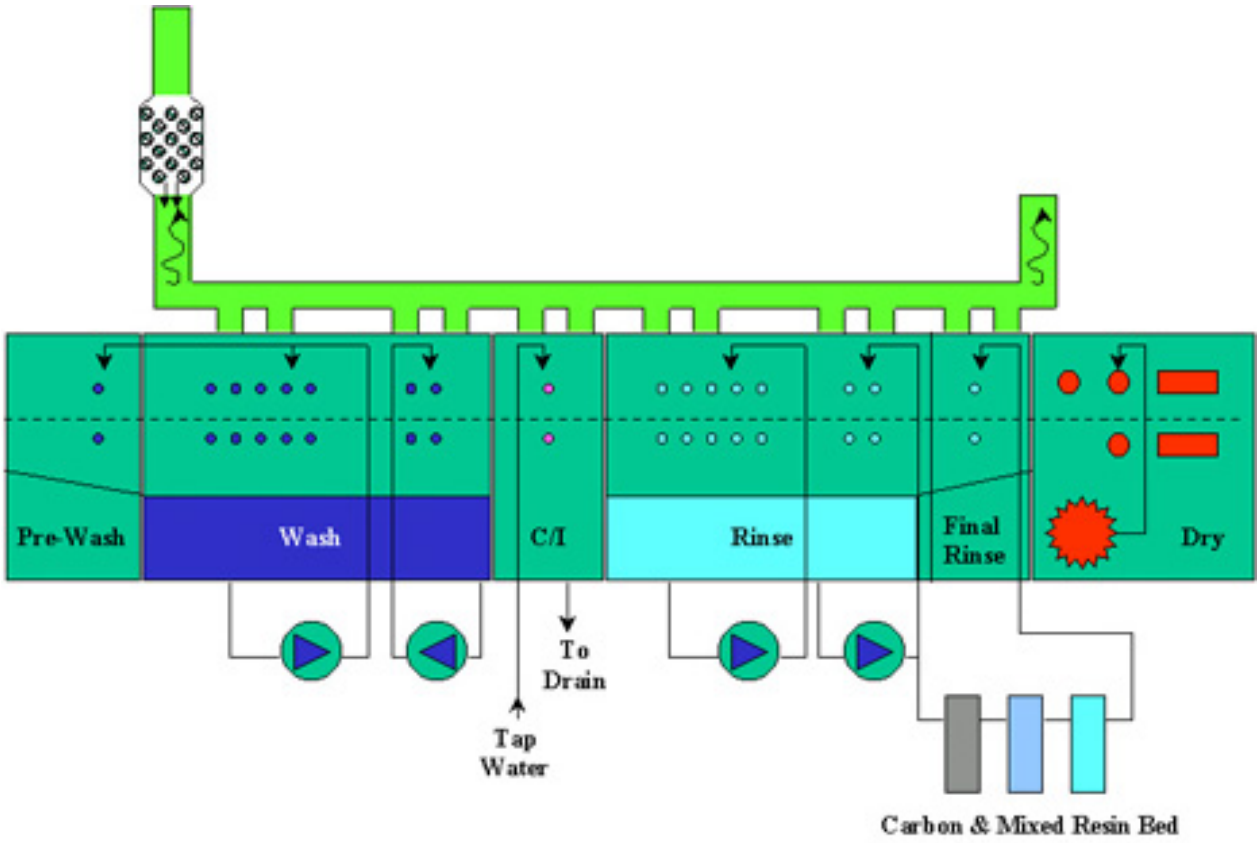
SM-859

Process Cleaning Recommendations
ALPHA® BC-2200 Aqueous Electronics Cleaner

Application: Removal of flux residue from printed circuit assemblies after reflow and wave soldering processes. **ALPHA BC-2200** engineered material composition is designed for use in aqueous spray-in-air, planarized batch, and dishwashing style cleaning machines.

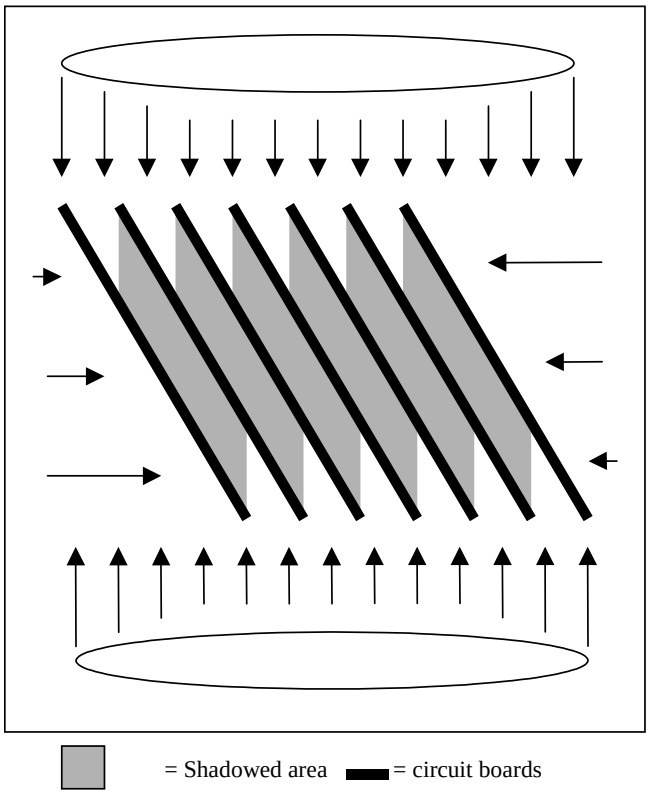
Process: An optimized cleaning process requires a cleaning chemistry suitable for removing the flux residue in question that integrates with the cleaning equipment. The process-cleaning rate (R_p) equals the static rate of dissolution from the cleaning chemistry (R_s) plus the dynamic cleaning rate (R_d) from the physical energy of the cleaning machine. Normally, the static rate or dynamic rate dominates a given cleaning process step. Figure 1 illustrates an inline spray-in-air cleaning process dominated by high physical energy.

Figure 1: Spray in Air Cleaning Machine



Dishwasher style batch spray-in-air cleaning machines exhibit less physical energy, which requires a greater dependency of the static cleaning rate of dissolution from the cleaning chemistry. This difference arises due to shadowing of parts and certain board surfaces in dimensional racking baskets (Figure 2).

Figure2: Shadowing in Dishwasher Style Cleaners



Typical dominance of spray-in-air cleaning machine designs is shown in Figure 3.

System Design	Wash		Rinse		Dry	
	$\%R_s$	$\%R_d$	$\%R_s$	$\%R_d$	$\%R_s$	$\%R_d$
Static Immersion	100%	0%	100%	0%	100%	0%
Dish Washer	70%	30%	70%	30%	50%	50%
Planarized Batch	30%	70%	40%	60%	20%	80%
Inline Air Spray	20%	80%	20%	80%	2%	98%

Cleaning process variables must be considered based on the static cleaning rate of dissolution for the flux contaminates in question and the process cleaning rate based on the physical energy of the cleaning machine. The variables consist of solvency, time, temperature, and mechanical energy.

- Solvency: Represents the dissolution rate of flux contaminates at various cleaning chemistry concentration ranges.
- Time: Represents the amount of time needed to adequately remove the residue during the washing step. For inline spray-in-air processes, typically 2-3 minutes of spray impingement is adequate. For batch dishwasher designs, typically 5-10 minutes of wash time is adequate.

- Temperature: Increases in wash cleaning temperature typically improves the dissolution rate of cleaning. A 20ºF rise from 120ºF to 140ºF can dramatically improve the dissolution rate of cleaning.
- Mechanical Energy: Maximizing the physical energy delivered at the surface to be cleaned improves cleaning effectiveness.

Product: ALPHA BC-2200 is an engineered electronic assembly cleaning material designed to remove a wide array of flux residues while meeting many stringent environmental requirements. This engineered material consists of:

- Solvating: Mixture of oxygenated materials that dissolve resin structures.
- Wetting: Reduces the surface energy of the cleaning solution.
- Reactivity: Rapidly softens resins by increasing the static rate of dissolution.
- Inhibition: Prevents chemical oxidation of the solder alloy, which results in mirror solder joint finish.

Recommended Process Parameters on Cookson Soldering Materials:

Cookson Material	ALPHA BC-2200 Concentration	Time: Inline (Soak + Impingement)	Time: Dishwasher (Soak + Impingement)	Temperature
PASTE				
ALPHA OM-338	17-25%	2-3 minutes	5-10 minutes	130-160ºF
ALPHA OM-325	17-25%	2-3 minutes	5-10 minutes	130-160ºF
ALPHA OM-310	17-25%	2-3 minutes	5-10 minutes	130-160ºF
ALPHA OM-5000	15-20%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA OM-5002	15-20%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA OM-5100	15-20%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA OM-6106	15-20%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA WS-609	2-5%	1-3 minutes	2-5 minutes	100-140ºF
ALPHA WS-709	2-5%	1-3 minutes	2-5 minutes	100-140ºF
ALPHA 390DH3	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA 390DH4	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA UP-78M	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA LR-721	20-25%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA 7LV	5-10%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA 102-1500	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA 611	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA 615	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA 620	10-15%	2-3 minutes	5-10 minutes	120-140ºF
FLUX				
ALPHA RF-800	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA K9185-21D	5-10%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA NR300A2	5-10%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA NR300	5-10%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA WS-373	5-10%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA WS-375	5-10%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA SLS 65C	5-10%	2-3 minutes	5-10 minutes	120-140ºF
WIRE				
ALPHA Flutin 1532	10-15%	2-3 minutes	5-10 minutes	120-140ºF
ALPHA Telecore Plus	10-15%	2-3 minutes	5-10 minutes	120-140ºF