

# Technical datasheet

## AZ<sup>®</sup> 1500 Series

### Positive Tone Photoresist

#### APPLICATION

General purpose positive tone photoresists featuring excellent substrate adhesion for demanding wet etch applications.

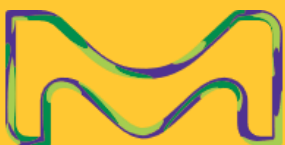
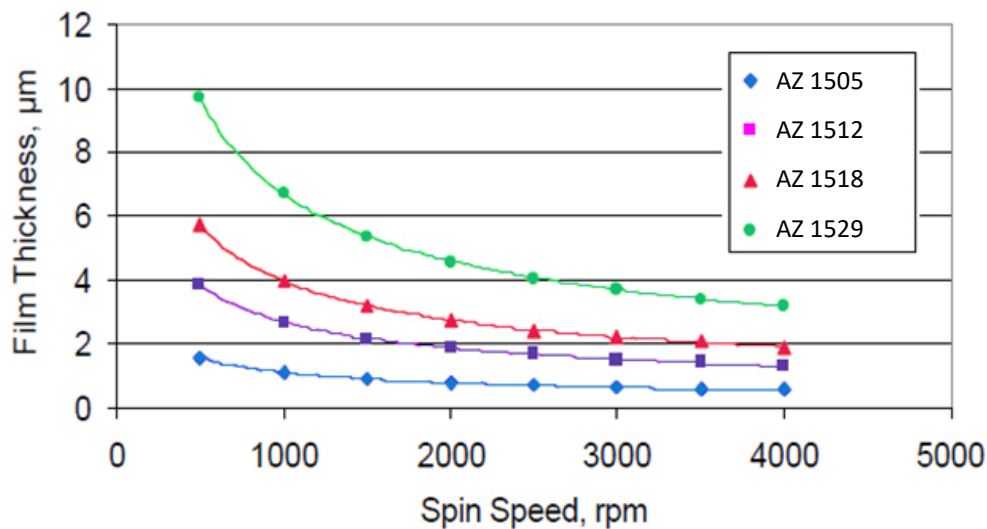
- Fast for high throughput
- MIF or IN developer compatibility
- Safe solvent
- Spin coated thickness from 0.5 to 6µm
- Dyed and un-dyed versions available

#### TYPICAL PROCESS

- Soft Bake: 90°C to 110°C\*
- Expose: 310-450nm sensitive
- Post Expose Bake: Optional
- Develop: 60s Puddle or immersion Developer type: MIF or IN

\* Use higher soft bake temp. for best adhesion to metals

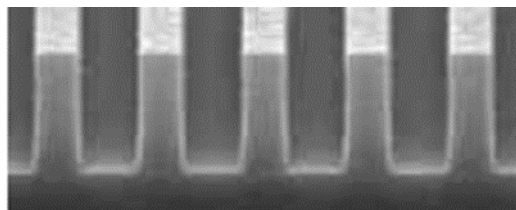
#### SPIN CURVES (150mm Wafers)



## OPTICAL CONSTANTS\*

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Cauchy A	1.5996
Cauchy B ( $\mu\text{m}^2$ )	0.013498
Cauchy C ( $\mu\text{m}^4$ )	1.90E-04
n @ 633nm	1.63447
k @ 633nm	0



AZ 1518 Photoresist  
1.0 $\mu\text{m}$  lines in 2.40 $\mu\text{m}$  film  
150mJ/cm<sup>2</sup> g-line exposure  
AZ 300 MIF Develop (60s)

\* Unexposed photoresist film

## COMPANION PRODUCTS

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### THINNING/EDGE BEAD REMOVAL

AZ EBR Solvent or AZ EBR 70/30

### DEVELOPERS

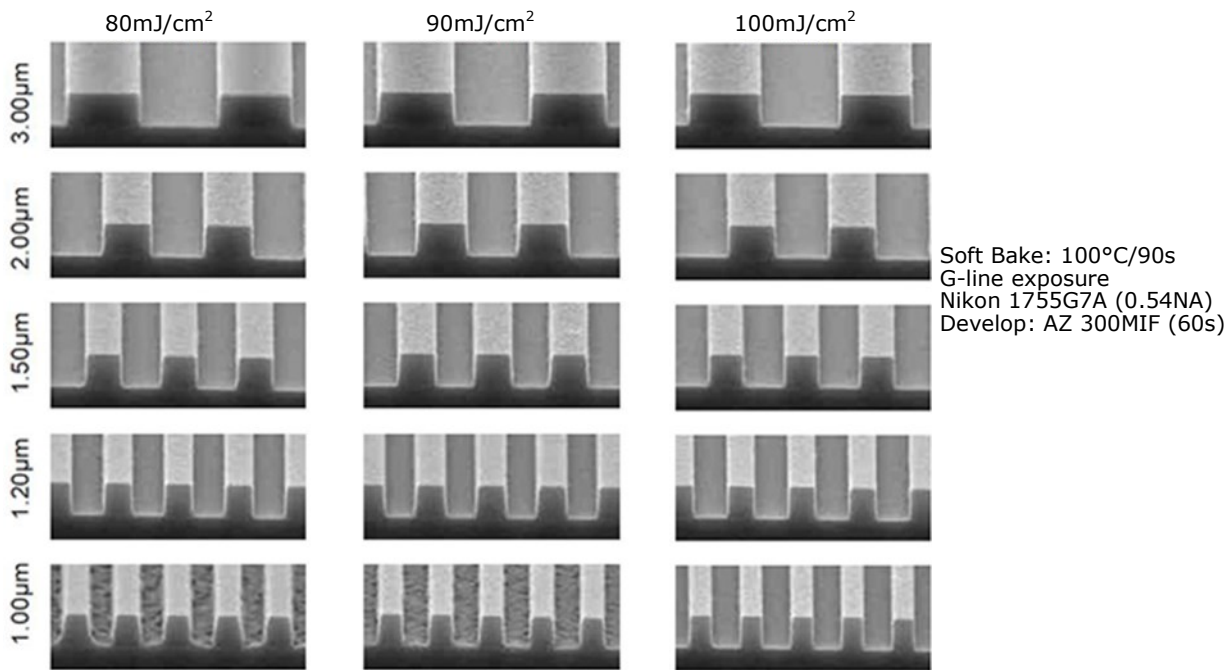
AZ 300MIF, 726MIF, 917MIF, AZ 400K 1:4

### REMOVERS

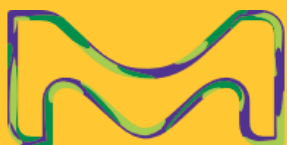
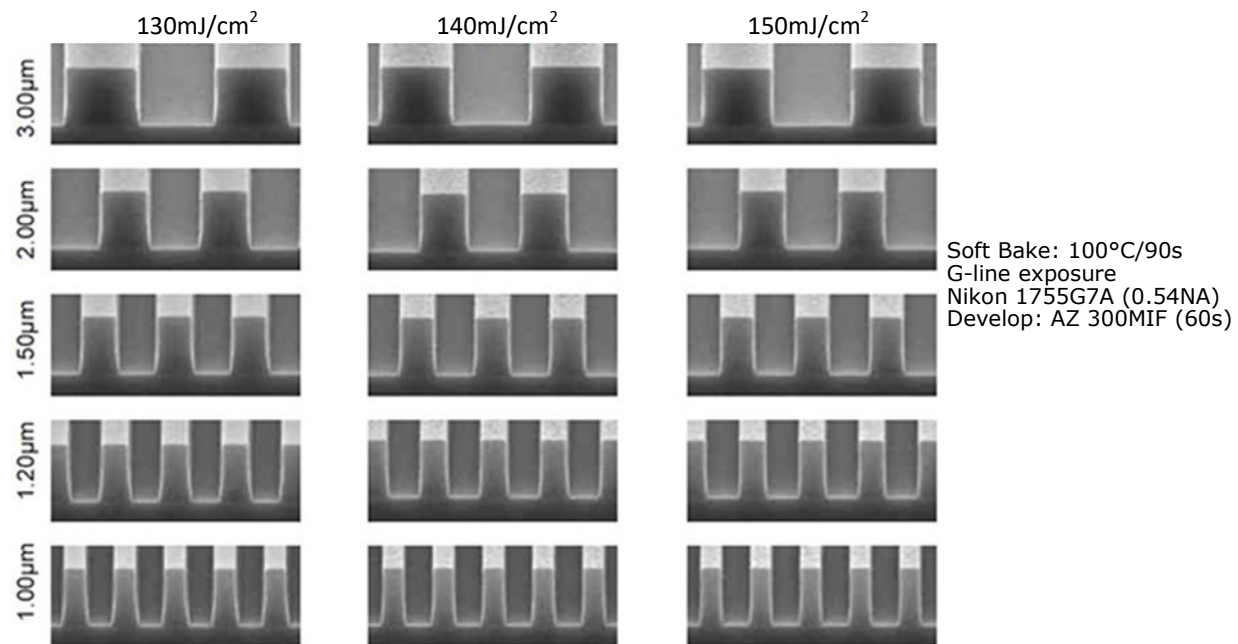
AZ 300T, AZ 400T, or AZ Kwik Strip™



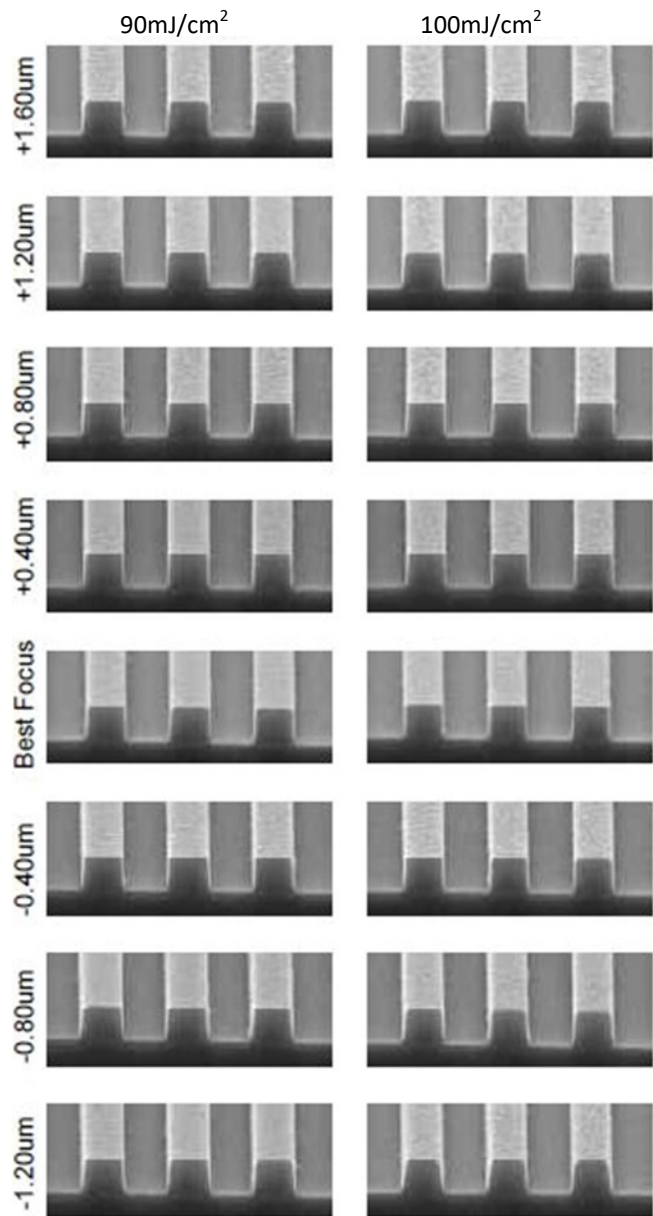
## RESOLUTION OF AZ 1512 at FT = 1.3 $\mu$ m on Si



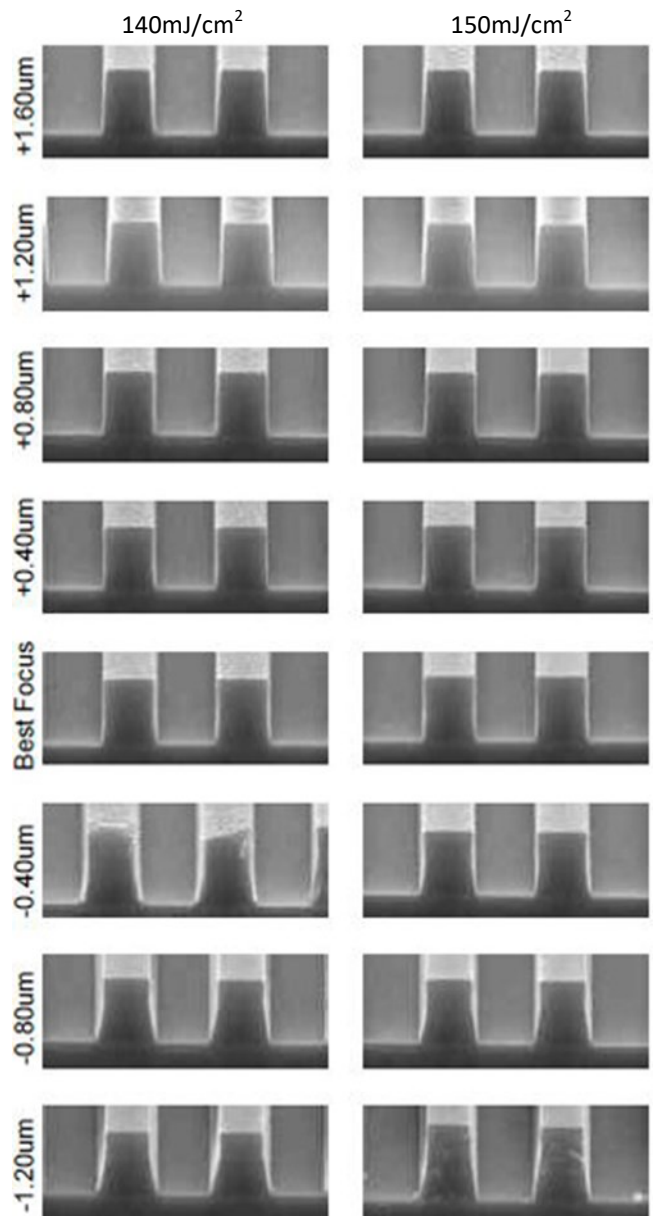
## RESOLUTION OF AZ 1518 at FT = 2.4 $\mu$ m on Si



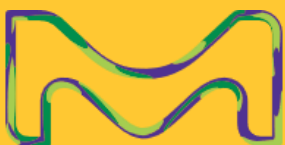
**DEPTH OF FOCUS FOR 1.5 $\mu$ M LINES**  
**AZ 1512 AT FT = 1.30 $\mu$ M ON SI**



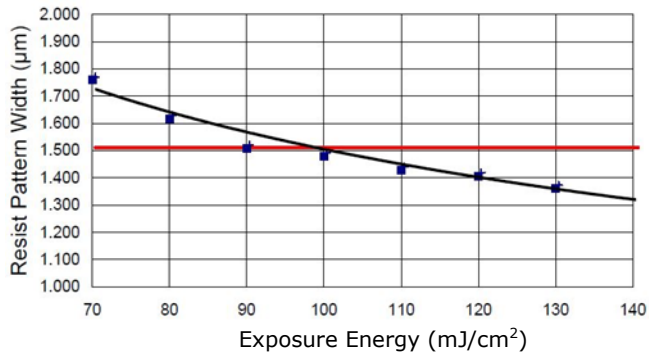
**DEPTH OF FOCUS FOR 2.0 $\mu$ M LINES**  
**AZ 1518 AT FT = 2.40 $\mu$ M ON SI**



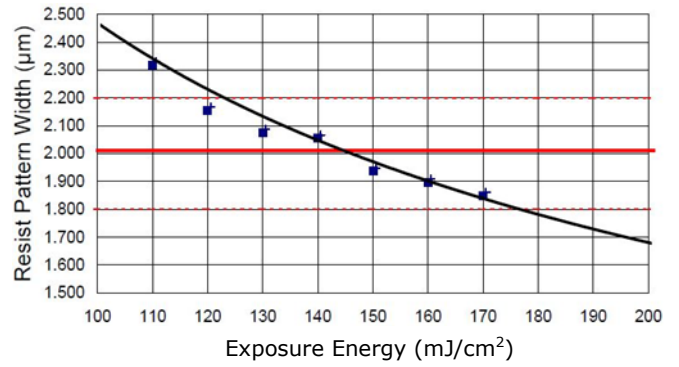
Soft Bake: 100°C/90s (hotplate)  
g-line exposure; Nikon 1755G7A (0.54NA)  
Develop: AZ 300MIF (60s) puddle



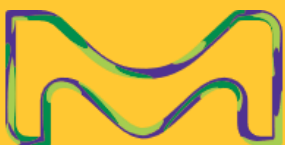
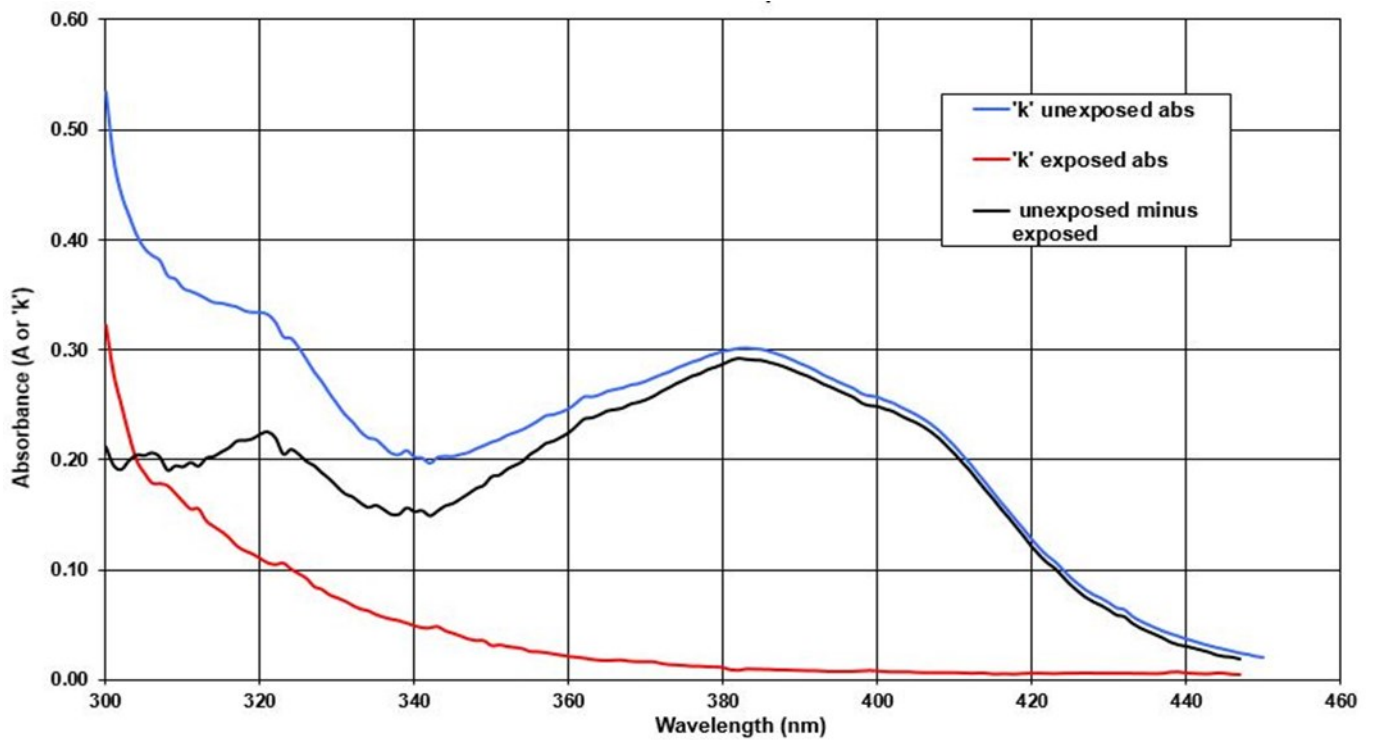
**EXPOSURE LATITUDE FOR 1.5 $\mu$ m lines  
AZ 1512 at FT = 1.30 $\mu$ m**



**EXPOSURE LATITUDE for 2.0 $\mu$ m lines  
AZ 1518 at FT = 2.40 $\mu$ m**



**ABSORBANCE SPECTRA OF AZ 1500 PHOTORESIST (NORMALIZED TO 1.0 $\mu$ M)**



## PROCESS CONSIDERATIONS

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### SUBSTRATE PREPARATION

Substrates must be clean, dry, and free of organic residues. Oxide forming substrates (Si, etc.) should be primed with HMDS (hexamethyl disilazane) or other suitable primer prior to coating AZ 1500. Contact your AZ products representative for detailed information on pre-treating with HMDS.

### COATING

AZ 1500 series resists are compatible with all common coating methods including spin, spray, and roller coating.

### SOFT BAKE

Optimum soft bake times and temperatures may be application specific. Process optimization is recommended to ensure stable lithographic and adhesion performance. Soft bake temperatures for AZ 1500 should be in the 90-110°C range. Temperatures towards the high end of this range will improve adhesion to metals. Bakes may be performed on hotplates or in vented bake ovens.

### EXPOSURE

AZ 1500 is sensitive to exposure wavelengths between 310 and 450nm. 365-436nm is recommended.

### POST EXPOSURE BAKE

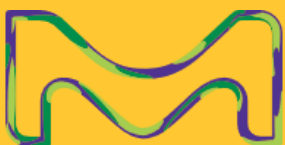
A PEB may be employed to maximize process latitudes and mitigate standing wave effects caused by monochromatic exposure. PEB temperatures and times may be application specific. As a general rule, PEB temperatures should be in the 105°C to 115°C range.

### DEVELOPING

AZ 1500 series photoresists are compatible with both metal ion free (TMAH) and inorganic (Sodium or Potassium based) developers. AZ 400K 1:4 or AZ 300MIF developer is recommended for tank immersion processing and AZ 917MIF is recommended for puddle developing.

### HARD BAKE

Hard baking (post develop bake) improves adhesion in wet etch or plating applications and improves pattern stability in dry etch processes. Hard bake temperatures should be in the 100°C to 110°C range to ensure minimal thermal distortion of the pattern.



## **STRIPPING**

Under normal process conditions, AZ 1500 strips readily in removers designed for DNQ/novolac type photoresists. AZ 300T, AZ 400T, and AZ Kwik Strip removers are recommended. Contact your AZ products representative for application/substrate specific remover recommendations and data sheets.

Strip times may vary depending upon the thermal history of the photoresist pattern. Patterns subjected to high processing temperatures (above 140°C) may cross link and become more difficult to remove. Care should be taken to avoid excessive processing temperatures which may char the photoresist pattern. Charred photoresist patterns will not dissolve in solvent based removers.

## **COMPATIBLE MATERIALS**

AZ 1500 Series materials are compatible with all commercially available lithography processing equipment. Compatible materials of construction include glass, quartz, PTFE, PFA, stainless steel, HDPE, polypropylene, and ceramic.

## **HANDLING/DISPOSAL**

AZ 1500 Series materials contain PGMEA (1-Methoxy-2-propanol acetate). Refer to the current version of the MSDS and to local regulations for up to date information on safe handling and proper disposal. Wear solvent resistant gloves, protective clothing, and eye/face protection.

AZ 1500 is compatible with drain lines handling similar organic solvent based materials.

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