



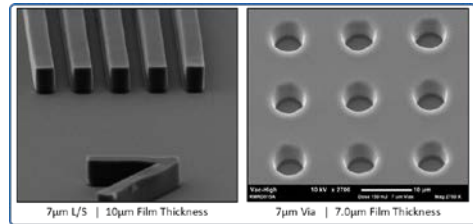
# KMRD-015A series, Low Temperature Cure, Photo-Polymer

## MATERIAL DESCRIPTION

KMRD-015A is a negative tone, low temperature cure polyamide photo-dielectric for redistribution and buffer layers. Reactive to broadband and i-Line exposure systems, aqueous developed and compatible with industry standard edge bead removers and back-rinse solvents.

## KEY FEATURES

- Aqueous Developed (0.26N TMAH), Negative Tone
- Single Stage, Low Temperature Cure, 1hr @ 185 °C
- Low Shrinkage / Film Loss During Process
- Good Chemical & Thermal Stability
- Excellent Processability and Process Latitudes
- Good Storage and Shelf Life



## MATERIAL PROPERTIES

The below listed material properties are based on a cure temperature of 185 °C with a 1hr dwell time.

Mechanical / Thermal Properties	
Youngs Modulus	2.0 GPa
Tensile Strength	80 MPa
Elongation	>60%
CTE α1 (<Tg)	60 ppm / °C
Internal Stress	20 MPa
Tg (DMA)	240 °C
5% Weight Loss (Td5 - N2)	287 °C
5% Weight Loss (Td5 - Air)	283 °C

Electrical Properties	
Volume Resistivity	3.0 x 10 <sup>16</sup> Ohm.cm
Breakdown Voltage	390 V/µm
Dielectric constant	3.2
Dissipation Factor	0.018

## PROCESS GUIDELINES

<b>Type</b>	Liquid Negative Tone.
<b>Substrate Pre-Clean</b>	The substrate should be free of all organic contaminates. Conventional pre-clean steps should be used. Examples: O <sub>2</sub> Plasma descum or sulfuric clean.
<b>Coat</b>	KMRD-015A is applied directly to the substrate. No adhesion promoters are required.  Please see spin-speed curves for the available film thickness range.  KMRD-015A is compatible with industry standard EBR and back-rinse solvents such as; Cyclopentanone or PGME based solvent blends.
<b>Soft-Bake</b>	95 °C , 2 min. (Hot-Plate)      Note: ver. 15.0 requires 110°C , 4 min.
<b>Exposure</b>	Reactive to i-Line and broadband systems. Broadband exposure dose : 200 mJ/cm <sup>2</sup> (Mask-Aligner)* i-Line exposure dose : 550 mJ/cm <sup>2</sup> (i-Line Stepper)* * intensity measured at 365nm wavelength

\*Ver. 15.0 requires higher dose 300 mJ/cm<sup>2</sup> (Mask-Aligner), 800 mJ/cm<sup>2</sup> (i-Line Stepper)



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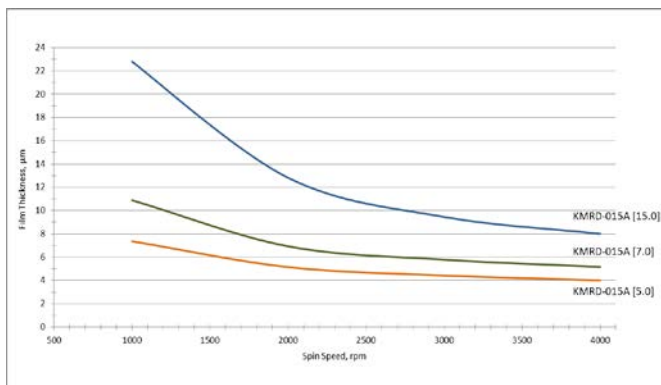
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<b>Post-Exposure-Bake (PEB)</b>	110 °C , 2.5 minutes (Hot-Plate)
<b>Development</b>	2.38% TMAH (0.26N). 90 seconds puddle with thorough DI rinse / dry.
<b>Cure</b>	Thermal Cure is performed in a convection oven at 185 °C for 60 minutes at temperature (dwell time). Post cure shrinkage is <5% @ 185 °C, and <10% @ 200 °C.

### **SPIN-SPEED CURVES and CAUCHY COEFFICIENTS**

Spin-Speed curves listed are post Soft-Bake, as coated thickness.



<b>Cauchy Coefficients</b>	
<b>n1</b>	<b>1.5705</b>
<b>n2</b>	<b>9.056E-03</b>
<b>n3</b>	<b>4.339E-04</b>

<b>n &amp; k</b>	
<b>@ 365nm</b>	<b>1.669, 0.003</b>
<b>@ 405nm</b>	<b>1.646, 0.003</b>
<b>@ 436nm</b>	<b>1.635, 0.002</b>
<b>@ 633nm</b>	<b>1.602, 0.001</b>

### **REMOVAL PROCESS**

Post Soft-Bake KMRD-015A can be removed using conventional removal methods. Post development, prior to cure KMRD is removed using organic solvent stripper. A post plasma descum should be used to remove any trace organic contamination.

### **STORAGE**

KMRD-015A should be stored in refrigerated conditions (<10 °C) in the original packaging. Shelf-life is 6 months under refrigerated conditions and 6 weeks at room-temperature (20-23 °C).

### **HANDLING PRECAUTIONS and DISPOSAL CONSIDERATIONS**

Before using this product, consult the Safety Data Sheet (SDS) / Material Safety Data Sheet (MSDS) for details on the product hazards and handling precautions.

Dispose in accordance with all local, state, federal, government regulations. The material and its container must be disposed in a safe and legal manner. It is the user's responsibility to verify that treatment and disposal procedures comply with local regulations.

For further information on the use and performance of KMRD-015A,  
please contact your local Nippon Kayaku Group representative.

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