Florida CirTech
LEADERS IN ADVANCED MATERIALS

Product Data Sheet

OS490 Hard Water Tolerant Developer

DESCRIPTION

OS490 is a highly concentrated liquid alkaline product used to develop semi-aqueous and aqueous dry films as well as liquid or dry film photoimageable solder masks. OS490 contains ingredients that soften water. Unlike many competitive products, OS490 does not contain strong chelating agents such as EDTA. Water with hardness in excess of 300 ppm (as $CaCO^3$) can be used with OS490 without the formation of water scale. This greatly reduces the need for maintenance of the spray equipment. OS490 contains 550 grams per liter potassium carbonate.

OPERATING PARAMETERS

Concentration	1.35 to 2.25% by volume OS490 (equivalent to 0.75 to 1.25% potassium carbonate)
Temperature	80°F to 105°F (see technical bulletin for dry film)
Time	As required for complete development

PHYSICAL PROPERTIES

Fill the sump of freshly cleaned spray equipment to about 90% of capacity with tap water. Add the required amount of OS490. (Use the chart below to select the appropriate potassium carbonate equivalence for the dry film or solder mask to be developed.) Add about 1 ml per gallon of a suitable defoamer such as OS31R1 or OS419. Fill to final volume with tap water. Heat to desired temperature. Adjust the conveyer speed so that the unexposed dry film or solder mask is essentially completely removed by the time the parts are about 2/3 of the way through the developer spray zone. When development is complete, rinse thoroughly with clean water spray. Dry immediately to prevent water spotting.

POTASSIUM CARBONATE EQUIVALENCE CHART

	0.75% K2CO3	**1.0% K2CO3**	**1.25% K2CO3**
Gallons OS490 per 100-gallon bath	1.35	1.8	2.25

ml OS490 per liter bath	13.5	18	22.5

CONTROL PROCEDURES

ANALYSIS OF ACTIVE OS490 CONCENTRATION

1. Place a 25 ml sample of OS490 bath into a 250 ml beaker.
2. Add about 50 ml deionized or distilled water.
3. Using a pH meter recently standardized to pH 7, titrate with 0.1 N hydrochloric or sulfuric acid to pH 8.2.

Calculations:

Potassium Carbonate Equivalent:

ml acid x 0.056 = % by weight active potassium carbonate equivalent

Active OS490 Concentration (active):

ml acid x 0.084 = % by volume active OS490

Phenolphthalein indicator can be used to determine the endpoint of the titration (at pH 8.2) if a pH meter is not available.

ANALYSIS OF TOTAL OS490 CONCENTRATION

4. Place a 25 ml sample of OS490 bath into a 250 ml beaker.
5. Add about 50 ml deionized or distilled water.
6. Using a pH meter recently standardized to pH 7, titrate with 0.1 N hydrochloric or sulfuric acid to pH 4.4.

Calculations:

Potassium Carbonate Equivalent:

ml acid x 0.028 = % by weight total potassium carbonate equivalent

Active OS473 Concentration:

ml acid x 0.042 = % by volume total OS490

Methyl Orange indicator can be used to determine the endpoint of the titration (at pH 4.4) if a pH meter is not available.

The pH of an OS490 bath is about 11.3 at makeup. As parts are processed, the pH will drop. When the pH drops below 10.4, dump and recharge the bath. If preferred, maintain the pH between 10.4 and 10.8 by feed and bleed replenishment using fresh OS490 solution at the original makeup concentration. Do not use OS490 concentrate to raise the pH of the bath.

1.5% by volume OS490 will effectively soften water with hardness in excess of 300 ppm (as $CaCO_3$). Tap water with substantially greater hardness may not be completely softened by OS490, but water scale formation will still be dramatically less than with ordinary developing products.

SAFETY AND STORAGE

PVC, polypropylene, stainless steel and titanium equipment may be used in contact with OS490 solutions. Heaters of stainless steel, quartz or titanium are acceptable. OS490 is alkaline and may irritate skin and eyes. Wear safety glasses, rubber gloves, and protective clothing when handling these products.

STORE CONTAINERS OF OS490 AT 40° F OR HIGHER. Prolonged exposure to temperatures below 40□ F can cause crystallization of the ingredients.