EMD PERFORMANCE MATERIALS

technical datasheet

AZ® Organic Developers

Metal Ion Free (TMAH) Photoresist Developers

APPLICATION

AZ MIF developers are high contrast, ultra-high purity tetramethyl-ammonium hydroxide (TMAH) based photoresist developers formulated for a wide range of advanced IC and thick photoresist applications.

- Surfactant enhanced and surfactant free options
- Industry leading normality control
- Wide range of normalities available
- High purity, low particulate formulations (0.20µm filtered)
- Multiple bulk and non-bulk packaging options

PROCESSING

GENERAL PROCESSING GUIDELINES

AZ MIF developers should be used at room temperature in puddle, spray, or batch immersion processing mode. Variations in develop time, developer temperature, and substrate temperature will result in inconsistent develop uniformity and will affect process repeatability/reproducibility. It is important to monitor and control these variables.

When processed in batch immersion mode, MIF developer bath life will be limited by the volume of dissolved photoresist in solution and by carbonate uptake from the fab environment. Bath change out frequency should be specified by the number of substrates processed and by elapsed time since the last bath change. The maximum number of substrates that may be processed through a given bath will depend upon the photoresist thickness, the % of substrate surface covered, and the volume of the developer tank.

When not in use, developer tanks should be covered to minimize evaporation and the rate of carbonate uptake. Inert gas blankets (dry N_2 for example) may also be used to isolate developer tanks from the fab environment. In general, immersion tanks should be changed at least every 24 hours (or sooner if the maximum number of substrates processed is reached).

BATH AGITATION

Mild agitation of immersion developer tanks may improve wafer-to-wafer develop uniformity and photo speed when batch processing substrates.

PUDDLE DEVELOPING

Due to their lower surface tension, surfactant enhanced developers improve substrate wetting and facilitate puddle formation using lower dispense volumes than typical surfactant free developers. Complete development of patterns in thick photoresist films (> 3.0µm) may require multiple developer puddles. Increased normality developers and/or aggressive surfactants can improve dissolution rates and reduce develop time for thick photoresist films (see application guide section of this publication).

RINSING

Use de-ionized water only to rinse wafers post develop and to "quench" the developer activity. Spray pressure or bath agitation during rinsing may reduce post develop defect density by minimizing re-deposited surface particles.

DEVELOPER APPLICATIONS GUIDE

0.26N (2.38%) TMAH DEVELOPERS

0.26N TMAH developers are the industry standard for advanced integrated circuit (IC) production and general lithography.

AZ 300MIF Developer
AZ 300MIF is an ultra-high purity, general purpose, surfactant free 0.26N TMAH developer featuring class leading normality control and ppb level metals content. Recommended for puddle, spray, and immersion applications.

AZ 726MIF Developer
AZ 726MIF is a surfactant enhanced 0.26N TMAH developer optimized for puddle develop processes.

AZ 917MIF Developer
AZ 917 MIF is a surfactant enhanced 0.26N developer formulated to improve photo speed in puddle or immersion develop processes with no loss of contrast or selectivity. Improves photo speed by 10-20% vs. AZ 726MIF.

CUSTOM NORMALITY TMAH DEVELOPERS

Custom normality developers may be desirable in cases where the develop rate or selectivity provided by 0.26N materials is inadequate. Reduced normality developers can improve selectivity to unexposed resist and increased normality developers will reduce the required exposure dose and/or develop time for thick resist processing.

AZ 422MIF Developer
AZ 422MIF is a reduced normality (0.215N) surfactant free developer engineered to maximize dissolution selectivity and process control.

AZ 435MIF Developer
AZ 435MIF is a surfactant free, increased normality (0.35N) TMAH developer optimized to improve photo speed for medium thick photoresist processing (5-10µm thick) while maintaining good process control. Recommended for use with AZ 9200 and AZ P4000 series photoresists.

AZ 405MIF Developer
AZ 405MIF is an aggressive, surfactant enhanced, high normality developer (0.405N) designed for thick photoresist processing (>15µm thick). This developer provides a metal ion free alternative to the sodium or potassium based developers typically employed in thick resist processing. Recommended for use with AZ 9260, AZ 50XT, and AZ P4620 photoresists.

PRODUCTS and SPECIFICATIONS for 0.26N (2.38%) TMAH DEVELOPERS

	AZ 300MIF	AZ 726MIF	AZ 917MIF
Normality	0.26100 ±0.00010	0.2610 ±0.0005	0.2610 ±0.0005
Carbonate (ppm max.)	30	80	80
Chloride (ppb max.)	30	100	100
Surfactant Enhanced	No	Yes	Yes
Shelf Life	18 Months	18 Months	18 Months

PRODUCTS and SPECIFICATIONS for CUSTOM NORMALITY TMAH DEVELOPERS

	AZ 422MIF	AZ 435MIF	AZ 405MIF
Normality	0.215 ±0.004	0.350 ±0.001	0.405 ±0.0005
Carbonate (ppm max.)	30	100	80
Chloride (ppm max.)	30	1.0	0.1
Surfactant Enhanced	No	No	Yes
Shelf Life	18 Months	18 Months	18 Months

PACKAGES and PART NUMBERS

Description	Package	Part Number
AZ 300MIF (Gallon)	4x1 Gallon HDPE Bottle	18441123163
AZ 300MIF (55g)	55 Gallon HDPE Drum (single use*)	18441123179
AZ 726MIF (Gallon)	4x1 Gallon HDPE Bottle	18444823163
AZ 726MIF (55g)	55 Gallon HDPE Drum (single use*)	10055825695
AZ 917MIF (Gallon)	4x1 Gallon HDPE Bottle	18445723163
AZ 917MIF (55g)	55 Gallon HDPE Drum (single use*)	18445723179
AZ 422MIF (Gallon)	4x1 Gallon HDPE Bottle	18443723163
AZ 435MIF (Gallon)	4x1 Gallon HDPE Bottle	18471723163
AZ 405MIF (Gallon)	4x1 Gallon HDPE Bottle	21175723163
AZ 405MIF (55g)	55 Gallon HDPE Drum (single use*)	21175723179

* Contact your AZ products representative for information on returnable and bulk container options.

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