

PC-450 A Stabilized Developer Concentrate

Product Description

PC-450 is a carbonate based, liquid developer concentrate for developing fully or semi aqueous dry films and/or liquid photo imagable solder masks. Unlike conventional stabilizers, the PC-Series stabilizers do significantly increase the pH of the solution and can be employed at concentrations high enough to obtain 15-20% more throughput using the same volume of chemistry.

This economical concentrate can also be employed in manual or automated replenishment systems. When used in combination with Seacole's PC-AUTO/Controller and Dosing Device, the PC-Series Developer baths may be operated for 4-20 weeks continuously and without dumping (depending upon throughput). The PC-AUTO/Controller will automatically make additions of developer concentrate and water, maintaining the pH at +/- 0.02 pH units and the carbonate concentration at +/- 0.03% by weight, resulting in predictable developing quality without adjusting the conveyor speed.

Performance Features

- PC-450 is compatible with virtually all type of aqueous and semi aqueous dry films and LPI solder masks.
- PC-450 is stabilized, improving process consistency and improving bath life up to 20%.

Physical Specifications

Physical State	Liquid
Appearance	Transparent Solution
Odor	Odorless
Stability	Stable
Freeze Stability	DO NOT FREEZE (17°F)
Specific Gravity	1.5
pH	> 11

Technical Data Sheet

Equipment Requirements

Tanks: Constructed Of Polypropylene, Polyethylene, PVC Or CPVC.

Heaters: Quartz, Titanium, Stainless Steel, Or Teflon Encased Steel.

Racks/Baskets: Constructed of Polyethylene, Polypropylene, Stainless Steel Or Plastisol Coated Steel.

Cooling Coils: Polyethylene, Polypropylene, Teflon, Stainless Steel Or Plastisol Coated Steel.

Ventilation: Recommended

Agitation: Spray Processing May Require The Addition Of Anti-Foam. A Nonpetroleum-Based Anti-Foam Such As Seacole's Anti/Foam CR-98S Is Recommended.

Filtration: Continuous Filtration Is Recommended.

Product Make-Up

PC-450 must be diluted prior to use. Please refer to the following chart on recommended concentrations. Per 100 gallon Bath:

Type of Photopolymer	PC-450(gal)	Water (gal)
Fully Aqueous Dry Film	2.2	97.8
Semi-Aqueous Dry Film	2.4	93.6
LPism	2.7	97.3

Always follow manufacturers recommendation regarding the carbonate concentration suitable for developing a specific photopolymer. The above data is to be used as a guide only. The following procedure is recommended for mixing the bath.

Procedure

1. Thoroughly rinse the tank and inspect for cleanliness paying special attention to the heaters and heater sheathings, and cooling coils. (If necessary, employ EQUIPMENT/Cleaner 60 to thoroughly clean the tank.)
2. Fill the tank half full with deionized water. Add PC-450 concentrate such that after final dilution the concentration desired is obtained. Fill the tank to operating level with deionized water.
3. Measure the potassium carbonate concentration by employing the test method described in this data sheet.
4. Turn on heaters and verify temperature with a thermometer.

NOTE: To assure optimum performance, it is recommended deionized or distilled water be used to dilute PC-450.

Technical Data Sheet

Operating Parameters

PC-450 should be operated within the specifications of your dry film and/or LPI solder mask supplier. Typically, these specifications are as follows:

Potassium Carbonate Concentration	0.85 - 1.10% by weight
Temperature	85 - 110°F
Dwell Time	30 - 150 seconds (to maintain 50% "break")

Control and Replenishment

BATCH DUMP PROCESSING

Make-up a new bath at the desired concentration and measure the pH. The pH of a new bath should be 11.0 - 11.6 depending upon sump cleanliness and water quality. During operating, periodically measure the pH of the bath. The bath should be dumped when the pH drops below 10.3 pH units.

AUTOMATED FEED AND BLEED PROCESSING

Only two variables, the pH and percent by weight (%w/w) total carbonate require control during processing. It is recommended the pH be maintained between 10.70 - 10.75. This is most effectively accomplished by employing an automated feed and bleed pH control system. Seacole's PC-AUTO/Controller employs a simple pH controller and Developer Dosing Device to accurately regulate the volume developer concentrate and water additions. The operation of the system is extremely simple. When the pH reaches the lower set point, water is allowed to pass through the valve. Based upon the flow of water passing through the valve, the valve blends PC-450 and water at correct ratio, and delivers the solution to the processing sump. Additions are made until the pH reaches the high set point. Please note, the valve DOES NOT require consistent water flow to function accurately (within +/- 0.03% w/w total carbonate). It is unnecessary to dump the bath except during routine equipment maintenance, eliminating frequent bath make-ups and heat-up time. Additionally, because the pH is held constant (+/- 0.02 pH units), it is unnecessary to continually adjust conveyor speed to control the break point.

Technical Data Sheet

Measuring the Percent by Weight Total Carbonate

The percent by weight (% w/w) of PC-450 in the working bath or diluted feed line can be calculated using the procedure below.

Equipment Required	Reagents Required
Buret, 50 ml	Methyl Orange Indicator
Erlenmeyer Flask, 250 ml	Hydrochloric Or Sulfuric Acid - Standardized .10N
Pipet, 50 ml	

Procedure

1. Pipet 50 ml of sample into a 250 ml Erlenmeyer flask containing approximately 50 ml of deionized water.
2. Add approximately 10 drops of indicator and titrate with standardized acid from an orange to a red endpoint. Record the mls of titrant required to reach the endpoint.

Calculation

$$\frac{A \times B \times C}{2 \times D} = \text{g/L potassium carbonate}$$

NOTE: The g/L total carbonate divided by 10 equals % w/w total carbonate.

Where	A	=	volume of titrant required in ml
	B	=	N of the titrant
	C	=	M.W. potassium carbonate (138.2)
	D	=	sample volume in ml

Safety and Handling

Read and understand this products MSDS before handling.

Waste Treatment

Individual users should verify the nature of spent solutions to assure compliance with local, state, and federal regulations. Contact Seacole for specific details and/or further waste treatment recommendations.

Ordering Information

PC-450 is available in 5-gallon pails, 55-gallon drums, and 275-gallon totes.

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