

Technical Explain

| Date | Document name | Revision |
|--------------|--|----------|
| 31 July 2024 | MBtech Stencil Cleaner How it works | 1 |

Introduction:

[MBtech](#) is a French manufacturer of cleaning machines founded in 1993, specialized in applications in the electronics assembly industry.

The portfolio consists of machines for:

1. Cleaning Stencils, Squeegees and Misprinted boards
2. Removing flux residue after soldering, such as on PCBAs, Wafers, Lead Frames and Power modules
3. Cleaning Solder Pallets, Reflow oven Filters, Heat Exchangers, Coating Frames and other mechanical parts.

These applications require different cleaning fluids and other cleaning methods, which means they cannot be properly combined in one machine.

That is why MBTech carries the three groups mentioned.

The attached brochure provides an overview of all available machines.

This document only contains additional information about the product group "Stencil cleaners". Please let us know if you would like to receive more information about one of the other product groups.

Within the "stencil cleaning" product group, MBtech offers two cleaning methods:

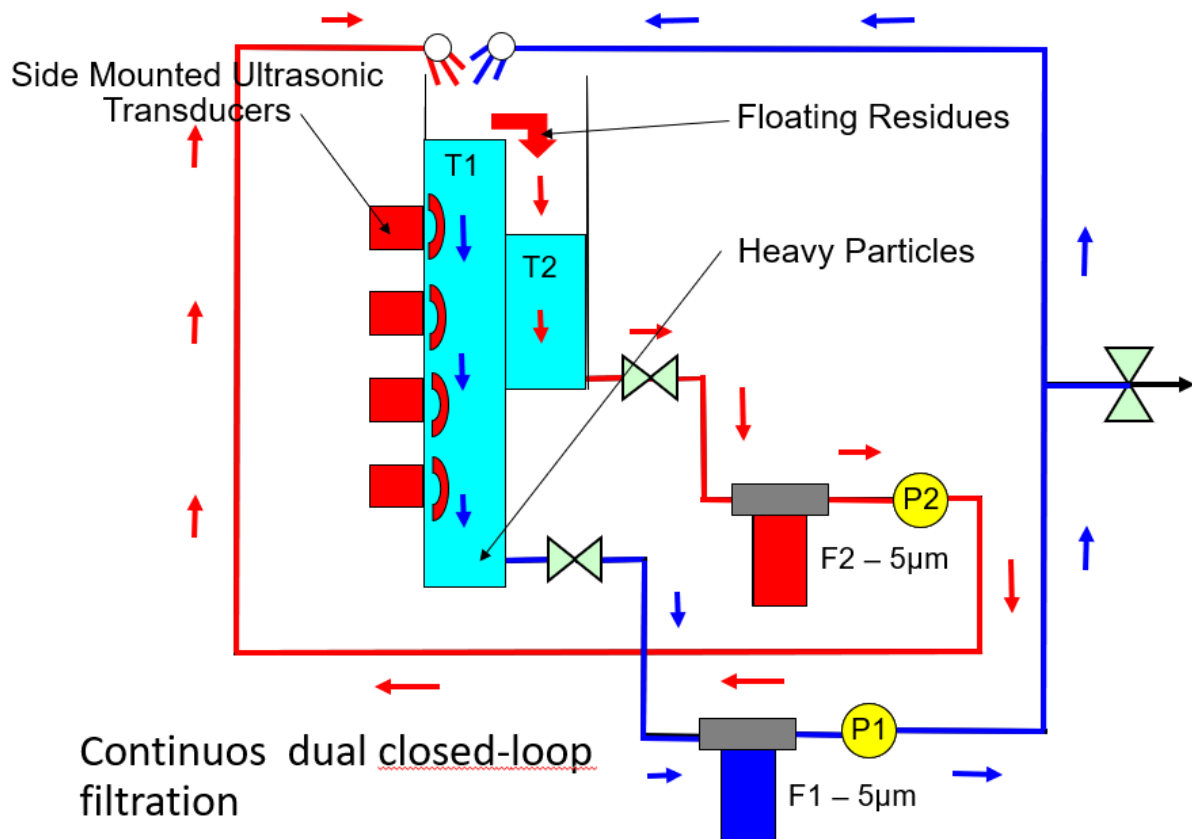
- Ultrasonic: The models N29, N29E and N29SA4 only work according to the "ultra-sonic cleaning method"
- Spray-under-Immersion: The models N29AUTO, N29HV and N29HV-AL work according to the "spray-under-immersion'cleaning method", but can also be equipped with ultrasonic cleaning.

Ultrasonic: Ultrasonic cleaning proves to be a very effective method for cleaning stencils. A stencil is completely immersed in a bath with cleaning fluid. An ultrasonic transducer placed in the wall then creates vibrations that are sent perpendicularly through the stencil. This resonance removes all remaining paste or glue parts from the surface and out of the holes. Heavy paste parts fall down and are sucked out from the

bottom of the container and filtered out through a microfilter, before the liquid is returned into the bath. Any floating flux residues continuously overflow into a smaller reservoir from where they are also extracted and filtered out. This prevents these floating parts from soiling the stencil when removing it. The return of both fluid-flows is made through two spray bars located just above the main reservoir. Stencils are sprayed with freshly filtered liquid when are taken out. This will remove the last possible residues.

The diagram below clarifies how Stencil Cleaning works.

PATENTED FILTRATION SYSTEM



In this way, a solder paste stencil can be completely cleaned in 5 minutes and a glue stencil in 11 minutes. (This is the time without drying)



The most basic and best priced machine version is the N29, where you manually place and remove the stencil in and out of the cleaning bath. There is no drying facility available as standard on the N29. You should place the stencil at a convenient location to dry in the air for a while or blow it off with some low-pressure compressed air to speed up this process.

The N29E is additionally equipped with a heated drying chamber that is placed behind the cleaning bath. This allows cleaning and drying to take place in parallel. Drying takes about 15 minutes. As with the N29, loading and unloading is done completely manually.

The N29SA4 is also equipped with an automatic lift above the cleaning bath. With this lift you can lower the stencil into the machine and, after cleaning, the lift automatically moves up to allow the stencil to drip out. You can then manually place the stencil in the drying chamber, or remove it immediately if necessary.

If desired, an N29 can also only be supplied with a lift only.

Spray-under-Immersion: For applications where ultrasonics are not permitted, for example with glued emulsion screens, or for applications where washing and drying must be fully automated, MBtech also offers machines that work according to the "spray under immersion" method.

The stencil is also completely submerged but then not cleaned by ultrasonic vibrations but rinsed submerged using spray nozzles. This process is also very efficient; Paste cleaning takes approximately 6 minutes and cleaning adhesive stencils approximately 12 minutes (excluding drying). Optionally, this type of machines can also be equipped with an ultrasonic generator, allowing you to choose the desired cleaning method per product.

The filtering works identically to ultrasonic machines; Heavy parts are sucked out from the bottom of the tank and filtered out, floating parts overflow into an overflow tank that is also extracted via a filter and pumped back.

On the N29Auto machines, the drying chamber is located directly above the cleaning tray, an integrated lift automatically places the stencil in this drying chamber after cleaning.

The N29HV version uses the chassis of an MBtech flux cleaning machine and is therefore equipped with a buffer for 5 stencils and is also equipped with a separate DI water cleaning and vacuum drying chamber, through which the stencils move successively. This makes this machine not only suitable for high volume stencil cleaning (up to 12 stencils per hour) but also ideally suited for cleaning double sided misprinted because they are rinsed with filtered demineralized water. (see also explanation about cleaning agent further in this email)

With an N29HV-AL, the machine's buffer is expanded to 15 or even 25 stencils, ideal for extremely high cleaning volumes.

Efficient, cost-saving and environmentally conscious.

MBtech builds the most efficient stencil cleaners with the lowest energy and fluid consumption in our industry. This is because the stencil is immersed in a slightly heated bath of cleaning fluid, allowing 100% contact and soak with the surface to be cleaned. The ultrasonic transducer or spray nozzles then do the "mechanical cleaning work"

This immersion prevents unnecessary evaporation and cooling of the cleaning fluid, as is the case with spray-in-air machines (similar to your dishwasher at home).

"Spray in Air" cleaning usually takes much longer and uses up to 5x more fluid and energy.

All MBtech machines are completely closed-loop, meaning that no cleaning fluids are discharged to the sewer, but everything is filtered and returned to the machine.

Cleaning agent:

The patented cleaning methods have been developed based on cleaning agents from the [Zestron](#) company. To guarantee good results and prevent any damage to the machines, we therefore only offer the machines in combination with this Zestron liquid.

We recommend HYDRON SC300 for both paste and adhesive cleaning. This water-based liquid is perfectly able to "temporarily grab" paste and adhesive parts, allowing them to be filtered out with a 5 micron filter. Compare this with fine sand that floats in (moving) water without dissolving. By continuously filtering out the "floating parts", the lifespan of the bath is at least 1 year. We recommend having your machine cleaned/maintained once a year and then replacing the fluid. In the meantime, you only need to top up and check whether the concentration of Hydron/demineralized water is still correct. For this check, Zestron offers a simple "bath analyzer 20" test kit that determines the percentage of water or Hydron you need to add.

Hydron SC300 dries in ambient air and leaves no residue and therefore does not require rinsing. This also applies to cleaning misprinted boards, provided that the purity of the demineralized water in the solution can be guaranteed over time.

However, because the liquid can potentially absorb ionic contaminants over time, for example from fingerprints on stencils, we advise caution when cleaning misprints.

If these are cleaned later in your production process in a flux-cleaning machine, there is no problem at all.

This risk can also be avoided with an N29HV or N29HV-AL machine because these stencil cleaners are equipped with a filtered demi-water rinse circuit. These machines are also equipped with an efficient vacuum drying chamber so that the risk of moisture accumulation can be minimized.



References:

More than 500 MBtech stencil cleaners are in use worldwide, in the Benelux by well-known companies such as Jabil, VDL-TBP, Philips, Neways, Variass and Benchmark. But smaller companies such as R&R, Faber and Unitron have also invested in this machine.

They are very reliable machines that require little maintenance and last for years.

Please contact Partnertec if you would like to get more information or a product presentation.