

## DS-44 Developer Concentrate

### A Stabilized, Hard Water Inhibited, Developer Concentrate

#### Product Description

DS-44 is a carbonate based, liquid developer concentrate for developing fully or semi aqueous dry films and/or liquid photo imaged solder masks. DS-44 contains a chemical stabilizer and optional cleaners. Unlike conventional stabilizers, the PC-Series stabilizers do significantly increase the pH of the solution, and thus can be employed at concentrations high enough to obtain 15-20% more throughput through 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 DS-44 Developer bath 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

- DS-44 is formulated with a unique hard water scale inhibitor which will not dull fused solder during LPI solder mask processing.
- DS-44 is compatible with virtually all type of aqueous and semi aqueous dry films and LPI solder masks.
- DS-44 is stabilized, improving process consistency and improving bath life by 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

DS-44 must be diluted prior to use. Please refer to the following chart on recommended concentrations.

Per 100 gallon Bath:

Type of Photopolymer	DS-44 (gal)	Water (gal)
Fully Aqueous Dry Film	1.6	98.4
Semi-Aqueous Dry Film	1.8	94.2
LPism	1.7	98.3

Always follow manufacturer's 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 de-ionized water. Add DS-44 concentrate such that after final dilution the concentration desired is obtained. Fill the tank to operating level with de-ionized 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 DS-44.

## Technical Data Sheet

### Operating Parameters

DS-44 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. 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 (+/- 0.025 pH units), it is unnecessary to continually adjust conveyor speed to control the break point.

#### ***MEASURING THE TOTAL WEIGHT BY CARBONATE***

The percent by weight (% w/w) of DS-44 in the working bath or diluted feed line can be calculated using the procedure below.

<b>Equipment Required</b>	<b>Reagents Required</b>
Buret, 50 ml	Methyl Orange Indicator
Erlenmeyer Flask, 250 ml	Hydrochloric or Sulfuric Acid - Standardized .10N
Pipet, 10 ml	

## Technical Data Sheet

### Procedure

1. Pipet 10 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

DS-44 is available in 5 gallon pails, 55 gallon drums, and 275 gallon totes.

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