# AZ 351B

General Purpose Developer

Clariant

## Description

AZ 351B Developer is a general purpose developer for use with almost any positive AZ Photoresist. It was designed to achieve utmost contrast and best wall profile. It is an odourless, aqueous, inorganic, alkaline solution, free of phosphates. It is compatible with batch and in-line spray-developing processes. Precise manufacture and stringent quality control ensure batch-to-batch reproducibility and product quality.

AZ 351B Developer is supplied as a concentrate. The standard high contrast make-up provides optimum resolution and contrast as well as maximum processing latitude. The standard high-speed dilution results in very high production throughput.

## Bath Make-Up

To prepare the standard high resolution and high-speed dilutions from the concentrate, mix AZ 351B Developer and deionized water by volume as follows:

| Developer Make-Up | AZ 351B Developer | Deionized Water | Normality |
|---|---|---|---|
| High Contrast | 1.0 part | 5.0 parts | 0.23 N |
| High Speed | 1.0 part | 3.5 parts | 0.31 N |

Mix well. Adjust to desired temperature prior to use.

## Physical and Chemical Properties

| | |
|---|---|
| Colour | Clear |
| Normality | 1.39 +/- 0.05 N |
| Filtration | 0.2 µm absolute |

## Exposure

Most AZ Photoresists respond to radiation in the range of 310 – 450 nm. The absorption maxima are at 350 and 398 nm. High-pressure mercury, metal halide, or other sources with high output in this region are recommended. Because of wide variations in exposure systems, monitoring devices and processing parameters, specific exposure doses cannot be provided. See also the data sheets for the photoresist used.

## Development

**Immersion**
For most applications and common film thicknesses immersion for approximately 1 minute in the high contrast make-up is recommended. For thicker resist films, especially with AZ 4562, use about 30 seconds per micron film thickness as a starting value. The developer bath should be maintained at constant temperature (+/-1°C) within the range 20 – 25 °C. For less critical applications immersion for approximately 60 seconds in the high-speed make-up is recommended, for thick coatings time has to be prolonged as mentioned above. In all cases use mechanical agitation with the motion in the plane of the wafers. Avoid vigorous agitation.
Rinse immediately in deionized water until resistivity is within specifications. Spin dry in air or force dry with filtered nitrogen.
Fresh developer gives optimum results. Major degradation of developer activity is caused by carbon dioxide absorption from air. It is recommended that the bath solution be replaced at least once a shift. Protection of the bath with a nitrogen curtain extends its life time.

**Recirculating Bath Spray**
Replenish with fresh developer as recommended by the equipment manufacturer. Moderate spray pressure is recommended.

**In-Line Spray**
Control developer temperature at the dispensing head at a constant temperature (± 1°C) within the range of 20° - 25°C. Moderate spray pressure is recommended. A typical process will involve spraying either the High Speed or High Contrast developer on a slowly spinning wafer for 30 – 60 seconds, and overlapping a deionized water rinse with the developing cycle. After a 10 – 15 second D.I. rinse, the wafer is spun dry.

## Determination of Normality

**Reagents**
Hydrochloric acid (HCl) 0.2 N, standardised
Methyl Red indicator (0.2% in methanol)

**Procedure**
1. Pipette 5 ml of AZ 351B Developer into a 250 ml Erlenmeyer flask
2. Dilute with approximately 100 ml deionized water
3. Add 3 drops of methyl red indicator
4. Titrate with hydrochloric acid (0.2 N) to a red endpoint

**Calculation**

$$\frac{(\text{ml HCl}) \times (\text{N HCl})}{5 \text{ ml AZ 351B}} = \text{N of AZ 351B}$$

Normality of a freshly made-up batch should be 0.22 to 0.24 for the high-contrast make-up (1 + 5).
Normality of a freshly made-up batch should be 0.30 to 0.32 for the high-speed make-up (1 + 3.5).

## Handling Advises

Consult the **Material Safety Data Sheets** provided by us or your local agent!
**Store** in sealed original containers between 0°C and 35°C, prevent from freezing.
**Shelf life** is limited, the **expiration date** is printed on the label of every bottle below the batch number and coded as **[day/month/year]**.
**AZ 351B** Developer is compatible with most commercially available wafer processing equipment. **Recommended materials** include PTFE, stainless steel and high-density poly-ethylene and -propylene.

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