

## *PROCESSING GUIDELINES*

### **XP PriElex<sup>®</sup> SU-8 1.0**

#### **Description**

XP PriElex<sup>®</sup> SU-8 1.0 is an epoxy (SU-8)-based ink that was optimized for use with inkjet printing processes and suitable for dielectric and isolation patterning.

#### **Features**

- Inkjet compatibility
- Low temperature cure (< 150°C)
- Good dielectric properties
- Excellent thermal and chemical resistance
- Maskless lithography
- Rapid prototyping
- Reduced material waste
- Ability to coat unusual substrates

#### **BASIC PROCESSING GUIDELINES**

##### **Substrate**

XP PriElex<sup>®</sup> SU-8 1.0 has been tested primarily on silicon substrates. The choice of substrate and surface pretreatment will greatly affect the wetting behavior of jetted droplets.

Other compatible substrates include PET, polyimide and glass.

##### **Inkjet Printing**

All process parameters were obtained using a FUJIFILM Dimatix DMP-2800 printer with 10 pL drop volume print head, and are meant to serve as a baseline for process development. Optimal settings will vary with printer, printhead, substrate and environmental conditions.



Fully inkjetted print example

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## Typical Ink Properties

Surface Tension	30 Dynes/cm
Density	1.038 g/cm <sup>3</sup>
Filtration	0.2 µm
Viscosity (kinematic)	9.19 cSt
Nominal Solids	32%

## Print Parameters

Jetting Voltage	17 – 20V
Jetting Temp	30°C
Platen Temp	30°C – 60°C
Drop Volume	10 pL
Meniscus Vacuum	3.0 inch H <sub>2</sub> O

## Jetting Waveform



Segment	Level %	Slew Rate	Duration (us)
1	0	.65	3.584
2	100	1.34	1.984
3	67	.60	0.512

## Leader Bar

When working with XP PriElex® SU-8 1.0, printheads may need to ‘pre-fire’ nozzles before reaching optimum droplet speed and accuracy. In this case, a short leader bar of 2-5 mm may be used to improve pattern quality.



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# XP PriElex® SU-8 1.0 Processing Guidelines

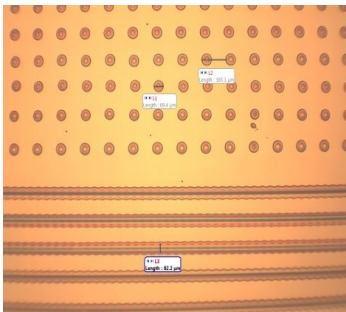
## Curing

After printing XP PriElex® SU-8 1.0, the substrate should be soft baked to remove excess solvent. While a heated platen is often sufficient for this purpose, an optional soft bake on a hot plate may be beneficial for thicker layers, i.e. multiple passes. The ink is sensitive to broadband or i-Line (365 nm) exposure. Jetted coatings up to 2.5  $\mu\text{m}$  should be subject to a broadband exposure dose of approximately 35 mJ/cm<sup>2</sup>, followed by a post-exposure bake on a hot plate at 110°C for 5 minutes, to ensure adequate curing. Higher exposure doses might be required for exposure at 365 nm vs. broadband. Longer bake times and increased dosage may also be necessary for some substrates and thicker coatings. An optional hard bake at 150°C for 15 minutes or more for thicker coatings is recommended if the coating is to remain as a permanent part of the final device.

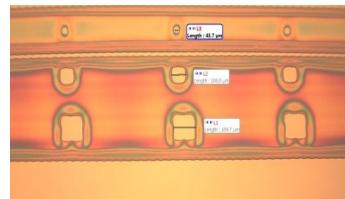
## Typical printed patterns

- Dots, lines and vias printing on silicon

*Single pass, 60  $\mu\text{m}$  drop spacing (423 dpi), 30°C platen, no additional soft bake*



69  $\mu\text{m}$  diameter dots (top)  
82  $\mu\text{m}$  wide line (bottom)



44, 108 and 170  $\mu\text{m}$  vias  
(top, middle, bottom)

*Multiple passes, 55  $\mu\text{m}$  drop spacing (462 dpi), 55°C platen, no additional soft bake*

Passes	Film Thickness ( $\mu\text{m}$ )	Resolution ( $\mu\text{m}$ )
1	0.7	90
2	1.3	92
3	2.0	94
4	2.6	96
5	3.5	98

Table reflects typical average values. Line width will vary with substrate/surface treatment.

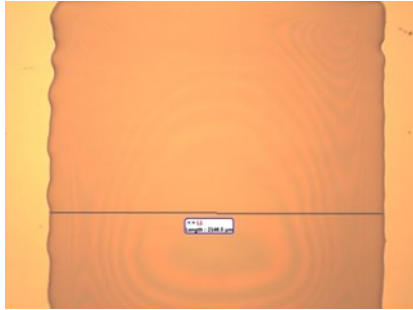


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- 2 mm<sup>2</sup> pads

*20 μm drops spacing (1270 dpi), room temperature platen followed by a soft bake (110°C/2 min)*



1 pass, 2.8 μm film thickness



2 passes, 5.4 μm film thickness

## Cleaning Cycles

Periodic maintenance may help keep nozzles clear and functioning properly after prolonged print jobs or idle periods. A short purge before the start of printing is usually sufficient to prime the printhead. PGMEA and cyclopentanone can be used as cleaning/flushing solvents.

## Storage and Handling

Store XP PriElex® SU-8 1.0 in a cool, dry area away from direct sunlight. Consult the material Safety Data Sheet (SDS) for details on the handling procedure and product hazards prior to use.

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For further information on the use and performance, please contact a Kayaku Advanced Materials sales representative.

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ADVANCED MATERIALS

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