

Technical data sheet

Technisches Datenblatt

AZ Developer

General-Purpose
Developer

Description

AZ Developer can be used in combination with most families of AZ Photoresists (i.e. AZ 1500, AZ ECI3000 and AZ 4500). It is designed to meet the demanding microlithographic and processing requirements of the semiconductor industry and tuned to lowest attack of aluminium. It is an odourless, aqueous, inorganic, alkaline solution, which is compatible with batch and in-line developing processes. Precise manufacture and stringent quality control ensure batch-to-batch reproducibility and product quality.

AZ Developer is supplied as a concentrate. The standard high-contrast version provides superior resolution and contrast as well as broad processing latitude. Use of the concentrated AZ Developer as a high-speed version results in very high production throughput. AZ Developer displays the lowest aluminium etch rate of all AZ Developer-types and is ideal for metal levels.

Bath make-up

To prepare the ready-to-use dilution from the concentrate, mix AZ Developer and deionized water by volume as follows:

Developer make-up	AZ Developer	D.I. water	Normality
High-contrast	1.0 part	1.0 part	0.30 N
High-speed	1.0 part	---	0.60 N

Mix well. Adjust to desired temperature prior to use.

Physical and Chemical Properties

Color	Clear
Density at 20° C	1.05 ± 0.01 kg/l
Normality	0.600 ± 0.005 N
Filtration	0.2 µm absolute

Merck Performance Materials GmbH

Rheingastrasse 190 - 196
D-65203 Wiesbaden
Germany
Tel. +49 (611) 962-4031
Email: jasmin.schmicking@merckgroup.com



Development

Immersion

Immerse for approximately 60 seconds in either high-contrast or high-speed AZ Developer maintained at a constant temperature ($\pm 1^\circ \text{C}$) within the range of $20^\circ - 25^\circ \text{C}$. Use mechanical or nitrogen burst (not air) 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

Replenish with fresh developer as recommended by the equipment manufacturer.

In-Line Spray

Control developer temperature at the dispensing head at a constant temperature ($\pm 1^\circ \text{C}$) within the range of $20^\circ - 25^\circ \text{C}$. 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 60 seconds, and overlapping a deionized water rinse with the developing cycle. After a 10 - 15 second D.I. water rinse the wafer is spun dry.

Determination of Normality

Reagents

Hydrochloric acid (HCl) 0.5 N, standardised.
Methyl Red Indicator (0.2 % in methanol).

Procedure

1. Pipette 25 ml of AZ 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 (0.5 N) to red endpoint.

Technical data sheet

Technisches Datenblatt

Calculation

$$\frac{(\text{ml HCl}) \times (\text{N HCl})}{\text{25 ml AZ Developer}} = \text{N of AZ Developer}$$

Normality of a freshly made-up bath should be 0.30 N for the high-contrast make-up (1 + 1).
Normality of a freshly made-up bath should be 0.60 N for the high-speed make-up (concentrate).

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.

AZ Developer is compatible with most commercially available wafer processing equipment.

Recommended materials include PTFE, stainless steel and high-density poly-ethylene and -propylene.

We advise our customers regarding technical applications to the best of our knowledge within the scope of the possibilities open to us, but without obligation. Current laws and regulations must be observed at all times. This also applies in respect of any protected rights of third parties. Our suggestions do not relieve our customers of the necessity to test our products, on their own responsibility, for suitability for the purpose envisaged. Quotations from our literature are only permitted with our written authority, and the source must be stated.

Merck Performance Materials GmbH

Rheingastrasse 190 - 196
D-65203 Wiesbaden
Germany
Tel. +49 (611) 962-4031
Email: jasmin.schmicking@merckgroup.com

