AZ 3312 Photoresist
(18cps)
Data Package

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AZ 3300 Photoresist

i-line Resolution at Specific Film Thickness

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<table>
<thead>
<tr>
<th>AZ 3300 Photoresist</th>
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</table>
| **AZ 3312** Photoresist (18cps) | High thermal stability  
Good process latitude in i-line, g-line, and broad band  
Resolution in i-line 0.6µm, in g-line 0.8µm  
Excellent for wet etch processes |
| **AZ 3318-D** Photoresist (30cps) | Dyed resist  
Prevents notching on substrates with high or varying reflectivity  
Reduced swing curve |
AZ 3300 Photoresist
Spin Speed Curves
AZ 3300 Photoresist
Features & Benefits

◊ Sensitivity to g, h, and i-line wavelengths
◊ Process relatively insensitive to bake conditions, develop times, and develop temperatures
◊ Compatible with inorganic and organic (w/ & w/o surfactant) developers
◊ Thermal stability to 125°
◊ Good depth of focus, linearity, and photospeed for crossover applications
◊ Very high stability against particle generation
◊ Excellent value for performance
AZ 3312 Photoresist (18 cps)
Optical Parameters

◊ Refractive Index

<table>
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<th>365nm</th>
<th>405nm</th>
<th>435nm</th>
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<td></td>
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<td>1.6906</td>
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<td>k</td>
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<td><strong>Unbleached</strong></td>
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<td>k</td>
<td>0.0333</td>
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Bake conditions: Soft bake 90°C/60 sec.
PEB 110°C/60 sec.
AZ 300 MIF Developer 23°C
AZ 3312 Photoresist (18 cps)
Optical Parameters

◊ Dill Parameters

**i-line:**
A = 1.1390 (µm⁻¹)
B = 0.0762 (µm⁻¹)
C = 0.0264 (cm²/mJ)

**g-line:**
A = 0.6695 (µm⁻¹)
B = 0.0172 (µm⁻¹)
C = 0.0186 (cm²/mJ)

◊ Cauchy Coefficients

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
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<td>Bleached</td>
<td>1.5869</td>
<td>0.011818</td>
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<tr>
<td>Unbleached</td>
<td>1.6005</td>
<td>0.011334</td>
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Bake conditions:
- Soft bake 90°C/60 sec.
- PEB 110°C/60 sec.
- AZ 300 MIF Developer 23°C
AZ 3312 Photoresist (18 cps)
Optical Parameters - Absorptivity

![Graph showing Optical Parameters - Absorptivity for AZ 3312 Photoresist (18 cps). The graph plots absorptivity against wavelength in nanometers. Notable wavelengths include 345 nm, 405 nm, and 428 nm.](image-url)
AZ 3312 Photoresist (18 cps)
Development Parameters

◊ PROLITH™ Modeling Parameters

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<tr>
<td>Rresin (nm/s)</td>
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<tr>
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<tr>
<td>n notch</td>
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<td>1.10</td>
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Bake conditions: Soft bake 90°C/60 sec.
PEB 110°C/60 sec.
AZ 300 MIF Developer 23°C
AZ 3312 Photoresist (18 cps)
Suggested Process Conditions

⇒ Spray/Puddle Process:
  – Softbake 90° -110° C,
  – 60 - 90 sec
  – Expose: g-line, h-line, i-line stepper or broadband exposure source
  – Develop: AZ 300 MIF developer, 60 sec. spray-puddle

⇒ Double Puddle Process:
  – Softbake 90° -110°C,
  – 60 - 90 sec
  – Expose: g-line, h-line, i-line stepper or broadband exposure source
  – Develop: AZ 917 MIF developer, 52 sec. double puddle
AZ 3312 Photoresist (18 cps)

i-Line Swing Curve

- Dense Lines
- SB: 90°C, 60 sec; PEB: 110°C, 60 sec
- Puddle: 60 sec AZ 300 MIF Developer at 23°C
- NIKON 0.54 NA i-Line

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AZ 3312 Photoresist (18 cps)

**g-Line Swing Curve**

Dense Lines
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec Spray-puddle @23°C
GCA 0.42 NA **g-Line**
AZ 3312 Photoresist (18 cps)

Film Thickness 0.974 µm @ Emax
Exposure with NIKON 0.54 NA i-line Stepper
Using AZ 300 MIF Developer
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23.0°C
Nikon 0.54 NA i-Line

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AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,

100 mJ/cm²
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
0.60 µm L/S DOF on Silicon for Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23.0°C
Nikon 0.54 NA i-Line
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.6 µm Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.6 µm Dense Lines, FT = 0.974 µm

-1.2µm

-1.0 µm

-0.6 µm

-0.2 µm

100 mJ/cm²

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,

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AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.6 \( \mu \)m Dense Lines, FT = 0.974 \( \mu \)m

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,

110 mJ/cm²
**AZ 3312 Photoresist (18 cps)**

0.60 µm L/S Exposure Latitude on Silicon, FT = 0.974 µm

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**Dense Lines**

SB: 90°C, 60 sec; PEB: 110°C, 60 sec

Puddle: 60 sec AZ 300 MIF Developer at 23°C

Nikon 0.54 NA i-Line

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AZ 3312 Photoresist (18 cps)
0.50 µm L/S DOF on Silicon for Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23.0°C
Nikon 0.54 NA i-Line
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.5 μm Dense Lines, FT = 0.974 μm

90 mJ/cm²

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.5 µm Dense Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.5 µm Dense Lines, FT = 0.974 µm

110 mJ/cm²

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
0.50 µm L/S Exposure Latitude on Silicon, FT = 0.974 µm

Dense Lines
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23°C
Nikon 0.54 NA i-Line

89 mJ/cm²
36% Exposure Latitude
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23.0°C
Nikon 0.54 NA i-Line
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,

110 mJ/cm²
AZ 3312 Photoresist (18 cps)
0.60 µm L/S DOF on Silicon for Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23.0°C
Nikon 0.54 NA i-Line
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.6 µm Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,

-1.4 µm  -1.2 µm  -1 µm  -0.6 µm
90 mJ/cm²  0.0 µm

0.6 µm  0.4 µm
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.6 µm Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.6 µm Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
0.50 µm L/S DOF on Silicon for Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23.0°C
Nikon 0.54 NA i-Line
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.5 µm Isolated Lines, FT = 0.974 µm

-1.4 µm  -1.2 µm  -1 µm  -0.6 µm

90 mJ/cm²

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.5 µm Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.5 µm Isolated Lines, FT = 0.974 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
Contact Hole Focus Latitude, FT = 1.076µm

140 mJ/cm²

SB: 90°C/ 60 sec, Nikon i-line, 0.54 NA
PEB: 110°C/ 60 sec
AZ 300 MIF developer/ double puddle 52 sec
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.7 µm Contact Holes, FT=1.076 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.6 µm Contact Holes, FT=1.076 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,

140 mJ/cm²
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.5 µm Contact Holes, FT=1.076 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Nikon 0.54 NA i-Line,
AZ 3312 Photoresist (18 cps)

Film Thickness 1.17 µm @ Emax
Exposure with GCA 0.42 NA g-line Stepper
Using AZ 300 MIF Developer
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23°C
GCA 0.42 NA, g-Line
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line

125 mJ/cm²
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line

135 mJ/cm²
AZ® 3312 Photoresist (18 cps)
0.7 µm L/S DOF on Silicon for Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ® 300 MIF Developer at 23°C
GCA 0.42 NA, g-Line

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AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.7 µm Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line

125 mJ/cm²
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.7 µm Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line
AZ 3312 Photoresist (18 cps)
0.7 µm L/S Exposure Latitude on Silicon, FT = 1.171 µm

Dense Lines
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ® 300MIF, 60 sec Spray-puddle Developer @23°C
GCA 0.42 NA, g-Line
AZ 3312 Photoresist (18 cps)
0.65 µm L/S DOF on Silicon for Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Puddle: 60 sec AZ 300 MIF Developer at 23°C
GCA 0.42 NA, g-Line

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AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.65 µm Dense Lines, FT = 1.17 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line

125 mJ/cm²

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AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.65 μm Dense Lines, FT = 1.17 μm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line

135 mJ/cm²
AZ 3312 Photoresist (18 cps)
0.65 µm L/S Exposure Latitude on Silicon, FT = 1.171 µm

Dense Lines
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF, 60 sec Spray-puddle Developer @23°C
GCA 0.42 NA, g-Line
AZ 3312 Photoresist (18 cps)
Contact Hole Focus Latitude, FT = 1.171µm
180 mJ/cm²

SB: 90°C/ 60 sec
GCA g-line, 0.42 NA
PEB: 110°C/ 60 sec
AZ 300 MIF Developer/ 60 s spray puddle.
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.9 μm Contact Holes, FT=1.171 μm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line

180mJ/cm²

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AZ 3312 Photoresist (18 cps)
DOF on Silicon for 0.8 µm Contact Holes, FT=1.171 µm

1.5µm
1.1 µm
0.3 µm
-0.5 µm

180mJ/cm²

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
GCA 0.42 NA, g-Line

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AZ 3312 Photoresist (18 cps)  
DOF on Silicon for 0.7 µm Contact Holes, FT=1.171 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec  
AZ 300 MIF Developer, 60 sec at 23.0°C  
GCA 0.42 NA, g-Line

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AZ 3312 Photoresist (18 cps)
Broadband, Linearity on Silicon, FT = 1.171 µm

Dense Lines
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 915 MIF Developer, 60 sec Spray-puddle Developer @23°C
Ultratech 1500 0.32 NA, Broadband

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AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 1.171 µm

1.0µm
0.9 µm
0.85 µm
0.8 µm

220 mJ/cm²

0.75 µm

0.65µm
0.7 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Ultratech 1500, 0.32 NA, Broadband
AZ 3312 Photoresist (18 cps)
Linearity on Silicon for Dense Lines, FT = 1.171 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Ultratech 1500, 0.32 NA, Broadband

230 mJ/cm²
AZ 3312 Photoresist (18 cps)
DOF for 1.0 µm Dense Lines on Silicon, FT = 1.171 µm

Dense Lines
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 915 MIF Developer, 60 sec Spray-puddle Developer @ 23 °C
Ultratech 1500 0.32 NA, Broadband

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AZ 3312 Photoresist (18 cps)
DOF on Silicon for 1.0 µm Dense Lines, FT = 1.171 µm

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Ultratech 1500, 0.32 NA, Broadband

220 mJ/cm²
AZ 3312 Photoresist (18 cps)
DOF on Silicon for 1.0 μm Dense Lines, FT = 1.171 μm

1.2 μm  0.6 μm  0.0 μm  -0.6 μm

230 mJ/cm²

SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 300 MIF Developer, 60 sec at 23.0°C
Ultratech 1500, 0.32 NA, Broadband

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AZ 3312 Photoresist (18 cps)
1.0 µm L/S Exposure Latitude on Silicon, FT = 1.171 µm

221 mJ/cm²
35 % Exposure Latitude

Dense Lines
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
AZ 915 MIF, 60 sec Spray-puddle Developer @23°C
Ultratech 1500 0.32 NA, Broadband
AZ 3312 Photoresist (18 cps)
Thermal Stability, 120 sec Hard Bake

No bake
115°C
120°C
125°C
130°C

FT = 1.187 µm
SB: 90°C, 60 sec; PEB: 110°C, 60 sec
Spray Puddle: 60 sec AZ 300 MIF Developer at 23.0°C
Nikon 0.54 NA i-Line

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