ELECTRONIC MATERIALS
MICROELECTRONIC TECHNOLOGIES

MICROPOSIT™ 351 DEVELOPER

For g-Line Applications

DESCRIPTION

MICROPOSIT 351 Developer is an aqueous alkaline solution for commercially available positive resists such as 1300 and specifically formulated for use with MICROPOSIT S1400™ and S1800™ Series Photoresist systems. It has been optimized for water fabrication and other microelectronic applications for which high-speed and resolution are required.

ADVANTAGES

Automation

- Immersion
- Inline track
- Batch spray

High Process Reliability

- Tight product specifications
- Stringent quality control
- Complete systems functional testing

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

INSTRUCTIONS FOR USE

Bath Make-up

Dilute MICROPOSIT 351 Developer for use as follows:

Bath Make-up

	High-speed Make-up (22% solution)	High-resolution Make-up (17% solution)
MICROPOSIT 351 Developer	1 part by volume	1 part by volume
Deionized water	3.5 parts by volume	5 parts by volume

Mix thoroughly. Proper dilution can be verified by analysis for normality. See Determination of Total Alkaline Normality.

Photoresist dissolution rate increases with increasing developer concentration. Maximum resolution is obtained at the lower developer concentration where unexposed resist loss is minimized. Shorter exposure times are possible when the higher developer concentration is used.

Production line downtime and potential dilution errors can be avoided with ready to use developers (MICROPOSIT 352, 353, 354, 355 Developers).

352 is recommended for high-resolution (equivalent to 1:5 make-up above).

354 is recommended for high-speed (equivalent to 1:3.5 make-up above).

Temperature

Operate MICROPOSIT 351 Developer between 20–50°C (68–122°F), with the temperature controlled ±°C. The photoresist dissolution rate increases with increasing developer temperature.

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

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Time

Immersion: 40–60 seconds

Spin/spray: Varies with equipment; consult your Rohm and Haas Electronic Materials 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.

Agitation

Immersion: Mild, consistent agitation is recommended

Spin/spray: Contact your Rohm and Haas Electronic Materials technical sales representative

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

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

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 MICROPOSIT 351 Developer bath into a 250 ml Erlenmeyer flask.

b) Add approximately 100 ml deionized water.

c) Add 3–5 drops methyl red indicator.

d) Titrate with 0.1N HCl from yellow to red color change.

III. Calculations

$$\text{NORMALITY} = \frac{\text{ml HCl titrated} \times \text{N HCl}}{5 \text{ ml}}$$

IV. Results

The normality of freshly made-up MICROPOSIT 351 Developer should be:

1:3.5 make-up	0.31 ±0.02N
1:5 make-up	0.23 ±0.02N

EQUIPMENT

Use polypropylene, polyethylene, polytetrafluoroethylene or equivalent materials.

PROPERTIES AS DELIVERED

MICROPOSIT 351 Developer is manufactured to the highest quality standards and is subjected to state-of-the art testing for physical, chemical and functional properties to assure the user of maximum lot-to-lot reproducibility.

MICROPOSIT 351 Developer is filtered to 0.2 µm 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 your Rohm and Haas Electronic Materials technical sales representative.

PRODUCT DATA (TYPICAL PROPERTIES)

Color:	Water-white to very pale yellow solution
Specific Gravity: (@ 20/20°C)	1.073–1.093
Turbidity	Non-turbid
Total Alkaline Normality:	1.36–1.42

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HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet for details on product hazards, recommended handling precautions and product storage.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

ELECTRONIC MATERIALS

Circuit Board Technologies

CMP Technologies

Microelectronic Technologies

Packaging and Finishing Technologies

For locations and information please visit; **http://electronicmaterials.rohmhaas.com**

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