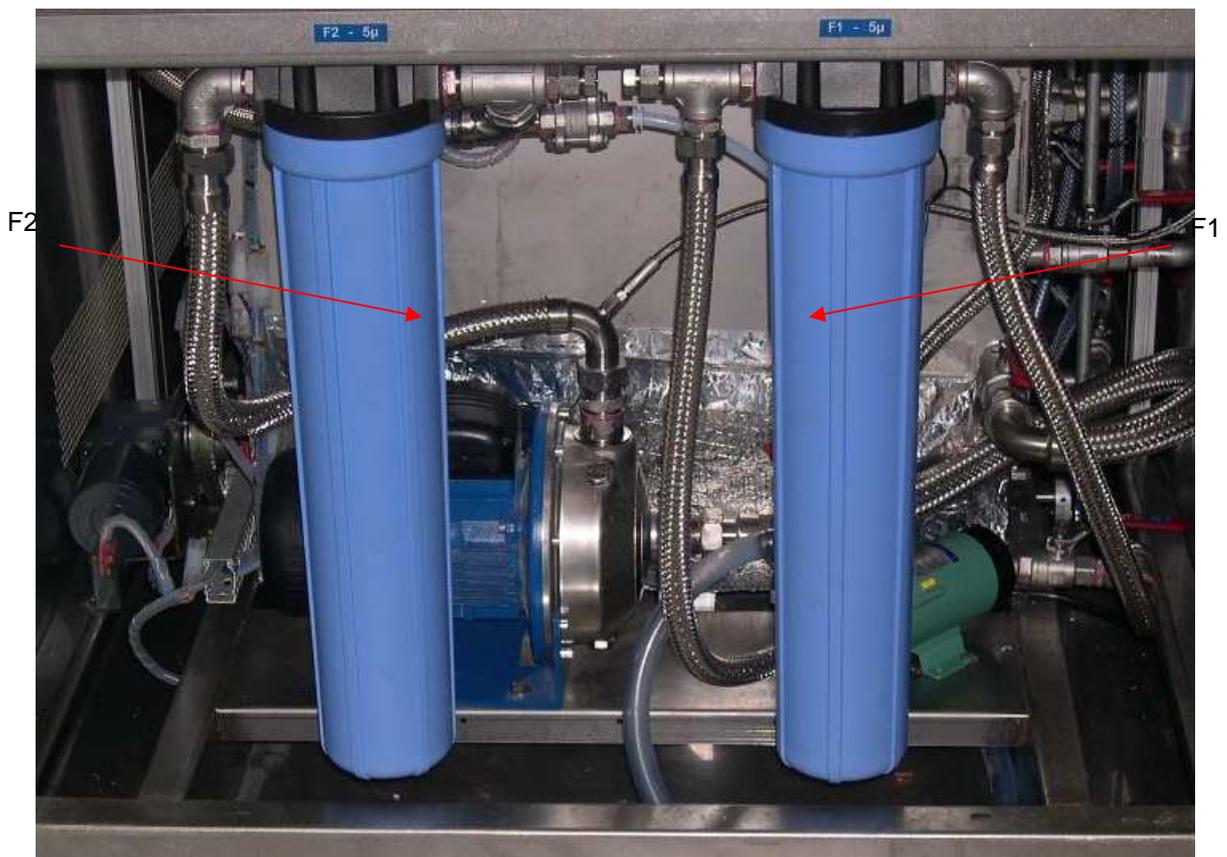
On the sides of the tank, there are heating resistors driven by a precise regulator ($\pm 1^{\circ}\text{C}$ precision) in order to meet the temperature wished. A safety thermostat adjusted to 67°C avoids the liquid overheating because of PLC failure.

Cleaning Tank Filtering System

Behind the bottom left door of the front face, there is the filtering system composed of two independent elements:

1. The fluid sucked into the lower part of T1 may contain particles of glue or heavy residues such as solder paste alloys. The alloy particles and the former are trapped in the 5 μ m F1 filter cartridge.
2. Likewise in the lower part of T2, the liquid charged with the floating particles that have overflowed from T1 (fluxes of solder paste) is filtered by 5 μ m F2 filter.

Each of these systems includes a magnetic driven pump to avoid any leaks. Valves at the outlet of T1 and T2 make it possible to change the filters. A pressure sensor makes the use of pump P2 safer. The filters consist in a bowl and an interchangeable filter with porosity of about 5 μ m.



Pre rinse Tank

This stainless steel tank can be configured into a pre rinsing tank with water in open or close loop. Whatever the configuration is, the goal of this tank is to increase the life time of the DI water station.

Rinse Tank

Identical to the cleaning tank, T3 is linked to the DI water station. It ensures the rinsing of boards by immersion. In this tank, boards are also shacked with the same agitation system as in the cleaning tank.

When the boards rise, they go through the air knife of SL5 and SL6 to eliminate most of the water before drying.

Drying Tank

This strengthen aluminium tank is heated up to 145°C maximum. Boards will be around 80°C. The temperature can be adjusted through the display.

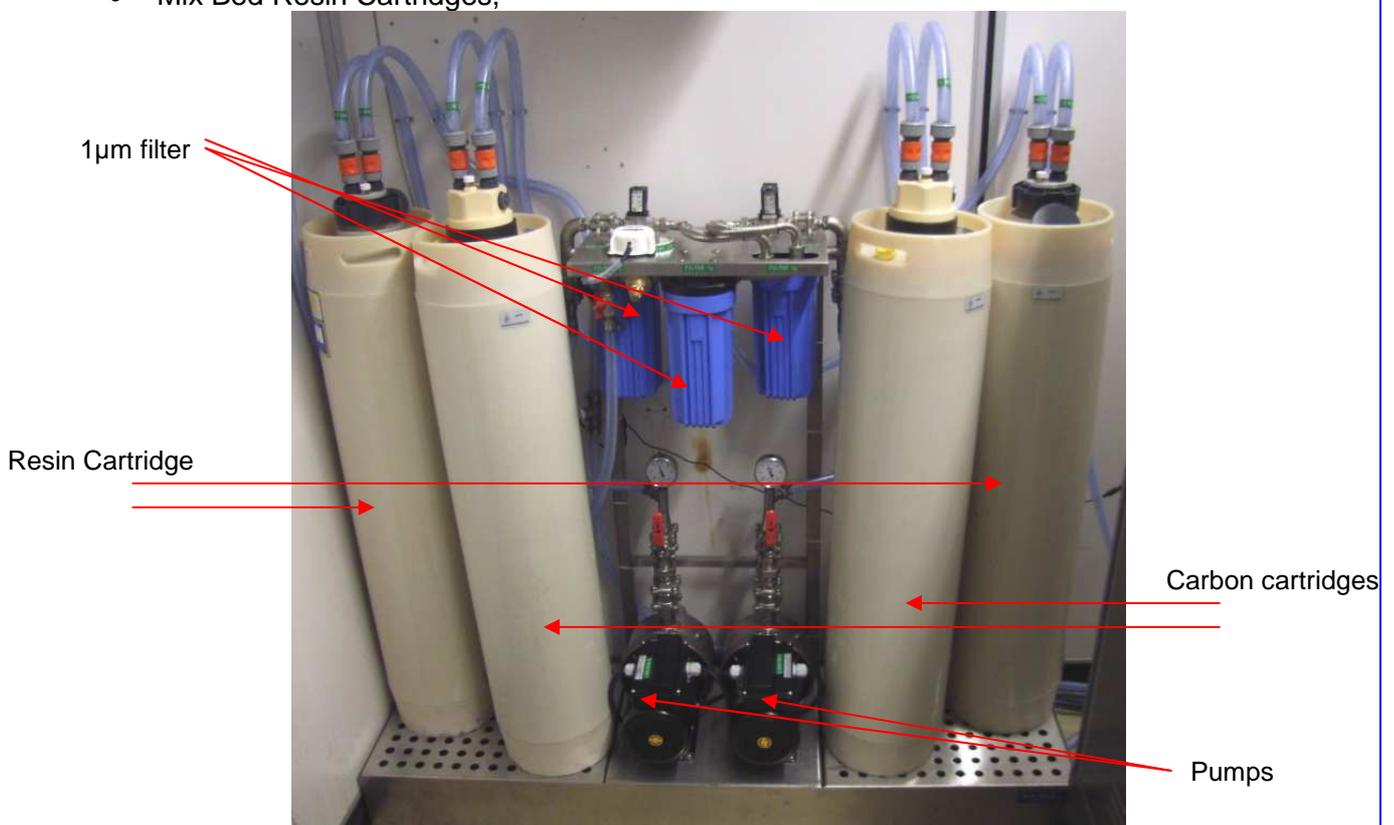
There is a cover on the top of the tank with an airtightness gasket that is moving with pneumatic cylinder system. A fan inside the tank makes forced convection as soon as the cover is closed.

The drying process consists in an alternated cycle of vacuum made with a vacuum pump. This system allows a very efficient drying.

DI Water Station

This DI water production unit is composed of:

- A body with pumps, manometers, filters and isolation valves,
- Active Carbon Cartridges,
- Mix Bed Resin Cartridges,



A Conductivity meter on the machine displays the conductivity value at the DI water station outlet. An alarm indicates when the threshold, set at 5 μ S/cm, is reached on 1st rinsing and 1 μ S/cm, is reached on 2nd rinsing.

Filling System

A stainless steel filling pipe is located on the side of the machine next to the control panel. It allows to fill manually the cleaning tank of the machine from the outside during the installation or to add cleaning liquid while the machine is running. The pipe has a label to identify the liquid to use.



As an option, the refilling of the first and second rinsing tanks is automatically made by the “automatic water level regulation” system.

Automatic refilling

This option makes possible to automatically adjust the level inside the 2 rinsing tanks.

Such option is also available for the cleaning tank together with the automatic dilution of the cleaning chemistry.