

# technical datasheet

## AZ<sup>®</sup> 1500 Series

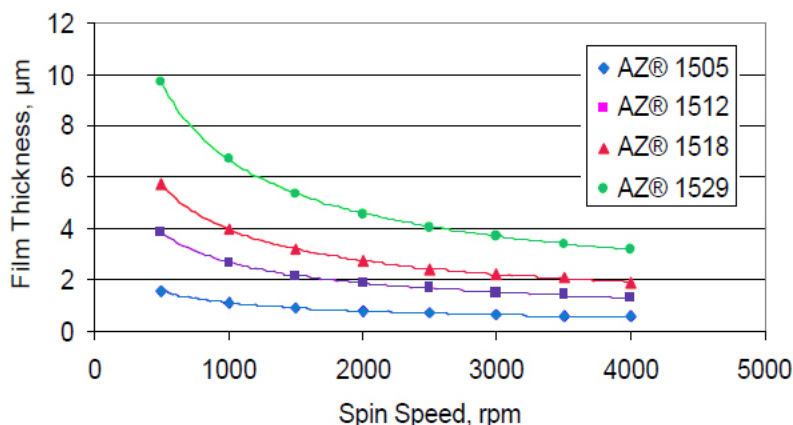
### Positive Tone Photoresists

#### 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

#### SPIN CURVES (150mm wafers)



#### COMPANION PRODUCTS

##### Thinning/Edge Bead Removal

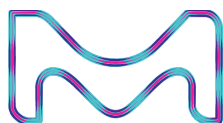
AZ<sup>®</sup> EBR Solvent or AZ<sup>®</sup> EBR 70/30

##### Developers

AZ<sup>®</sup> 300MIF, 726MIF, 917MIF, AZ<sup>®</sup> 400K 1:4

##### Removers

AZ<sup>®</sup> 300T, AZ<sup>®</sup> 400T, or AZ<sup>®</sup> Kwik Strip™



#### TYPICAL PROCESS

Soft Bake: 90 to 110C\*

Expose: 310-450nm sensitive

Post Expose Bake: Optional

Develop: 60s Puddle or immersion

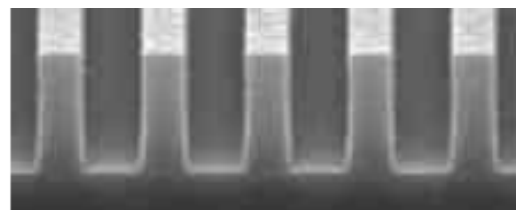
Developer type: MIF or IN

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

#### OPTICAL CONSTANTS\*

|                             |          |
|-----------------------------|----------|
| Cauchy A                    | 1.5996   |
| Cauchy B (µm <sup>2</sup> ) | 0.013498 |
| Cauchy C (µm <sup>4</sup> ) | 1.90E-04 |
| n @ 633nm                   | 1.63447  |
| k @ 633nm                   | 0        |

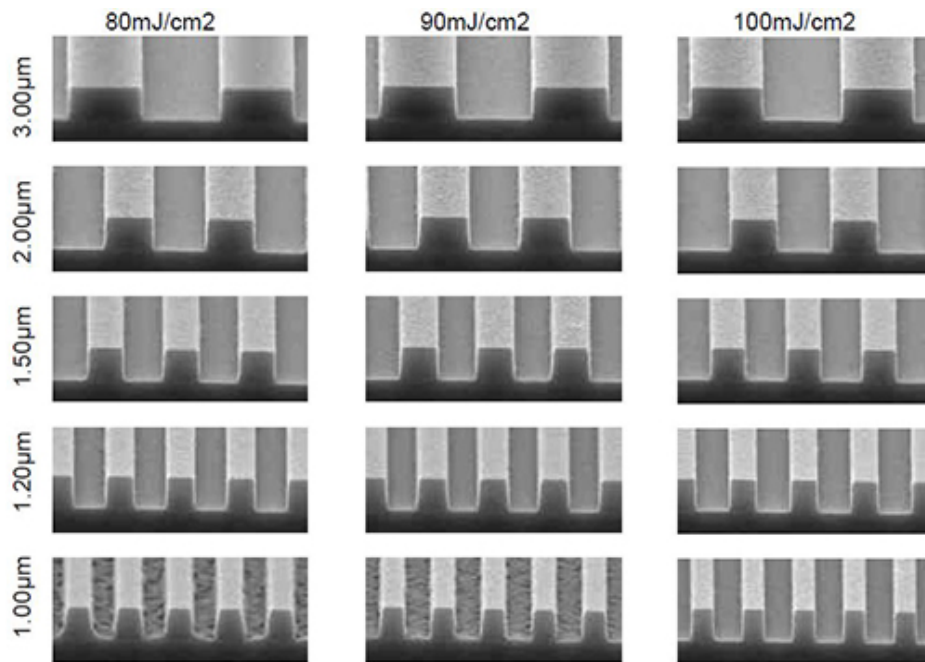
\* Unexposed photoresist film



AZ<sup>®</sup> 1518 Photoresist  
1.0µm lines in 2.40µm film  
150mJ/cm<sup>2</sup> g-line exposure  
AZ<sup>®</sup> 300 MIF Develop (60s)

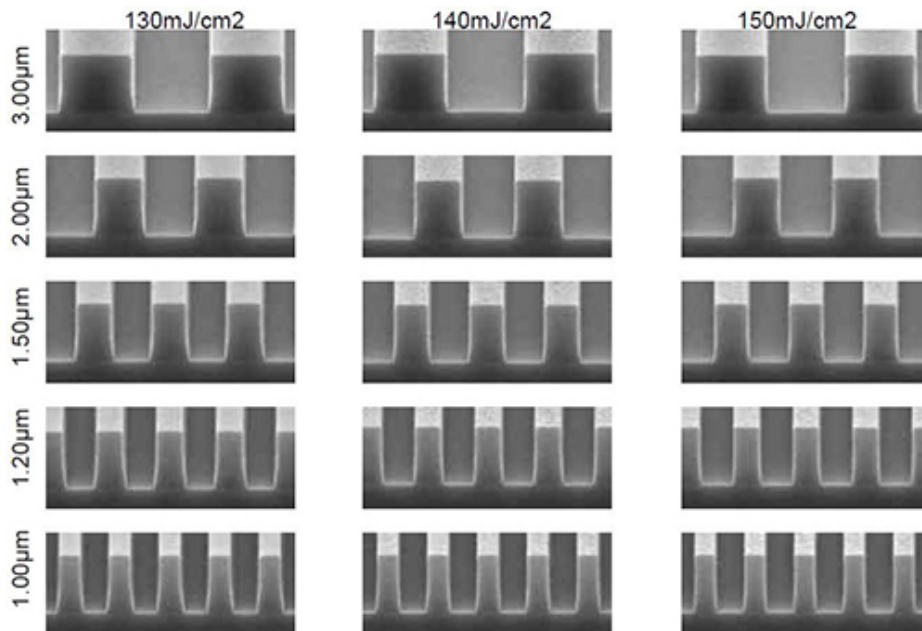
# AZ<sup>®</sup> 1500 Series

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

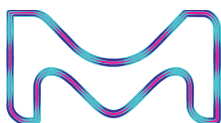


Soft Bake: 100C/90s  
g-line exposure  
Nikon 1755G7A (0.54NA)  
Develop: AZ 300MIF (60s)

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



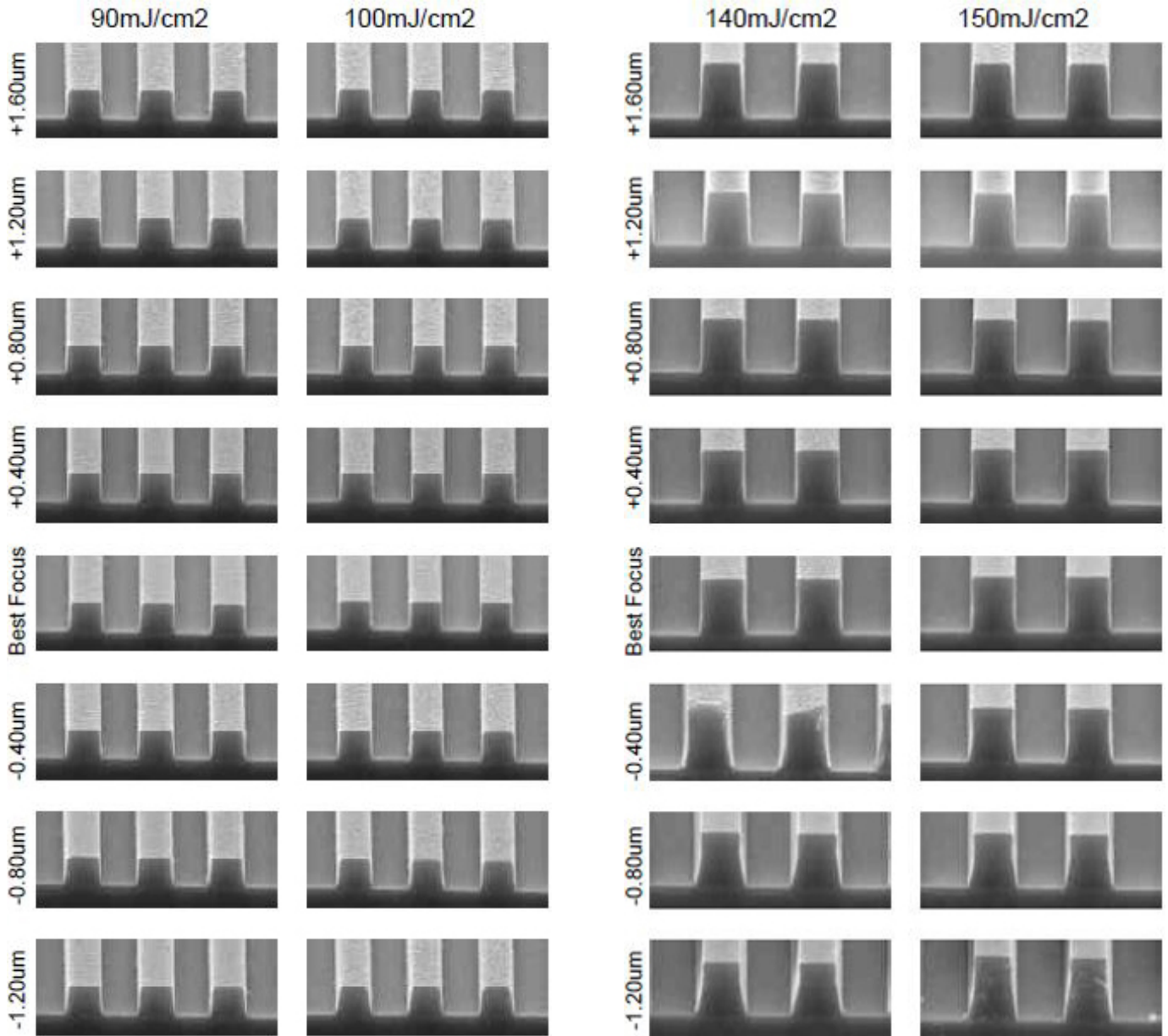
Soft Bake: 100C/90s  
g-line exposure  
Nikon 1755G7A (0.54NA)  
Develop: AZ 300MIF (60s)



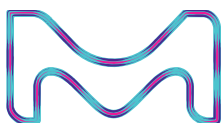
# AZ<sup>®</sup> 1500 Series

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

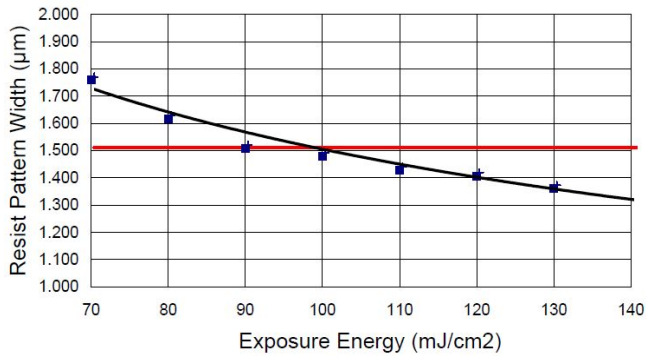


Soft Bake: 100C/90s (hotplate)  
g-line exposure; Nikon 1755G7A (0.54NA)  
Develop: AZ 300MIF (60s) puddle

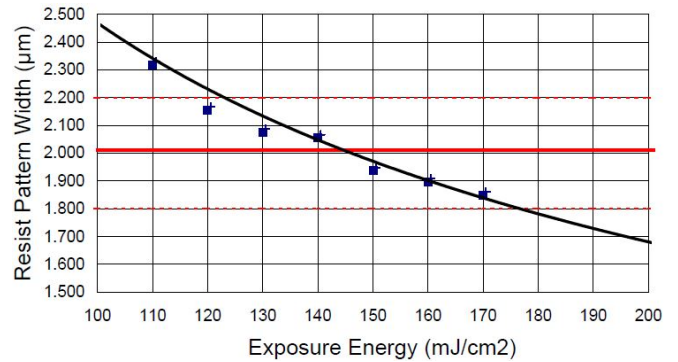


# AZ<sup>®</sup> 1500 Series

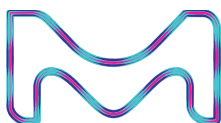
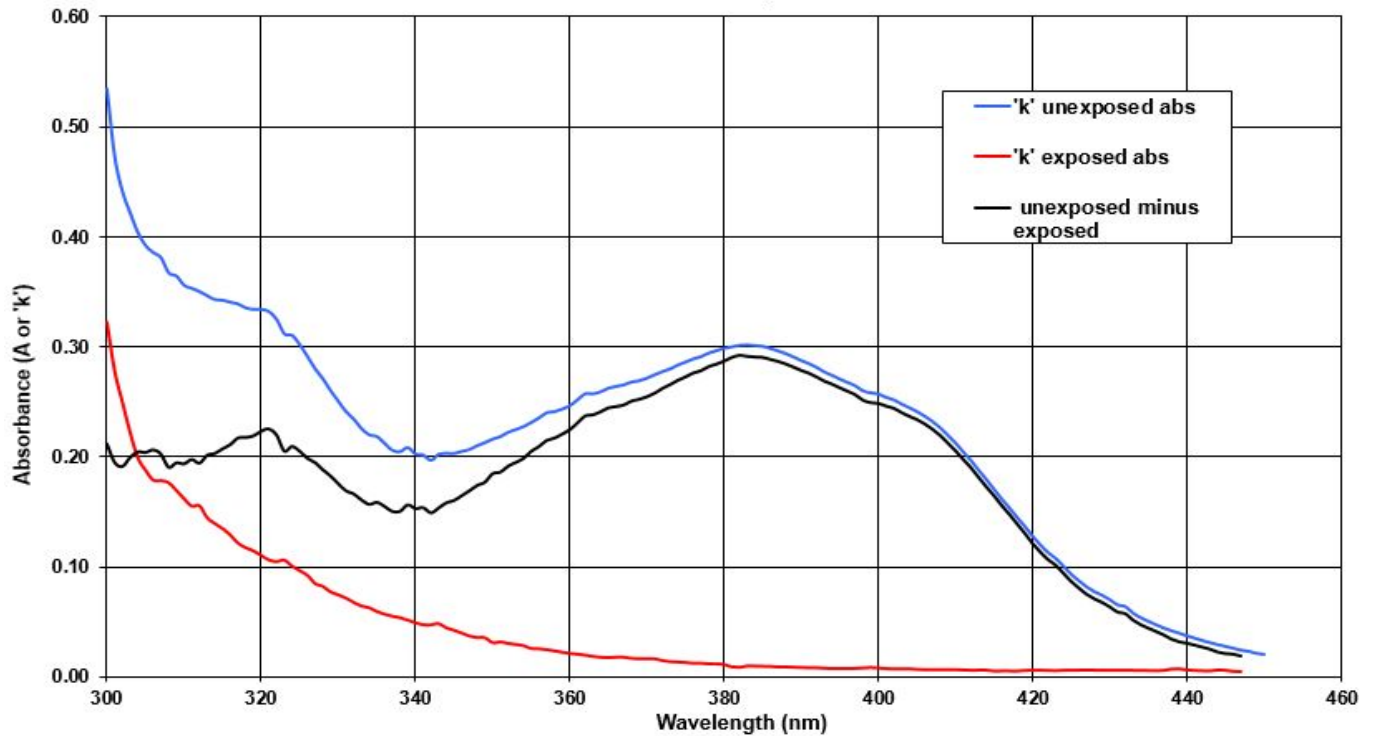
EXPOSURE LATITUDE for 1.5 $\mu$ m lines  
AZ 1512 at FT = 1.30 $\mu$ m



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)



# AZ<sup>®</sup> 1500 Series

## PROCESS CONSIDERATIONS

### 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 90-110C 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 EXPOSE 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 to 115C 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.

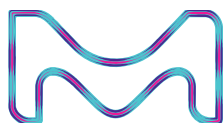
### HARD BAKE

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 to 110C 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 140C) 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.



# AZ<sup>®</sup> 1500 Series

## 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.

## STORAGE

AZ 1500 Series materials are flammable liquids. Store in sealed original containers in a well ventilated, dry area away from heat, light, oxidizers, reducers, and sources of ignition. Recommended storage temperature is 30°-70°F.

## 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.

### North America:

EMD Performance Materials  
70 Meister Avenue  
Somerville, NJ USA 08876  
(908) 429-3500

### Germany:

Merck Performance Materials  
(Germany) GmbH  
Wiesbaden, Germany  
+49 611 962 4031

### Korea:

Merck Performance Materials  
(Korea) Ltd.  
Seoul, Korea  
+82 2 2056 1316

### Singapore:

Merck Performance Materials  
Pte. Ltd.  
Jurong East, Singapore  
+65 68900629

### Taiwan:

Merck Performance Materials  
Co. Ltd.  
Hsinchu, Taiwan  
+886 3 5970885#375

### Japan:

Merck Performance Materials  
G. K.  
Tokyo, Japan  
+81 3 5453 5062

### China:

Merck Electronic Materials  
Shanghai, China  
+86 (21) 2083 2362

[www.emd-performance-materials.com](http://www.emd-performance-materials.com)

Products are warranted to meet the specifications set forth on their label/packaging and/or certificate of analysis at the time of shipment or for the expressly stated duration. EMD MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE REGARDING OUR PRODUCTS OR ANY INFORMATION PROVIDED IN CONNECTION THEREWITH. Customer is responsible for and must independently determine suitability of EMD's products for customer's products, intended use and processes, including the non-infringement of any third parties' intellectual property rights. EMD shall not in any event be liable for incidental, consequential, indirect, exemplary or special damages of any kind resulting from any use or failure of the products. All sales are subject to EMD's complete Terms and Conditions of Sale. Prices are subject to change without notice. EMD reserves the right to discontinue products without prior notice.

EMD, EMD Performance Materials, AZ, the AZ logo, and the vibrant M are trademarks of Merck KGaA, Darmstadt, Germany.

