Cleaning SMT Stencils

The Basics :

When cleaning SMT stencils there are three key areas of concern, removing excess unused paste / adhesives left on the top side from the squeegee or wiper blades, removing underside smearing of flux and residues and the most important area, removing material trapped in the print apertures.
Whatever stencil cleaning system you use the “bulk” topside material should be removed from the stencil using a spatula or scraper and deposited either back into a clean pot for re-use or into your metal disposal containers (*New* WEEE directive). Putting “bulk” paste into a Stencil cleaner makes no sense as it contaminates and dilutes the cleaning fluid by dissolving fluxes into solution and the heavy metals needs subsequent separation for disposal.
Having removed the “bulk” material, the top and bottom side surface residues can easily be removed using a quality (lint free) impregnated wipe.
This leaves the “important” aperture areas that define and control your print quality. The particles (solder balls) used in *Lead Free* paste formulations are less dense than conventional *Tin / Lead* pastes and get impinged on the walls and corners of stencil apertures. Removal by spray / spray under immersion / immersion with ultrasonic may not totally remove. The only guaranteed way to ensure an aperture is clean is by either direct physical brushing (not recommended on stencils under 0.008”) or by “On Contact Ultrasonics”, a process adopted by 90% of Japan’s SMT assemblers.

Specifying a Stencil Cleaning System :

The overall equipment size is defined by your stencil size. Location is ideally as close to the printer(s) as possible but is dependant then on selection of fluids (do solvent types need to be located in a special area) plus consideration of services both power and extraction. Fluid choice is critical; solvents have faster drying but flash point defines location; the higher flash point fluids can be forced dried but the aroma needs extracting. With solvents, fluid storage and specialist disposal need to be taken into account. Aqueous formulations generally require an additional DI water rinse plus hot air dry and may require different processing fluids if using both solder pastes and adhesives. Control needs to be maintained on fluid concentrations, ph levels plus fluid disposal, DI water generation and control of heavy metal deposits.
If you use framed stencils then care must be taken when specifying fluid temperatures / drying temperatures; being compatible with the stencil / frame bonding materials especially on aged stencils, plus its essential only fully sealed frame sections are used when placed in immersion tanks and hole / thread inserts are sealed when using spray systems. Stencil foils require a specialist jig to support in an automated system to protect the foil and fixing / tension point.
The WEEE directive defines the disposal route for processing fluids, DI generation materials and any wipes used will go into your standard factory “wipe” disposal bags. Processing fumes will need to be exhausted with the relevant condensation and fluid traps.

Is there not a simple solution :

Basically yes – SCC Technology from PSP provide a simple, fast, efficient and cost effective solution. Using impregnated wipes, On Contact Ultrasonic Cleaning head, minimal cleaning fluid mist spray within an a ergonomic stencil support chase; your stencils can be wiped, cleaned and dried ready for use again within 3 minutes. The portable Ultrasonic unit can also be taken to the printer allowing stencils to be cleaned in situ without the need to re align printer set up, during a production aperture blockage.

Smarter Cleaning Solutions from…….

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www.process-support-products.com

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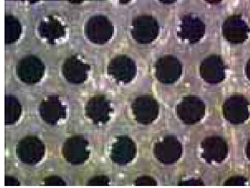
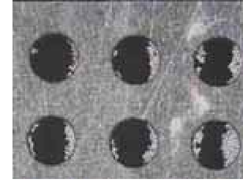
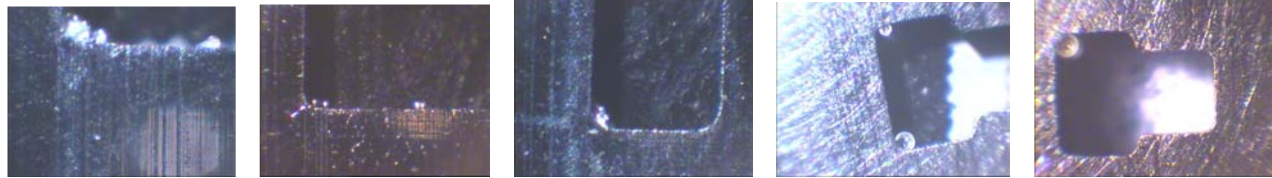
Direct Ultrasonic "On Contact" is the reliable way to 100% clean stencil apertures, the images below represent typical results from other cleaning methods that cannot fully penetrate the open apertures and cut wall areas that must be cleaned.



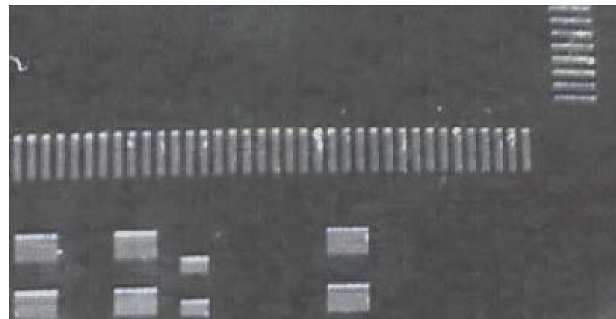
Typical residues left in BGA apertures



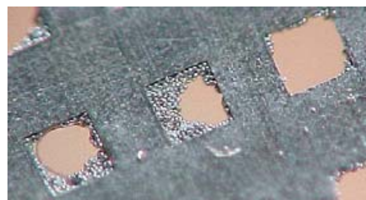


Individual solder particles impinged / trapped within the aperture walls surface cut

Incomplete cleaning of adhesives due to inability to penetrate apertures



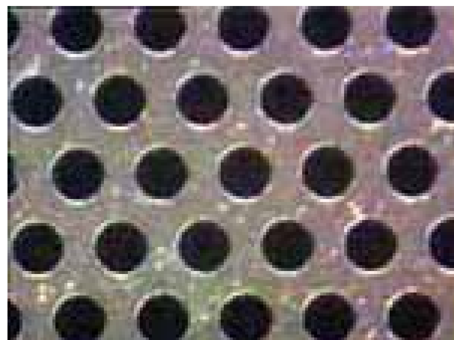
Typical blockages seen in QFP apertures after a manual clean operation



Blocked apertures

Incomplete cleaning

Brush damage during cleaning



Results from "On Contact" Ultrasonic Cleaning