

Stencil and Misprint Cleaning and Rinsing

By Michael Konrad, Aqueous Technologies



Mike Konrad
President/CEO

The leading manufacturer of cleaning and cleanliness testing products.

Aqueous Technologies
9055 Rancho Park Court
Rancho Cucamonga, CA
91730

Phone
(909) 944-7771

Fax
(909) 944-7775

E-mail
sales@aqueoustech.com

We're on the Web!
See us at:
www.aqueoustech.com

Q: Is Rinse Capability Important to a Stencil / Misprint Cleaning System?

A: Absolutely!

In almost every single application, the removal of contamination from an object consists of three basic steps; Wash – Rinse – Dry.

Each stage in the cleaning process provides a vital component to successful contamination removal.

The purpose of a wash cycle is to solublize (to place into solution) a contaminant. While most chemicals solublize (place in solution) the contaminant, some chemicals will simply separate it from the object. In either case, after a wash cycle, the wash solution (frequently a concentrated chemical mixed with water) must be removed from the object. This step is accomplished via a rinse cycle whereby the wash chemical is displaced by water (normally DI water). Once all of the wash chemical is removed from the object, the rinse water is removed from the object via a drying cycle.

There are stencil / misprint cleaning systems available that do not perform a rinse process. This raises great concerns on several fronts.

Operator Safety: All stencil cleaning chemistries carry warning in their respective MSDS's. Warnings include contact between the chemical and skin, eyes, and respiratory systems. Latex gloves and safety glasses are commonly recommended. The lack of a thorough rinse cycle forces the operator to handle stencil cleaning chemicals outside of a protected environment. Additionally, as solder paste contains hazardous substances, so may the chemical left behind on the stencil. The application of a rinse cycle displaces all traces of chemicals and other solublized hazardous substances.

Stencil Safety: All stencil cleaning chemicals have an ability to attack the epoxy bonds that hold the stencil to the mesh. Prolonged exposure to cleaning chemicals will cause a breakdown in the bond, leading to premature stencil failure. In fact, IPC-7526 (stencil cleaning standard) expresses concerns regarding rinseless stencil cleaning systems stating that "a no-rinse process should be qualified to assure that chemical agents remaining on the stencil cause no effect on future printing or on stencil life (delamination of the elastomer frame) before use in production.". A rinse-equipped stencil cleaning system does not require special qualifications.

Misprint Cleaning: Without exception, misprinted assemblies subjected to a cleaning chemical must be thoroughly cleaned and rinsed. While there is no ionic contamination specification for a stencil, there are published military and IPC specifications for board cleanliness. If a board had been dipped in, or sprayed with a cleaning chemical, the chemical cannot be left to dry on the board. Thorough rinsing with DI water is required

to ensure proper future reflow and to comply with all bare-board and post reflow cleanliness specifications.

IPC-7526, The Stencil and Misprinted Board Cleaning Handbook (a standard developed by IPC, published in February, 2007), contains a total of forty nine printed references to rinsing.

**Excerpts from IPC-7526
Stencil and Misprinted Board Cleaning Handbook**

Section	Reference (excerpts)
4.3	<p>PCB Cleaning Process Considerations</p> <p>A clean water rinse prevents wash contamination from redepositing on the surface of the board.</p> <p>Rinse pressure and duration are important process considerations when removing the cleaning chemistry from under components.</p> <p>A separate ultrasonic DI water rinse may be necessary when cleaning boards.</p>
6.6	<p>Automated Ultrasonic Stencil Cleaning</p> <p>A no-rinse process should be qualified to assure that chemical agents remaining on the stencil cause no effect on future printing or on stencil life (delamination of the elastomer frame) before use in production.</p>
7.4	<p>Aqueous Cleaning</p> <p>Aqueous cleaning refers to those processes in which a substrate is first washed with a water based cleaning agent, generally followed by a water rinse (DI or facility water).</p> <p>Once the wash step is completed, the parts are rinsed with water, either DI or facility water, to remove the cleaning agent and contamination.</p>
7.5	<p>Semi-Aqueous</p> <p>The cleaning media, along with agitation, will remove the soils from the stencil surface, and the rinse with water will remove any polar or ionic soils, as well as residual solvent and undissolved soils that remain on the surface.</p>
8.1.5	<p>Cleanliness</p> <p>Final rinse cleanliness is critical to part cleanliness.</p>
8.1.5.2	<p>Rinses in the Cleaning Process</p> <p>Although rinsing is not always needed, it can be an important step in the aqueous or semi-aqueous cleaning process. Often deionized or softened water is used, especially in a final rinse stage to minimize spotting.</p>