

## **TECHNICAL SPEC FOR Stepper**

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**System Model:**

**Canon FPA 3000 i4 SN 601596i4**

**Tool has been shut down by Litho tech.**

**Electricity, cooling water, Vacuum and CCA are closed.**

**Cables between Main unit and power box are still connected, locking kit and demounting for transport to be provided by buyer.**

**Wafer size: 6 inch**

**Wafer type: Jeida flat**

**Chuck type: 8 inch, pin chuck**

**Reticle changer type: (Canon standard?) I4 library Canon**

**Inline right or left: left**

**Particle checker (PPC): No**

**Touch panel type: Canon standard**

**Options:**

**Reticle size: 5 inch**

**Reticle alignment: see specs below**

**Wafer alignment: see specs below**

**Auto focus: see specs below**

**Auto feeder: Yes**

**Wafer tilt:**

**Wafer feeder: Yes**

**Track interface: Yes, tool was used inline, interface is track part**

**Laser: HeNe**

**Lens data: see below**

**Stage and U-lens at shutdown**

**Intensity: 400 mW/cm<sup>2</sup>**

**Uniformity: 2.8%**

**Stage vibration data:**

**Used for 0.35micron line and space? Y**

**Chuck maintenance tool: No**

**Reticle bar code reader: Yes**

**Cassette bar code reader: No**

**SW Version:**

**OS:**

**Vintage: 2006**

**Missing/defective parts: none**

# CANON FPA 3000i4

Acceptance results FOR ALCATEL-MIETEC

ACCEPTANCE CANON STEPPER 8 3000i4 Jun1 1997			SPECIFICATION	RESULT	JUDGE
<b>1. ILLUMINATOR</b>	<b>1a.</b>	Intensity (Normal Illumination)	≥ 650mW/cm2	903mW/cm2	OK
		Intensity (Off-Axis Illumination, Sia)	≥ 400mW/cm2	527.5mW/cm2	OK
		Intensity (Off-Axis Illumination, Sib)	≥ 400mW/cm2	511.8mW/cm2	OK
	<b>1b.</b>	Illumination Uniformity (Normal Illumination)	≤ ±1%	0.7%	OK
		Illumination Uniformity (Off-Axis Illumination, Sia)	≤ ±1.3%	1.0%	OK
		Illumination Uniformity (Off-Axis Illumination, Sib)	≤ ±1.3%	1.0%	OK
	<b>1c.</b>	Dose Control Accuracy	≤ ±1%	0.31%	OK
	<b>1d.</b>	Dose Repeatability CD Method (28 days)	Cp ≥ 1.0	1.17	OK
		Dose Repeatability CD Method (28 days)	Cp ≥ 1.3	1.4	OK
	<b>1e.</b>	Dose Matching Between Steppers CD Method	≤ ± 0.015μ	0.015 (st5) 0.012 (st6)	OK
<b>2. EXPOSURE PERFORMANCE</b>	<b>1f.</b>	Dose Matching Between Steppers CD Method	≤ ± 0.015μ	0.0067μ	OK
		Masking Blade Accuracy (Wafer level)	≤ ± 100 μ	60μ	OK
	<b>1g.</b>	Reticle Change Time (Including Alignment)	≤ 60 secs	57 secs	OK
	<b>2a.</b>	CD 0.35μ DOF (+/- 10%)	≥ 0.6μ	1μ	OK
		Slope 0.35μ DOF (>82deg)	≥ 0.6μ	0.7μ	OK
		overlapping UDOF 0.35μ	≥ 0.6μ	0.7μ	OK
		Linearity 0.35μ	≤ 10%	4.10%	OK
		Proximity Effect 0.35μ	≤ 0.05μ	0.0489μ	OK
	<b>2b.</b>	CD 0.32μ DOF (+/- 10%)	≥ 0.8μ	1.0μ	OK
		Slope 0.32μ (>82.6 deg)	≥ 0.8μ	0.9μ	OK
<b>2c.</b>		overlapping UDOF 0.32μ	≥ 0.8μ	0.9μ	OK
		Linearity 0.32μ	≤ 10%	7.50%	OK
		CD 0.50μ DOF (+/- 10%)	≥ 1.2μ	1.5μ	OK
		Slope 0.50μ DOF (>80deg)	≥ 1.2μ	1.6μ	OK
		UDOF 0.50μ	≥ 1.2μ	1.5μ	OK
		Linearity 0.50μ (9H,9V at best focus van 0.5-1μ, incr. 0.05μ)	≤ 10%	9.90%	OK
		Proximity Effect 0.50μ (9H,9V at best focus)	≤ 0.05μ	.02μ	OK
		Assymmetry 0.50μ (9H,9V at -0.75mm focus)	≤ 5gr	1.9degr	OK
	<b>2d.</b>	Linewidth Repeatability Within Field	0.35μ ± 0.02μ	0.0306μ	OK
		Linewidth Repeatability Within Field	≥ 85gr	83.1gr	OK*
<b>2e.</b>		Linewidth Repeatability Within Field	0.50μ ± 0.025μ	0.66μ	OK*
		Linewidth Repeatability Within Field	≥ 85gr	85.6degr	OK*
		Linewidth Repeatability Within Wafer	0.35μ ± 0.02μ	0.0156μ	OK
		Linewidth Repeatability Within Wafer	≥ 85gr	83.7gr	OK*
		Linewidth Repeatability Within Wafer	0.50μ ± 0.025μ	0.66μ	OK*
		Linewidth Repeatability Within Wafer	≥ 85gr	85.6degr	OK*

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Acceptance results FOR ALICA TELUMETEC					
3. AUTO FOCUS ACCURACY	2f.	Distortion - Deviation From Ideal Cartesian Grid (Normal Illumination)	≤ ± 0.05μ	0.014μ (X); 0.023 μ (Y)	OK
		Distortion - Deviation From Ideal Cartesian Grid (Off-axis SIA)	≤ ± 0.06μ	0.012μ (X); 0.023 μ (Y)	OK
		Distortion - Deviation From Ideal Cartesian Grid (Off-axis SIB)	≤ ± 0.06μ	0.014μ (X); 0.027 μ (Y)	OK
		Distortion Matching - Stepper8 to Miletac Reference Wafer	≤ ± 0.08μ	0.037μ (X); 0.024 μ (Y)	OK
		Distortion Matching - Stepper8 to Stepper6	≤ ± 0.08μ	0.015μ (X); 0.062 μ (Y)	OK
		Distortion Matching - Stepper8 to Stepper5	≤ ± 0.08μ	0.009μ (X); 0.018 μ (Y)	OK
		Distortion Matching - Stepper8 to Stepper4	≤ ± 0.08μ	0.077μ (X); 0.057 μ (Y)	OK
		Distortion Matching - Stepper8 to Stepper3	≤ ± 0.08μ	0.034μ (X); 0.046 μ (Y)	OK
		Distortion Matching - Stepper8 to Stepper2	≤ ± 0.08μ	0.036μ (X); 0.034 μ (Y)	OK
		Distortion Matching - Stepper8 to Stepper1	≤ ± 0.08μ	0.051μ (X); 0.025 μ (Y)	OK
3. AUTO FOCUS ACCURACY	3a.	Stability Over 28 days, 0.5μ lines	≤ 0.3μ range	0.3μ	OK
	3b.	Maximum Deviation of Best Focus between Bare Silicon, Nitride, Polysilicon and Metal Wafers, 0.8μ lines	≤ 0.3μ range	0.075μ range	OK
	3c.	Global Levelling Tilt	≤ 7ppm 3sd	≤ 1.96ppm (X) 1.56 (Y) 3sd	OK
	3d.	Die by Die Levelling Stability Focus	≤ 0.10μ 3sd	0.019μ	OK
	3e.	Die By Die Levelling Repeatability Tilt	≤ 7ppm 3sd	5.05ppm (X); 3.79ppm (Y)	OK
4. AUTO ALIGNMENT ACCURACY HeNe and Broadband	4a.	Reticle Rotation Accuracy	≤ ± 0.02μ	≤ ± 0.00446μ	OK
		Reticle Rotation Repeatability	≤ 0.03μ range	≤ 0.0074μ range	OK
	4b.	AGA Accuracy Single Machine (Resist to Resist, Mode 1, Day1)	≤ 0.06μ mean+3sd	0.0368μ (Y); 0.0478μ (Yr)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 1, Day2)	≤ 0.06μ mean+3sd	0.0205μ (Xl+Xr/2)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 1, Day3)	≤ 0.06μ mean+3sd	0.0495μ (Y); 0.0584μ (Yr)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 1, Day3)	≤ 0.06μ mean+3sd	0.0366μ (Xl+Xr/2)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day1)	≤ 0.06μ mean+3sd	0.0364μ (Y); 0.0476μ (Yr)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day1)	≤ 0.06μ mean+3sd	0.0213μ (Xl+Xr/2)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day2)	≤ 0.06μ mean+3sd	0.0386μ (X)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day2)	≤ 0.06μ mean+3sd	0.0530μ (Y)	OK
4. AUTO ALIGNMENT ACCURACY		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day3)	≤ 0.06μ mean+3sd	0.0335μ (X)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day3)	≤ 0.06μ mean+3sd	0.0437μ (Y)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day3)	≤ 0.06μ mean+3sd	0.0281μ (X)	OK
		AGA Accuracy Single Machine (Resist to Resist, Mode 4, Day3)	≤ 0.06μ mean+3sd	0.0432μ (Y)	OK
	4c.	AGA Accuracy Machine to Machine (Resist to Resist, stepper8-stepper6, Day 1)	≤ 0.09μ mean+3sd	0.0846μ (Y); 0.0890μ (Yr)	OK
4. AUTO ALIGNMENT ACCURACY		AGA Accuracy Machine to Machine (Resist to Resist, stepper8-stepper6, Day 2)	≤ 0.09μ mean+3sd	0.0496μ (Xl+Xr/2)	OK
		AGA Accuracy Machine to Machine (Resist to Resist, stepper8-stepper6, Day 2)	≤ 0.09μ mean+3sd	0.0878μ (Y); 0.0859μ (Yr)	OK
		AGA Accuracy Machine to Machine (Resist to Resist, stepper8-stepper6, Day 3)	≤ 0.09μ mean+3sd	0.0437μ (Xl+Xr/2)	OK
		AGA Accuracy Machine to Machine (Resist to Resist, stepper8-stepper6, Day 3)	≤ 0.09μ mean+3sd	0.0844μ (Y); 0.0889μ (Yr)	OK
		AGA Accuracy Machine to Machine (Resist to Resist, stepper8-stepper6, Day 3)	≤ 0.09μ mean+3sd	0.0498μ (Xl+Xr/2)	OK
4. AUTO ALIGNMENT ACCURACY	4d.	Overlay Guarantee ALL Process Layers and ALL Machines	≤ 0.20μ X + 3sd	**	OK
	4e.	Layer and Device Alignment Offsets	Fixed	Fixed	OK

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5. X-Y STAGE	5a.	Stepping Accuracy Wafer 1	≤ 0.04μ 3sd	0.0117μ (X); 0.0125μ (Y) 0.0149μ (X); 0.0219μ (Y)	OK
		Stepping Accuracy Wafer 2	≤ 0.04μ 3sd	0.0108μ (X); 0.0127μ (Y) 0.0169μ (X); 0.0208μ (Y)	OK
		Stepping Accuracy Wafer 3	≤ 0.04μ 3sd	0.0103μ (X); 0.0114μ (Y) 0.0151μ (X); 0.0232μ (Y)	OK
		Scaling	≤ ± 0.5ppm	-0.26ppm (X); -0.31ppm (Y)	OK
		Orthogonality	≤ ± 0.5ppm	-0.04ppm	OK
6. PRE-ALIGNMENT ACCURACY	6a.	Mechanical Prealignment Accuracy	≤ 30μ 3sd	3.76μ (X) 7.23μ (Y); 5.0μ (Yr)	OK
7. OPTICAL EBR		Edge Bead Removal Capability	0 - 6mm	1 - 3 - 6 mm	OK
		Edge Bead Removal Accuracy	+0.3/-0.5mm	+0/-0.445	OK
8. CONTAMINATION		Particles ≥ 0.3μ Added Per 150mm Wafer Per Pass	≤ 10	1	OK
		Particles ≥ 0.5μ Added Per 150mm Wafer Per Pass	≤ 3	0	OK
9. RELIABILITY		Cycled Wafers Through Coat, Expose and Develop Without Error/Assist:			
		Test I)	25	0	OK
		Test II)	500	0	OK
		MTBF	≥ 500hrs	147hrs (23/1/97)	OK***
		MTTR	≤ 2hrs	4hrs*** (23/1/97)	OK***
		Guaranteed Uptime	≥ 93%	97.2	OK
		Number Of Wafers Without Error/Assist	≥ 1000	1000	OK
		Number Of Wafers Without Breakage	≥ 20000	20000	OK
10. THROUGHPUT		150mm Wafers Per Hour With AGA, Multimark, 45 Shots Per Wafer, 20mmx20mm and 0.15secs Exposure			
		Die By Die Levelling ON	≥ 68	71	OK
		Die By Die Levelling OFF	≥ 69	77.5	OK
**** It is part of Canon's responsibility to get this figure improved in the future.					
*** mtr is by definition the diagnose-fixing time (qualification excluded). Here it includes qualification time.					
** all layers on stepper6,8 have Cpk>1; except C05 130 Cpk<1; matter of proces optimisation					
* as a result of discussions on reticle choice, a too severe specification for wall angle					

