

New Advanced Aqueous Cleaner Used in AT Trident Trio Batch Cleaner

Overview:

An EMS Company has been a long time KYZEN customer that specializes in high reliability with quality as their hallmark. To achieve their goal of providing a consistent and highly reliable quality product, the customer used an Aqueous Technologies Trident Trio batch cleaner with three KYZEN cleaning chemistries to address specific challenges. One of the chambers in the Trident Trio Batch Cleaner was charged with AQUANOX A4639, a second chamber with AQUANOX A4727, and AQUANOX A4638 in the last chamber. All wastewater is processed to drain, rather than recycled.

To achieve their high cleanliness standards, assemblies require cleaning after each soldering step. Additionally, like many EMS companies, they use a wide range of solder pastes and fluxes including lead and lead-free, water soluble, and no-cleans.

Situation:

The customer's goal was to streamline their production and cleaning processes as well as standardize with one product at one concentration for all of the soldering materials and sensitive components, like LED's and transformers. Unfortunately, until now, no cleaning agent available on the market has been able to clean effectively after double sided reflow on any of their no-clean boards. Some of the solder pastes have required significantly higher concentrations. Additionally, several assemblies required a more sophisticated cleaning agent to achieve acceptable cleanliness levels.

Soldering Material Combinations

Solder Pastes:

Lead-free, no-clean: HEN2023628 GC-10

Leaded, no-clean: SN63EP256-600G Kester EP 256

Lead-free, water soluble: HEN2041005 GC-3W

Leaded, water soluble: SN63HM531-600G89.5 Kester HM531

Flux:

Liquid, water soluble: KES2331ZX5G

Liquid, no-clean: 985M

Tacky/Repair Flux, no-clean: CW8500

Tacky/Repair Flux, water soluble: WS89F10CC

Nozzle Tinning Flux for selective solder: FLS75

Previous Process Parameters/Process Flow:

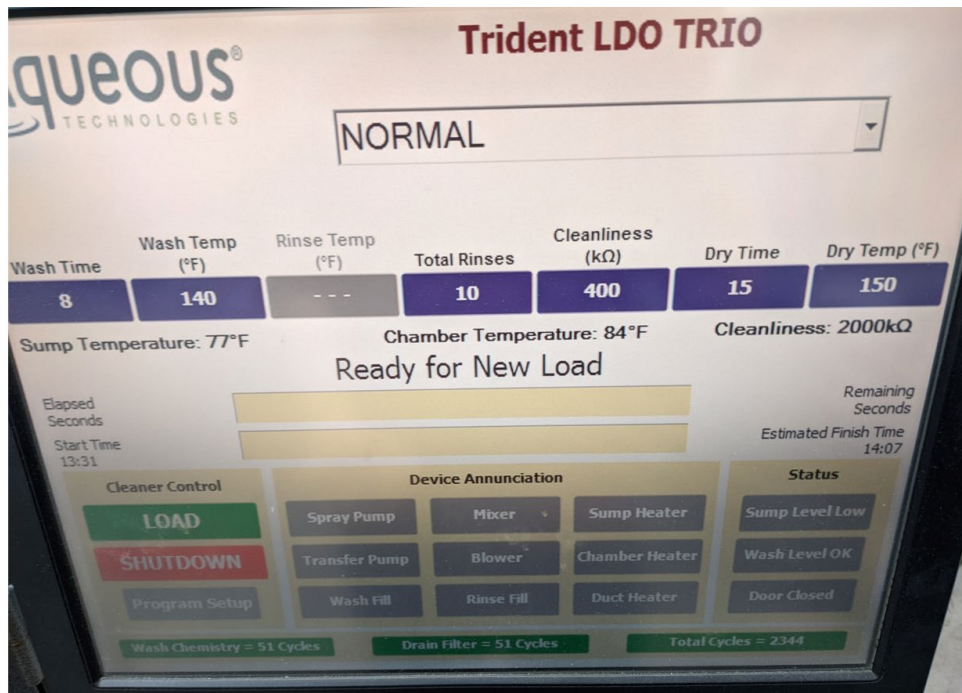
Cleaning Process Parameters #1	
Chemistry:	AQUANOX A4639
Wash Time:	8 Minutes
Wash Temperature:	140°F
Concentration:	18%
Rinse Temperature:	Ambient
Rinse Cycles:	500k/ohms or 10 Cycles
Actual Rinse Cycles:	6 Rinses

Cleaning Process Parameters #2	
Chemistry:	AQUANOX A4727
Wash Time:	8 Minutes
Wash Temperature:	140°F
Concentration:	14%
Rinse Temperature:	Ambient
Rinse Cycles:	500k/ohms or 10 Cycles
Actual Rinse Cycles:	6 Rinses

Cleaning Process Parameters #3	
Chemistry:	AQUANOX A4638
Wash Time:	8 Minutes
Wash Temperature:	140°F
Concentration:	8%
Rinse Temperature:	Ambient
Rinse Cycles:	500k/ohms or 10 Cycles
Actual Rinse Cycles:	6 Rinses

Trial Parameters/Process Flow:

Cleaning Process Parameters	
Chemistry:	AQUANOX A4626
Wash Time:	8 Minutes
Wash Temperature:	140°F
Concentration:	12%
Rinse Temp:	Ambient
Rinse Cycles:	500k/ohms or 10 Cycles
Actual Rinse Cycles:	6 Rinses

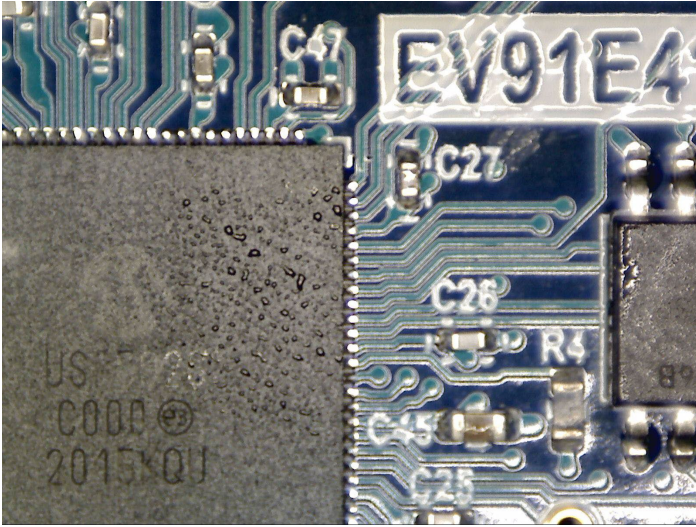


1st Cycle PCB orientation

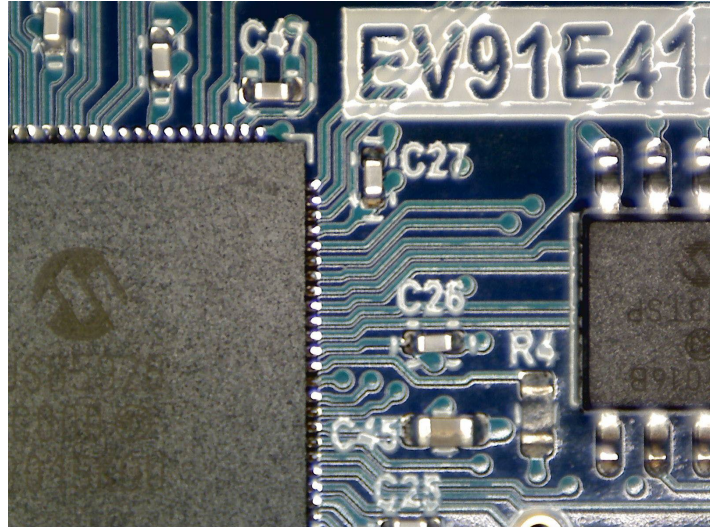
- PCB Placed as close to the spray arms as possible to prove out best case scenario.



Inspection Location #1



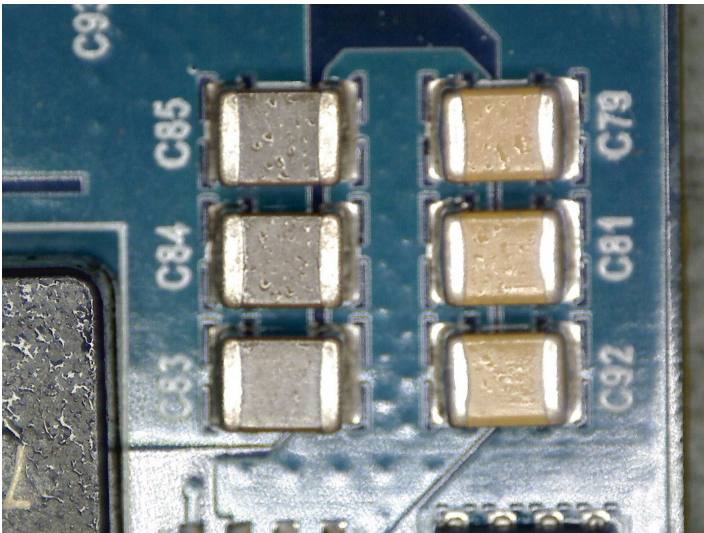
Before Cleaning



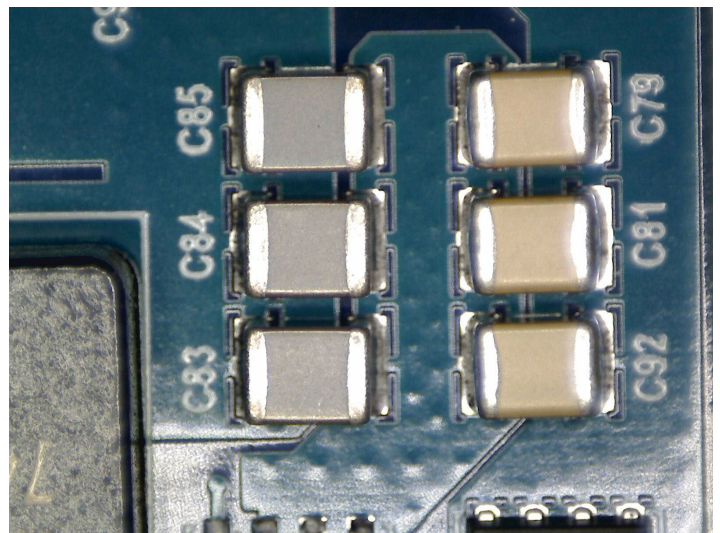
After Cleaning

Inspection Location #2

Very clean and accepted



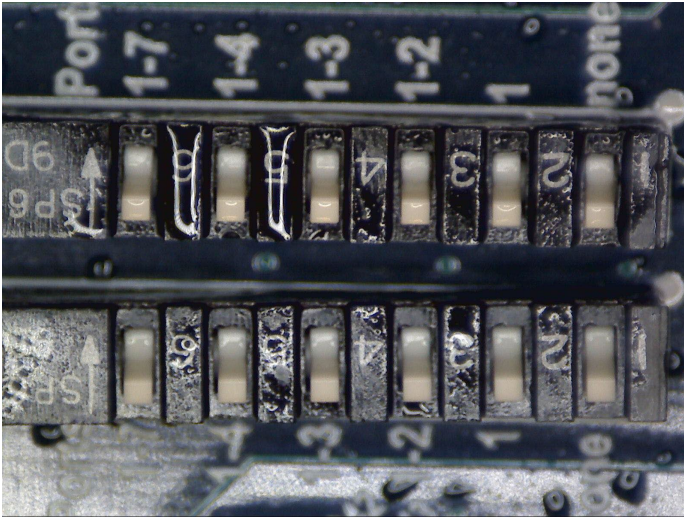
Before Cleaning



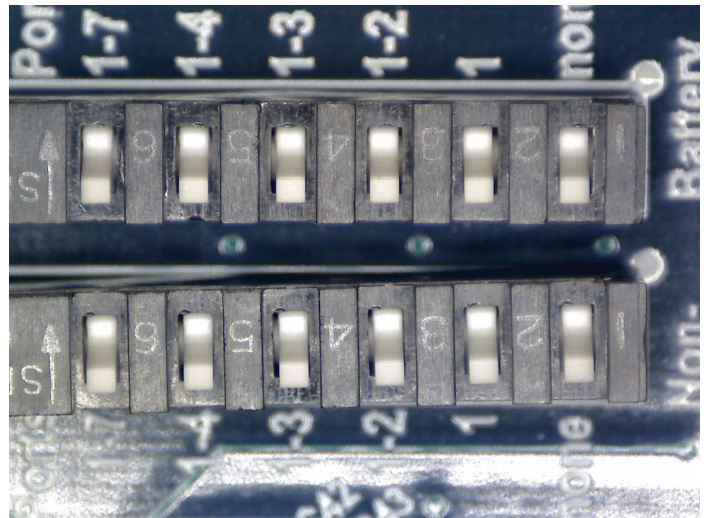
After Cleaning

Inspection Location #3

Very Clean



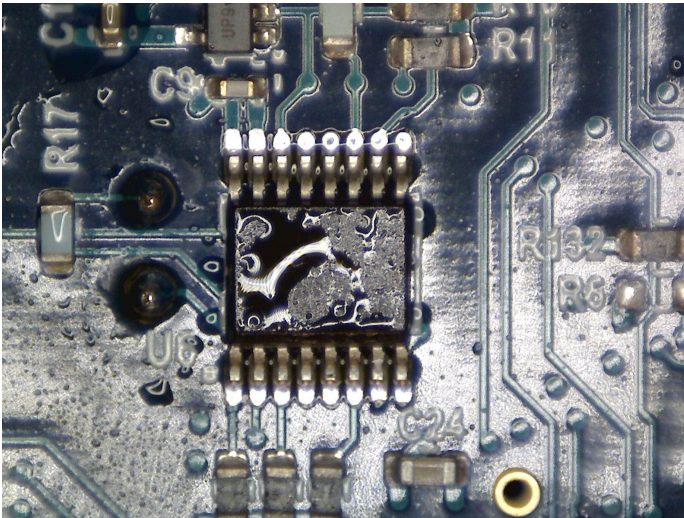
Before Cleaning



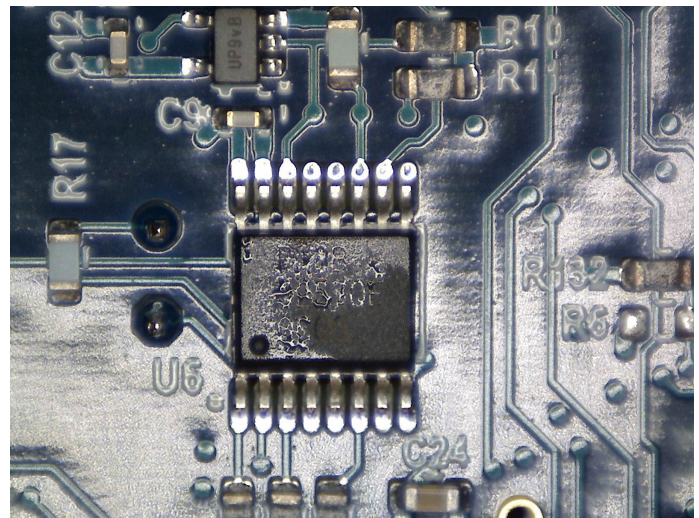
After Cleaning

Inspection Location #4

Clean around solder joints, however some residue remained on top side of component. Believed to be possible shadowing from location in basket, or just an anomaly.

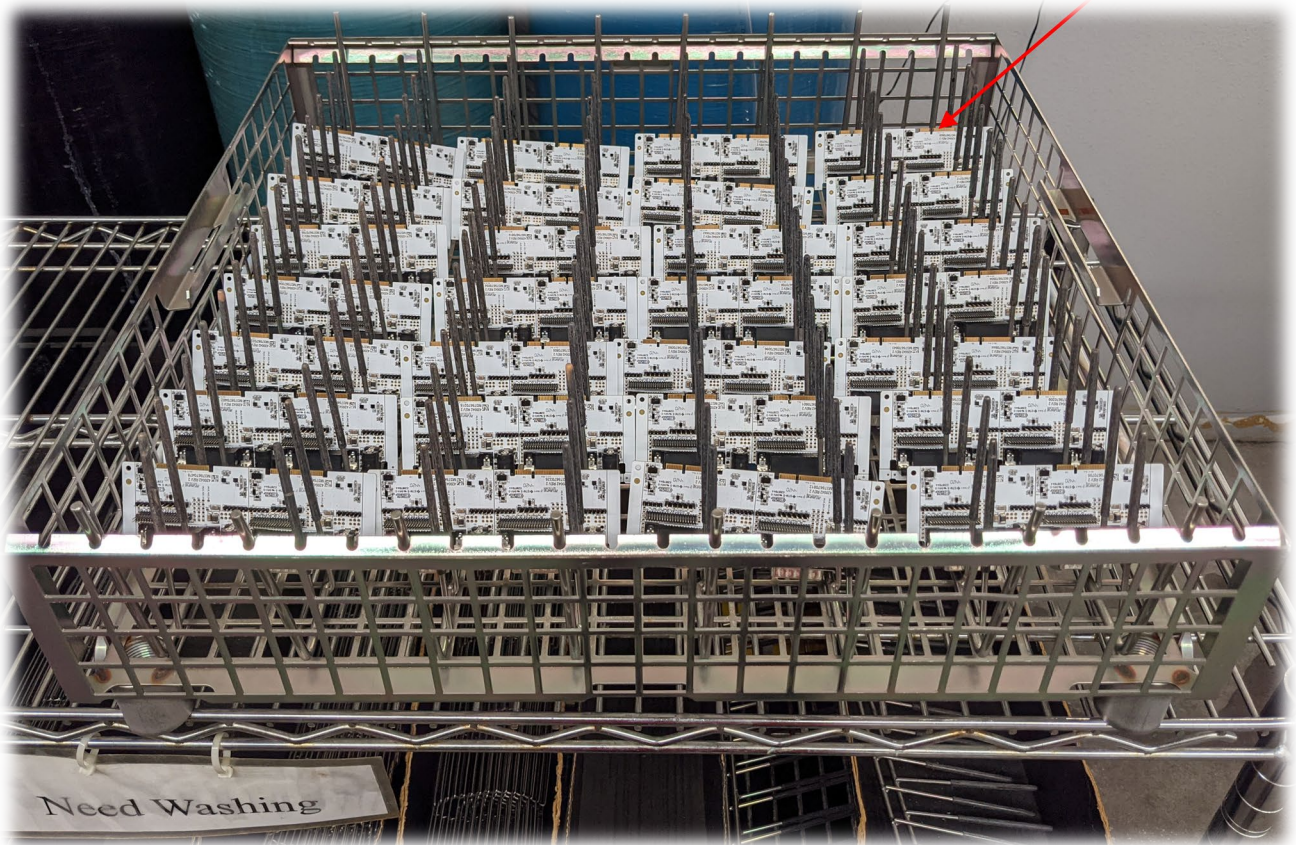


Before Cleaning

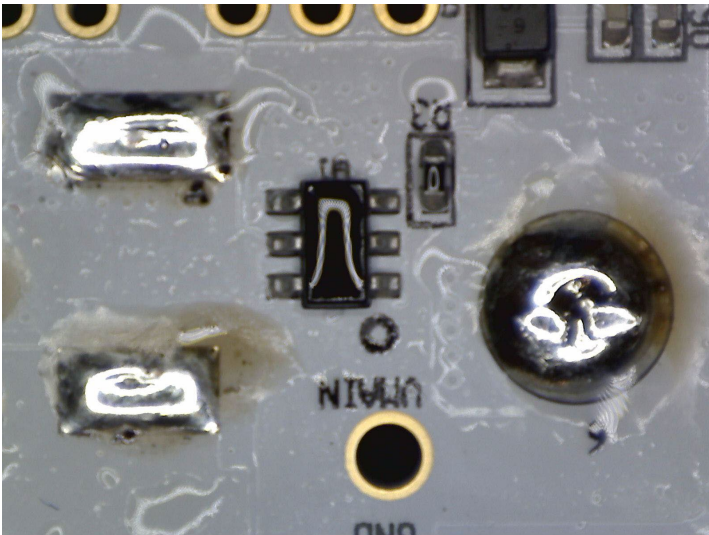


After Cleaning

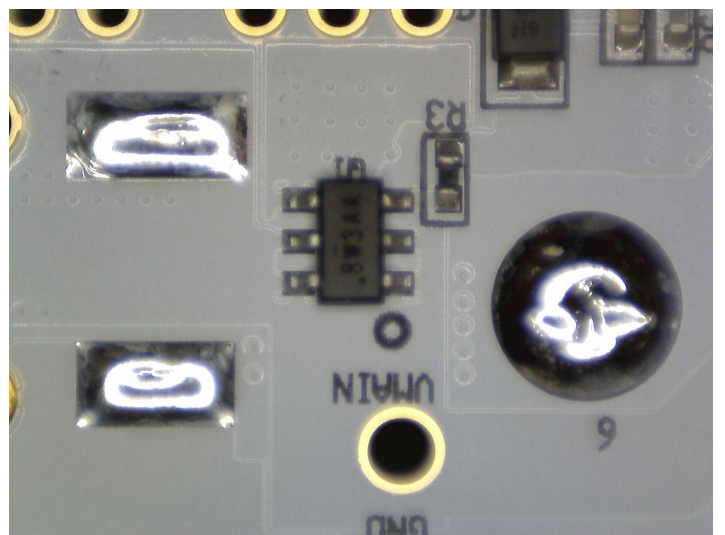
2nd Cycle PCB Orientation
- Hen2041005 Lead-Free OA



Inspection Location #1

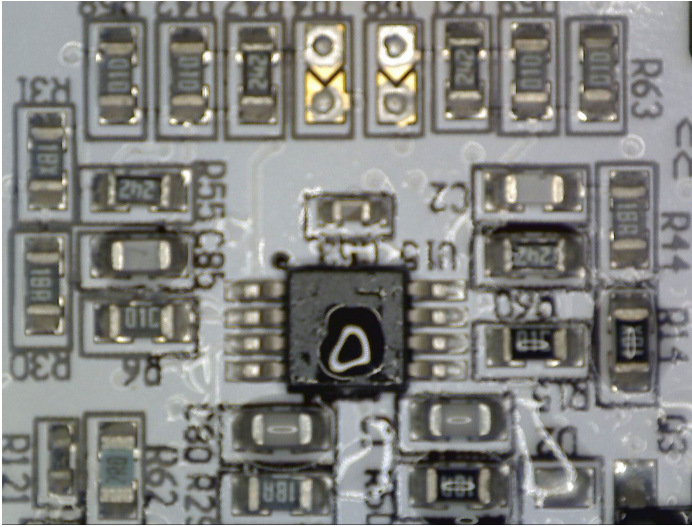


Before Cleaning

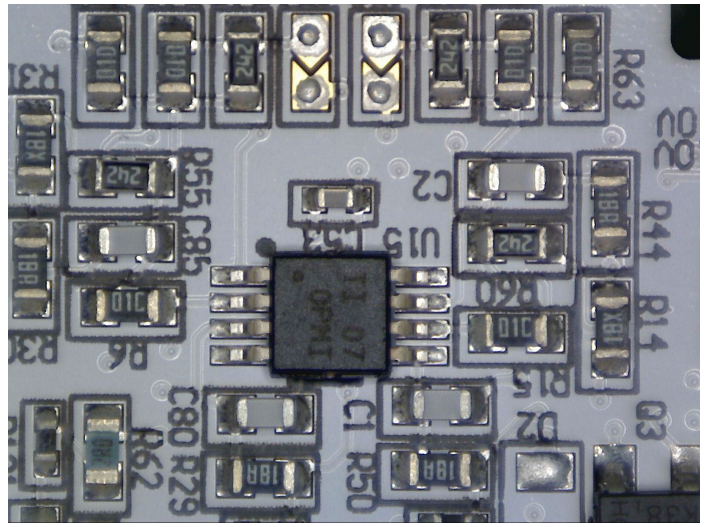


After Cleaning

Inspection #2



Before Cleaning



After Cleaning

Results and Conclusions:

The customer found the AQUANOX A4626 cleaning chemistry to be effective at removing all of their solder materials without compatibility issues using the same chemistry and concentration for even the most difficult to clean solder pastes. In addition, the customer found the following additional advantages:

- Successfully reduced cleaning to one cleaning cycle after final solder process rather than the 2-3 cycles previously required.
- Cost savings in time, electricity, and reduced labor.
- Reduced concentration to 12% for all materials, with the option to drop concentration when running the OA materials.
- Increased bath life from 100 cycles to 200 cycles per bath.
- Easy to mix and measure concentration.
- Compatible with LED.
- Low odor compared to some chemistries tested in the past.

More information on [AQUANOX](#) line is available on our website or by contacting your KYZEN Sales Representative directly. www.kyzen.com