

# MicroChem 452 Developer

## PRODUCT PROFILE

MicroChem 452 Developer is an aqueous alkaline solution. Specifically formulated for use with Dow MICROPPOSIT™ S1800® photoresist systems, it can also be used with other commercially available photoresists. It has been optimized for wafer fabrication and other microelectronic applications for which high resolution is required.

## AUTOMATION

- Immersion
- Inline track
- Batch spray

## HIGH PROCESS RELIABILITY

- Tight product specifications
- Stringent quality control

## EXCELLENT RESOLUTION

- High differential solubility
- Excellent development tolerance
- No swelling of photoresist

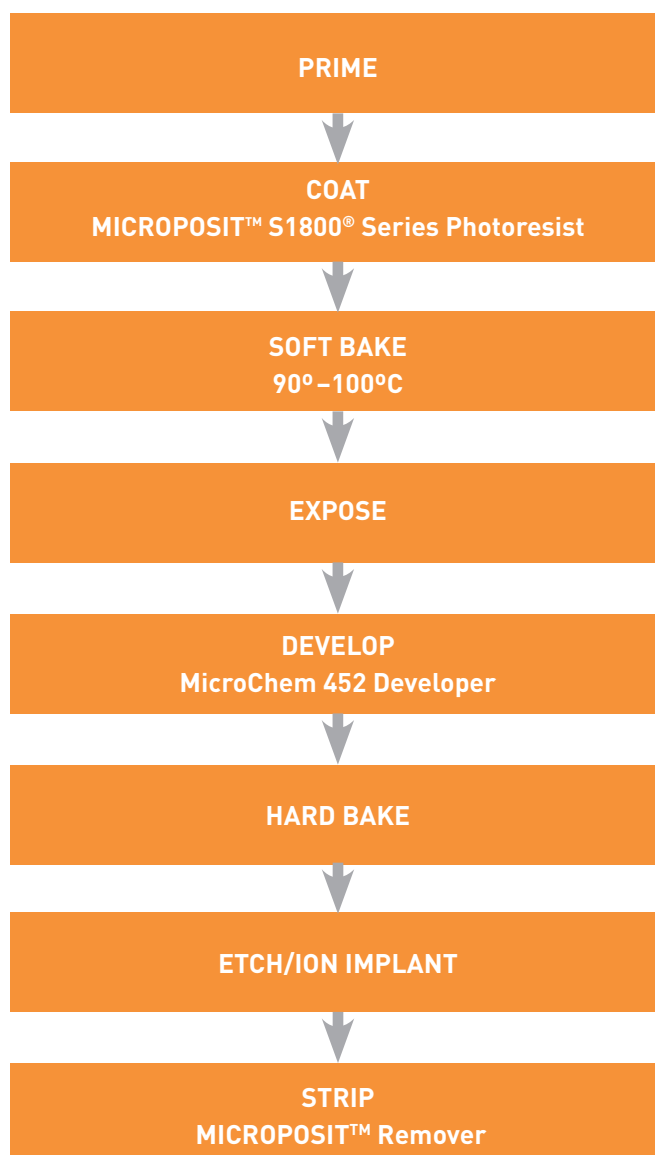
## HIGH INSPECTION YIELDS

- Clean, residue-free development
- Wide process latitude

## COST EFFICIENT

- Excellent exposure throughput

## SUBSTRATE PREPARATION



## MicroChem 452 Developer

### Determination of Total Alkaline Normality

- I. Reagents
  - a) Hydrochloric acid (HCl), 0.1N, standardized
  - b) Methyl red indicator solution
- II. Procedure
  - a) Pipette 5 ml aliquot MicroChem 452 Developer into a 250 ml Erlenmeyer flask.
  - b) Add approximately 100 ml deionized water.
  - c) Add 3 to 5 drops methyl red indicator.
  - d) Titrate with 0.1N HCl from yellow to red color change.

### III. Calculations

$$\frac{\text{ml HCl titrated} \times \text{N HCl}}{5 \text{ ml}} = \text{Normality of MicroChem 452 Developer}$$

### IV. Results

The normality of fresh MicroChem 452 Developer should be approximately 0.23.

### Equipment

Use polypropylene, polyethylene, polytetrafluoroethylene, or equivalent materials.

### Storage

Store MicroChem 452 Developer only in upright, original containers in a dry area at 50°- 90°F. Store away from acids. Do not store in sunlight.

Store away from heat and sources of ignition. Keep container sealed when not in use.

### Waste Treatment

Due to the nature of MicroChem 452 Developer, disposal of it, or residues therefrom, should be made in compliance with federal, state, and local environmental laws.

### Properties as Delivered

Microchem 452 Developer is manufactured to the highest quality standards and is subjected to state of the art testing to assure the user of maximum lot-to-lot reproducibility.

MicroChem 452 Developer is filtered to 0.2µm absolute directly into clean containers.

Certificates of Analysis will be supplied with each shipment upon request. Quality Assurance Material Specifications and Analytical Testing Procedures may be obtained upon request from MicroChem.

MicroChem 452 Developer, as delivered, will conform to the following specifications:

Specific gravity at 20/20°C	Approximately 1.0
Color	Water white to very pale yellow solution
Turbidity	Non-turbid
Total Alkaline Normality	0.22 – 0.24

### Handling Precautions

**DANGER!** MicroChem 452 Developer is an alkaline liquid containing potassium hydroxide. Contact with eyes, skin and mucous membranes causes irritation and burns. Handle with care. Do not get in eyes, on skin or on clothing. Avoid breathing vapors or mists. Use with adequate ventilation. Wash thoroughly after handling.

Consult product Safety Data Sheet before using.

FLUSH EMPTY CONTAINERS THOROUGHLY WITH WATER BEFORE DISCARDING.

## MicroChem 452 Developer

### INSTRUCTIONS FOR USE

#### I. Bath Make-up

MicroChem 452 Developer is supplied as a ready-to-use solution.

#### II. Temperature

Operate MicroChem 452 Developer between 20° and 25°C, with the temperature controlled  $\pm 1^\circ\text{C}$ . The photoresist dissolution rate increases with increasing developer temperature.

In spray equipment, the spray action causes a temperature drop in the developer solution. For this reason, developer temperature should be monitored at the substrate surface.

#### III. Time

**Immersion:** 40-60 seconds.

**Spin/spray:** Varies with equipment. Consult your MicroChem Technical Sales Representative. Longer development times permit the use of shorter exposure times. Shorter development times minimize developer attack on the unexposed photoresist. The range recommended is optimum. We recommend keeping the development time constant and adjusting the exposure time as necessary to meet critical dimension requirements.

#### IV. Agitation

**Immersion:** Mild, consistent agitation is recommended.

**Spin/spray:** Contact your MicroChem Technical Sales Representative.

#### V. Rinse

**Immersion:** Cascade rinse with deionized water to resistivity specification immediately after developing.

**Spin/spray:** Overlap deionized water rinse with developer cycle to prevent developer drying on substrate surface. Provide adequate rinsing of back side of substrates.

#### VI. Bath Control

**Immersion:** For maximum process control, replace bath with fresh developer solution at least once per shift. Keep bath covered when not in use.

**Spin/spray:** Not applicable.

**Batch spray:** As recommended by equipment manufacturer.

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