

FPA-3000i5+

Fine Pattern Aligner

Installation / Acceptance Data

For: ON Semiconductor
Belgium BVBA

Product Name	FPA-3000i5+
Serial No.	0112664
Product No.	Stepper 18
Inspection Date	29 September 2014.

Canon

Inspected by: Peter Wells / Chris Perry
Andy Day / Chris Howells.

Canon Europa NV,
Paisley Grove,
Chilwell Meadows Business Park,
Beeston,
Nottingham, NG9 6DJ.



Canon Europa N.V.
Bovenkerkerweg 59-61
P.O. Box 2262
1180EG Amstelveen
The Netherlands
Telephone 020-545-8545
Telex 15904/18276
Facsimile 020-545-8222
Direct telephone 020-545-8191

CONFIRMATION OF INSTALLATION/WARRANTY

ON Semiconductor

Name of the company

Purchase order No.

34038735

Order Date 22-May-14

Machine description

Canon FPA-3000i5+

Product Number

0111T601

Serial Number

0112664

Customer Number

1000018

Delivery date

17-Jul-2014

We / I hereby confirm Installation of the above mentioned machine for and on behalf of the above named company and also commencement of the warranty of 9 MONTHS from date below


Signature

MAINTENANCE
MANAGER
Title

18.12.2014
Installation Completion Date

18.12.2014
Date (if different date)

ON SEMI BELGIUM
At company

Dealt with by Canon Europa engineer


Signature

18th Dec 2014
Date

Canon Europa N.V.
Bovenkerkerweg 59-61
P.O. Box 2262
1180EG Amstelveen
The Netherlands
Telephone 020-545-8545
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Facsimile 020-545-8222
Direct telephone 020-545-8191

CONFIRMATION OF FINAL ACCEPTANCE

ON Semiconductor

Name of the company

Purchase order No.

34038735

Order Date 22-May-14

Machine description

Canon FPA-3000i5+

Product Number

0111T601

Serial Number

0112664

Customer Number

1000018

Delivery date

17-Jul-2014

We / I hereby confirm Final Acceptance of the above mentioned machine for and on behalf of the above named company.

Signature

MAINTENANCE
MANAGER
Title

18.12.2014
Acceptance Date

18.12.2014
Date (If different accepted date)

ON SEMI BELGIUM
At company

Dealt with by Canon Europa engineer

Signature

18th Dec 2014
Date



FPA-3000i5+

Lens Replacement Check Results

For : ON Semiconductor

User ID : Stepper 18

Serial No. 0112664

Work Begin 29-Sep-14

Period End 12-Dec-14

Staff In Charge A.Day, C.Perry & P.Wells

Classification	Item	Results	Spec.	Judge	Remark
1 Exposure Performance	Resolution	0.35 μm	0.35 μm	O	
	CD DOF	1.2 μm	$\geq 1.2\mu\text{m}$	O	
	IFD	0.19 μm	$\leq 0.30\mu\text{m}$	O	
	Distortion	DX 0.030 μm	DX,DY $\leq +0.035\mu\text{m}$	O	
	Normal (63,65)	DY 0.019 μm		O	
2 Illuminator	Illumination Intensity	Normal (63,65) 11553 W/m^2	$\geq 10000\text{W}/\text{m}^2$	O	New Lamp
		SiB 5341 W/m^2	$\geq 5500\text{W}/\text{m}^2$	X	With in 50 hours
	Illumination Uniformity	Normal (63,65) 0.952 %	$\leq 1.0 \%$	O	New Lamp
		SiB 0.796 %	$\leq 1.3\%$	O	With in 50 hours
	Dose Control Accuracy	0.57 %	$\leq 1.0\%$	O	80,250,500,1000msec
	Masking Accuracy	Total 73 μm	$\leq +100\mu\text{m}$	O	
3 Alignment Accuracy	Reticle Rotation Accuracy	4.7 nm	$\leq 10\text{nm}$	O	
	Reticle Rotation Repeatability	10.2 nm	$\leq 20\text{nm}$	O	
	He-Ne AGA Overlay	X 25.9 nm	$ m +3\sigma$	O	Center/32 shot
	Mode 1	Y 32.8 nm	$\leq 40\text{nm}$		5 wafers
	Broad Band AGA Overlay	X 33.9 nm	$ m +3\sigma$	O	Center/32 shot
	Mode 4	Y 27.5 nm	$\leq 40\text{nm}$		5 wafers
4 Auto Focus	Focus Leveling Repeatability	0.06 μm	3sigma $\leq 0.10\mu\text{m}$	O	
5 Die by Die	Leveling	3sigma X 2.5 ppm	3sigma $\leq 7\text{ppm}$	O	
	Leveling	Repeatability 3sigma Y 2.8 ppm		O	
6 XY Stage Accuracy	Stepping	XX 13.7 nm	3sigma $\leq 30\text{nm}$	O	Sample 3 Wafers data
	Accuracy	YY 12.6 nm		O	
	Orthogonality	-0.05 ppm	$\leq 0.5\text{ppm}$	O	
	Scaling	X -0.35 ppm	$\leq 0.5\text{ppm}$	O	
		Y -0.15 ppm		O	
7 PreAlignment Accuracy	Mechanical Pre Alignment	XI 8.3 μm	3sigma $\leq 30\mu\text{m}$	O	
		Xr 9.0 μm		O	
		YI 5.7 μm		O	
		Yr 5.0 μm		O	
	TV PreAlignment	X 0.26 μm	$\leq 3 \mu\text{m}$	O	Max X +Max DR
	Accuracy	Y 0.55 μm		O	
8 Throughput	DXD Tilt On	125.7 wph	$\geq 120 \text{ wafers / hour}$	O	32shot 90msec shutter time (Sub=0, main=4)
	DXD Tilt Off	128.8 wph	$\geq 120 \text{ wafers / hour}$	O	

Item : **DISTORTION**

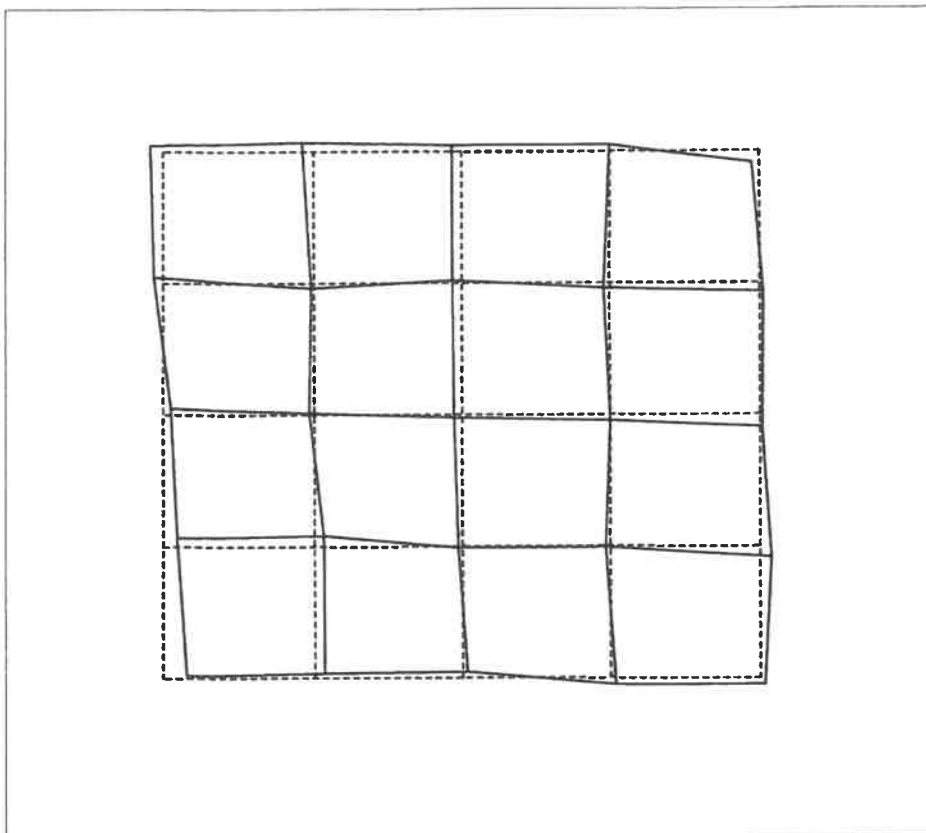
Engineer : P.Wells

MODE 6365
EXCLUDING MAGNIFICATION

Machine No. : 0112664

User ID : Stepper18

Reticle ID : 971101



Map Scale= 0.20 [um]

Distortion

X	Max=	0.030	um	Min=	-0.017	um
Y	Max=	0.017	um	Min=	-0.019	um

Distortion	X=	0.030	[um]
	Y=	0.019	[um]

Item: ILLUMINATION UNIFORMITY
&INTENSITY
for STANDARD 6365

Date: 9-Oct-14

Engineer: P.Wells

Machine No.: 112664

User ID: Stepper 18

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
[1]	55.5	99.1	99.4	99.5	99.6	99.7	99.6	99.7	99.9	99.9	99.9	100.0	99.9
[2]	99.4	99.7	99.8	99.9	100.0	100.1	100.2	100.2	100.2	100.2	100.2	100.3	100.3
[3]	99.8	100.1	100.2	100.1	100.3	100.4	100.4	100.4	100.4	100.3	100.4	100.4	100.5
[4]	100.0	100.1	100.3	100.3	100.4	100.3	100.3	100.3	100.3	100.3	100.4	100.4	100.5
[5]	100.1	100.5	100.4	100.3	100.3	100.3	100.2	100.2	100.2	100.2	100.2	100.3	100.5
[6]	100.4	100.5	100.4	100.5	100.4	100.3	100.1	100.2	100.1	100.1	100.2	100.3	100.4
[7]	100.5	100.7	100.5	100.6	100.5	100.3	100.2	100.2	100.2	100.1	100.1	100.1	100.5
[8]	100.6	100.7	100.6	100.6	100.6	100.3	100.3	100.3	100.2	100.2	100.2	100.1	100.4
[9]	100.7	100.8	100.8	100.7	100.5	100.4	100.3	100.2	100.2	100.2	100.2	100.2	100.4
[10]	100.8	101.0	100.8	100.6	100.4	100.2	100.2	100.2	100.1	100.1	100.1	100.1	100.4
[11]	100.8	100.9	100.6	100.5	100.3	100.2	100.2	100.2	100.0	100.0	100.0	100.0	100.2
[12]	100.7	100.8	100.6	100.5	100.3	100.1	100.1	100.0	99.8	99.9	99.9	99.9	100.2
[13]	100.7	100.8	100.6	100.5	100.1	100.2	100.0	100.0	99.8	99.8	99.9	99.8	100.0
[14]	100.6	100.7	100.6	100.5	100.2	100.1	99.9	99.8	99.8	99.8	99.7	99.7	99.8
[15]	100.4	100.7	100.1	100.3	100.1	100.0	99.9	99.8	99.8	99.7	99.8	99.7	99.9
[16]	100.4	100.6	100.4	100.3	100.1	100.0	99.9	99.8	99.8	99.8	99.8	99.7	100.0
[17]	100.3	100.3	100.2	100.1	100.1	100.1	99.9	99.9	99.8	99.8	99.8	99.8	100.1
[18]	100.0	100.3	100.3	100.4	100.3	100.3	100.1	100.0	100.1	100.1	100.1	100.2	100.3
[19]	99.7	100.1	100.2	100.4	100.3	100.5	100.3	100.4	100.4	100.4	100.4	100.5	100.5
[20]	99.3	99.8	100.0	100.3	100.3	100.3	100.3	100.3	100.5	100.4	100.5	100.5	100.5
[21]	57.6	99.3	99.6	99.8	99.9	100.0	100.0	99.9	100.0	100.1	100.1	100.2	100.2

	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]
[1]	99.9	99.9	99.9	99.8	99.7	99.5	99.4	53.9
[2]	100.4	100.3	100.3	100.2	100.1	100.0	99.8	99.6
[3]	100.5	100.5	100.4	100.4	100.5	100.4	100.2	100.0
[4]	100.6	100.5	100.5	100.4	100.5	100.6	100.5	100.3
[5]	100.6	100.6	100.5	100.5	100.6	100.9	100.8	100.5
[6]	100.6	100.7	100.6	100.7	101.0	101.2	101.1	100.9
[7]	100.5	100.6	100.8	100.8	101.1	101.3	101.2	101.1
[8]	100.5	100.6	100.7	100.8	101.1	101.4	101.3	101.2
[9]	100.4	100.4	100.6	100.7	101.2	101.4	101.4	101.2
[10]	100.3	100.4	100.5	100.6	100.9	101.2	101.2	101.2
[11]	100.2	100.3	100.4	100.4	100.8	101.1	101.2	101.1
[12]	100.2	100.3	100.5	100.5	100.9	101.2	101.3	101.2
[13]	100.1	100.2	100.4	100.5	100.8	101.1	101.3	101.1
[14]	100.1	100.2	100.5	100.4	100.8	101.0	101.1	100.9
[15]	100.1	100.2	100.4	100.4	100.7	100.9	101.0	100.8
[16]	100.2	100.2	100.4	100.3	100.6	100.7	100.8	100.6
[17]	100.1	100.3	100.4	100.5	100.5	100.6	100.6	100.3
[18]	100.4	100.4	100.6	100.7	100.6	100.6	100.5	100.1
[19]	100.6	100.6	100.7	100.8	100.7	100.6	100.4	99.9
[20]	100.6	100.6	100.6	100.7	100.6	100.4	100.1	99.5
[21]	100.1	100.1	100.2	100.1	99.9	99.7	99.4	54.6

[file information]

Region x	22.0 (mm)	illumination mode	Standard
Region y	26.0 (mm)	Stopper	Multiple
Pitch x	1.10 (mm)	2nd ZOOM LENS	60.20
Pitch y	1.30 (mm)	Compensator 2 value	16
IUC value	11533	Direction	-102.4
UC0	11536		
IUC max	101.400		
IUC MIN	99.486		
IUC val	0.952		

INTENSITY: 11533 [W/m²]

UNIFORMITY: 0.952 [%]

Date : 9-Oct-14

Item: ILLUMINATION UNIFORMITY
&INTENSITY
for STANDARD SiB

Engineer : P.Wells

Machine No. : 112664

User ID : Stepper 18

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
[1]	42.0	98.8	99.3	99.6	99.7	99.8	99.9	99.9	100.0	100.1	100.1	100.1	100.2
[2]	99.2	99.7	100.1	100.2	100.4	100.4	100.4	100.4	100.5	100.3	100.3	100.4	100.4
[3]	99.8	100.3	100.5	100.5	100.6	100.6	100.4	100.4	100.4	100.3	100.4	100.4	100.5
[4]	100.1	100.3	100.6	100.6	100.6	100.4	100.3	100.2	100.2	100.2	100.3	100.3	100.4
[5]	100.3	100.6	100.4	100.4	100.3	100.2	100.0	100.1	100.0	100.1	100.0	100.2	100.2
[6]	100.3	100.5	100.4	100.4	100.2	100.1	99.9	99.9	99.9	99.9	99.9	100.0	100.1
[7]	100.4	100.5	100.5	100.3	100.2	100.1	99.9	99.9	99.9	99.8	99.8	99.9	100.2
[8]	100.4	100.4	100.3	100.3	100.2	100.1	99.9	99.9	99.7	99.7	99.7	99.8	100.0
[9]	100.3	100.5	100.2	100.3	100.1	100.0	99.9	99.8	99.7	99.8	99.8	99.7	99.9
[10]	100.4	100.4	100.3	100.1	100.1	99.9	99.8	99.8	99.7	99.9	99.8	99.8	99.9
[11]	100.2	100.3	100.2	100.2	99.9	99.9	99.8	99.7	99.8	99.9	100.0	99.8	99.9
[12]	100.1	100.3	100.1	100.1	99.9	99.8	99.7	99.7	99.7	99.8	99.8	99.7	99.8
[13]	100.3	100.4	100.2	100.1	99.9	99.9	99.7	99.6	99.5	99.5	99.6	99.5	99.7
[14]	100.3	100.4	100.2	100.2	99.9	99.8	99.6	99.5	99.3	99.5	99.5	99.5	99.5
[15]	100.2	100.4	100.1	100.1	99.9	99.8	99.7	99.5	99.5	99.4	99.5	99.5	99.6
[16]	100.4	100.4	100.4	100.2	100.0	99.9	99.8	99.6	99.6	99.6	99.6	99.5	99.9
[17]	100.3	100.4	100.4	100.3	100.1	100.1	99.9	99.8	99.8	99.8	99.7	99.8	100.0
[18]	100.0	100.4	100.5	100.5	100.4	100.4	100.2	100.1	99.9	100.0	100.0	100.0	100.3
[19]	99.9	100.4	100.5	100.6	100.6	100.5	100.5	100.4	100.2	100.1	100.2	100.3	100.5
[20]	99.4	100.0	100.3	100.3	100.2	100.3	100.3	100.4	100.3	100.2	100.3	100.4	100.4
[21]	50.7	99.2	99.6	99.7	99.9	99.8	99.9	99.8	99.8	99.8	99.8	99.9	100.0

	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]
[1]	100.2	100.1	99.9	99.8	99.6	99.3	98.6	40.0
[2]	100.5	100.5	100.5	100.3	100.3	99.9	99.7	99.0
[3]	100.6	100.6	100.6	100.6	100.5	100.4	100.1	99.7
[4]	100.5	100.5	100.4	100.4	100.4	100.7	100.3	100.1
[5]	100.4	100.4	100.4	100.4	100.6	100.8	100.6	100.4
[6]	100.3	100.4	100.4	100.4	100.6	100.9	100.7	100.6
[7]	100.2	100.3	100.4	100.4	100.6	100.9	100.7	100.6
[8]	100.1	100.2	100.2	100.3	100.5	100.8	100.7	100.7
[9]	99.8	100.0	100.1	100.2	100.5	100.8	100.7	100.6
[10]	99.7	99.9	100.1	100.1	100.3	100.6	100.6	100.5
[11]	99.7	99.8	100.1	100.1	100.3	100.6	100.7	100.6
[12]	99.7	99.9	100.1	100.1	100.4	100.6	100.7	100.5
[13]	99.7	99.8	100.0	100.1	100.4	100.6	100.7	100.5
[14]	99.7	99.8	100.0	100.2	100.5	100.6	100.6	100.6
[15]	99.7	99.8	100.1	100.1	100.4	100.6	100.7	100.5
[16]	99.9	100.0	100.3	100.3	100.5	100.6	100.7	100.5
[17]	100.1	100.2	100.3	100.4	100.6	100.7	100.7	100.4
[18]	100.3	100.4	100.5	100.6	100.7	100.7	100.6	100.1
[19]	100.5	100.6	100.8	100.8	100.7	100.7	100.4	99.8
[20]	100.5	100.5	100.7	100.6	100.5	100.4	99.9	99.2
[21]	99.9	100.0	100.0	99.9	99.8	99.6	98.9	48.0

[file information]

Region x	22.0 (mm)	illumination mode	Standard
Region y	26.0 (mm)	Stopper	SiB
Pitch x	1.10 (mm)	2nd ZOOM LENS	90.00
Pitch y	1.30 (mm)	Compensator 2 value	26
IUC value	5341	Direction	-92.6
UC0	5796		
IUC max	100.919		
IUC MIN	99.325		
IUC val	0.796		

INTENSITY: 5341 [W/m²]
UNIFORMITY: 0.796 [%]

Canon FPA-3000i5+

Item: **LIGHT INTEGRATOR
ACCURACY**

Date: 9-Oct-14
Engineer: P.Wells
Machine No.: 0112664
User ID: Stepper 18

Time set (ms)	exp. set value	MAX	MIN	AVE	Repeatability
80	922.64	931.5	926.5	929.6	0.27
250	2883.25	2897	2890.5	2893.5	0.11
500	5766.5	5783	5774	5778.1	0.08
1000	11533	11578	11538.5	11551.4	0.17

Linearity 0.30 [%]
Total Accuracy : 0.57 [%]

Canon FPA-3000 i5+

**Item: MASKING BLADE
ACCURACY**

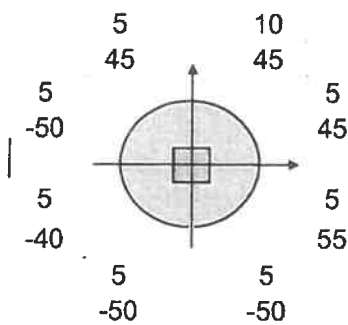
Date: 9-Oct-14

Engineer: C.Perry

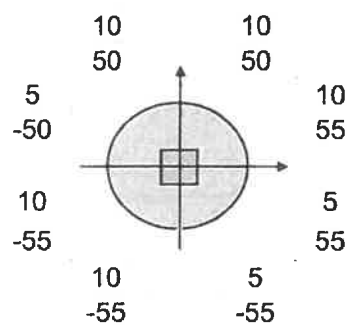
Machine No.: 0112664

User ID: Stepper 18

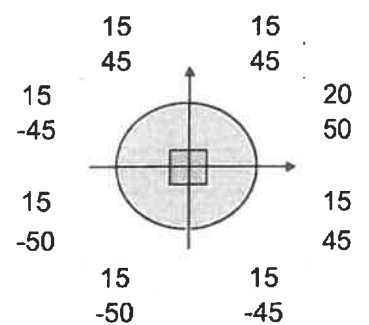
TOP



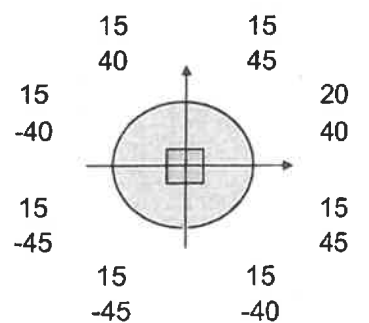
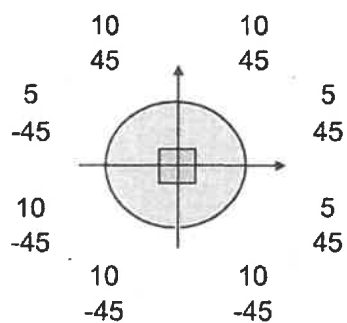
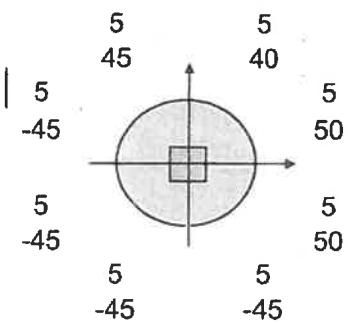
□ 5mm



□ 11mm



□ 18mm



BOTTOM

Rotation Theta: **124** [ppm]
Gray Zone(R): **20** [um]
Total Accuracy: **73** [um]

Canon *FPA-3000i5+*

Item: *RETICLE ROTATION*
ACCURACY

Date: 14-Dec-10
Engineer: A.DAY
Machine No.: 0112664
User ID: Stepper 18

	AVE	1	2	3	4	5
Y1	-0.0054	0.000	-0.004	-0.012	-0.006	X
Y2	-0.0141	X	-0.010	-0.015	-0.010	-0.020
Y3	-0.0102	-0.015	-0.010	-0.006	-0.010	X
Y4	-0.0103	X	-0.011	-0.010	-0.012	-0.009
Y5	-0.0072	-0.014	-0.011	-0.012	-0.007	X
Y	-0.0094					

Accuracy: **-4.7** [nm]
Repeatability: **10.2** [nm]

Item: AGA ACCURACY
Mode 1 Center venier 32 Shot

Date: 12-Dec-14
Engineer: C.Perry
Machine No.: 0112664
User ID: Stepper 18

	Wafer 1		Wafer 2		Wafer 3		Wafer 4		Wafer 5	
Shot	X	Y	X	Y	X	Y	X	Y	X	Y
1	14	-5	20	1	17	-4	15	-3	10	-14
2	18	-1	31	4	11	0	15	3	17	-5
3	8	-2	15	3	9	0	13	2	4	-2
4	15	2	9	-2	10	8	11	5	8	-3
5	8	12	8	22	5	18	22	25	13	12
6	3	0	9	2	9	7	14	8	14	7
7	8	2	17	-4	9	5	17	3	16	3
8	15	0	25	2	18	3	12	-3	17	-2
9	20	0	26	2	17	5	22	-3	13	-7
10	16	1	37	5	16	3	16	1	15	-4
11	11	3	19	4	7	4	19	-4	12	-2
12	19	6	14	0	13	6	16	2	19	2
13	18	5	15	8	15	9	17	6	19	9
14	10	11	21	10	12	7	15	9	11	10
15	12	13	3	9	10	12	15	11	7	18
16	9	10	10	16	12	16	17	15	13	23
17	6	17	15	26	11	25	18	14	14	19
18	4	12	8	14	4	20	20	9	16	16
19	8	4	14	7	6	6	18	9	21	17
20	14	7	19	14	15	11	18	10	24	12
21	13	10	17	8	18	6	18	6	25	9
22	15	7	25	9	21	12	18	4	18	9
23	15	10	32	5	19	3	21	0	17	6
24	17	9	12	10	18	9	9	4	29	16
25	9	9	16	11	11	12	22	6	21	18
26	10	6	22	12	11	14	17	8	25	18
27	10	15	14	17	10	22	10	14	13	26
28	5	8	7	1	6	5	19	-4	10	6
29	2	13	11	7	6	10	15	1	16	17
30	6	11	21	17	13	16	23	7	24	26
31	7	10	20	17	8	11	16	5	26	22
32	15	8	23	10	15	10	14	-1	36	17

Mean- 5W Mean Average	-3.6	-1.1	2.5	0.6	-2.9	1.4	1.8	-2.5	2.1	1.6
3S	14.7	16.3	23.4	21.0	13.6	19.7	10.4	19.2	20.5	31.2
Mean-(5W Mean Average)+3S	18.3	17.4	25.9	21.6	16.5	21.0	12.2	21.7	22.7	32.8

Mean-(5W Mean Average)+3S

X	Y
25.9	32.8

nm

Item: AGA ACCURACY
Mode 4 Center venier 32 Shot

Date: 12-Dec-14
Engineer: C.Perry
Machine No.: 0112664
User ID: Stepper 18

	Wafer 1		Wafer 2		Wafer 3		Wafer 4		Wafer 5	
Shot	X	Y	X	Y	X	Y	X	Y	X	Y
1	29	-10	27	0	26	-5	28	-6	44	-9
2	33	-5	28	2	22	7	27	-2	36	-4
3	27	1	24	6	21	7	24	3	33	-1
4	23	6	24	13	18	16	17	5	30	3
5	14	11	20	23	14	24	19	20	28	12
6	23	-1	24	12	13	10	13	5	31	5
7	20	1	27	13	5	4	24	5	19	-3
8	21	-3	15	-2	15	6	28	-3	44	-1
9	28	-9	22	1	10	-1	30	0	34	-10
10	27	-9	25	0	20	-1	32	-6	46	-8
11	19	3	23	1	19	5	37	-4	32	-6
12	28	0	31	5	12	2	26	-2	21	-7
13	31	3	23	2	19	7	22	4	20	-2
14	32	12	15	13	18	14	21	3	23	7
15	30	12	17	18	15	18	22	14	14	5
16	32	11	24	18	17	25	13	17	16	6
17	22	19	19	18	18	24	18	19	13	11
18	33	15	21	17	13	19	24	14	24	11
19	25	10	19	11	20	16	25	9	24	5
20	31	14	22	7	16	10	26	8	28	7
21	33	6	26	3	22	3	25	2	26	0
22	32	9	28	10	14	3	33	-1	31	-1
23	31	8	24	-5	16	1	32	-7	23	-5
24	29	7	18	6	16	0	19	0	17	4
25	33	8	28	9	18	6	22	1	20	3
26	37	18	12	13	11	12	13	3	21	4
27	30	22	18	24	13	21	14	15	9	15
28	28	11	10	6	8	8	12	8	9	-3
29	22	17	4	4	7	14	11	8	0	2
30	34	15	17	7	12	15	16	13	7	5
31	32	14	17	9	21	13	18	9	16	7
32	43	9	28	-2	21	1	33	1	22	1

Mean- 5W Mean Average	6.1	0.8	-1.2	1.9	-6.5	3.3	0.2	-1.4	1.4	-4.6
3S	17.5	25.3	17.9	22.4	14.4	24.3	21.0	22.3	32.5	19.1
Mean-(5W Mean Average)+3S	23.6	26.0	19.0	24.3	20.8	27.5	21.2	23.7	33.9	23.7

Mean-(5W Mean
Average)+3S

X	Y
33.9	27.5

nm

Item: **FOCUS LEVELING
REPEATABILITY
NO.1**

Date : 09-10-14
Engineer: Wells
Machine No. : 0112664
User ID: ST 18

Shot #	Z (um)	X (ppm)	Y (ppm)
1	-0.007	-0.100	-0.100
2	-0.032	1.300	0.400
3	0.003	-0.100	-0.800
4	0.014	1.400	-0.100
5	-0.019	-0.200	-0.100
6	0.010	0.300	-0.300
7	0.011	0.400	-0.400
8	0.032	-1.000	-0.200
9	-0.019	-1.500	-1.300
10	-0.015	-0.700	-0.100
11	0.009	0.400	1.600
12	-0.027	1.300	-0.800
13	0.000	0.400	0.200
14	-0.019	-0.600	-0.500
15	-0.019	0.500	1.600
16	-0.001	-0.600	-0.200
17	-0.031	0.500	1.100
18	-0.014	-1.500	2.800
19	0.024	0.800	0.600
20	0.016	1.000	0.000
21	0.003	0.400	0.800
22	0.007	-0.200	0.900
23	-0.043	-0.900	-0.400
24	-0.033	-0.500	0.800
25	0.007	-0.400	-0.200
26	-0.014	0.400	0.200
27	0.000	2.000	-0.100
28	-0.011	-0.800	1.100
29	-0.018	0.600	0.100
30	0.004	-0.400	1.200
31	-0.012	0.700	1.000
32	0.022	-0.400	0.100
AVE.	-0.001	0.100	0.300
3sigma	0.060	2.500	2.500

Focus: 0.060 [um]
Tilt X: 2.5 [ppm]
Y: 2.5 [ppm]

Canon FPA-3000-i5+

Item: **FOCUS LEVELING
REPEATABILITY
NO.2**

Date : 09-10-14
Engineer: Wells
Machine No.: 0112664
User ID: ST 18

Shot #	Z (um)	X (ppm)	Y (ppm)
1	0.020	-0.200	0.700
2	0.019	0.200	-0.800
3	0.000	0.200	0.200
4	0.013	0.700	0.400
5	-0.066	-2.200	0.200
6	0.007	-0.600	0.900
7	0.012	0.300	-0.800
8	-0.009	0.300	-0.100
9	0.018	0.000	1.200
10	0.005	-0.500	1.600
11	-0.004	-0.400	-0.900
12	-0.020	0.000	0.300
13	0.007	-0.100	1.000
14	0.000	-0.700	-0.900
15	-0.007	1.600	-0.700
16	-0.016	1.400	-1.200
17	0.005	-0.100	0.800
18	0.041	-0.600	0.900
19	0.012	-0.600	3.400
20	0.018	-0.900	0.500
21	-0.001	0.600	-0.600
22	0.007	-1.200	0.400
23	-0.036	0.700	-0.500
24	-0.020	1.400	0.700
25	0.016	-0.200	1.400
26	-0.018	0.300	1.000
27	0.005	-0.500	-0.200
28	-0.032	0.300	-0.600
29	-0.010	-1.400	-0.200
30	0.007	-0.700	0.400
31	0.010	-1.100	0.300
32	-0.001	-1.100	0.500
AVE.	-0.001	-0.200	0.300
3sigma	0.060	2.500	2.800

Focus:	0.060	[um]
Tilt X:	2.5	[ppm]
Y:	2.8	[ppm]

Canon FPA-3000-i5+

Item: **FOCUS LEVELING
REPEATABILITY
NO.3**

Date: 09-10-14
Engineer: Wells
Machine No.: 0112664
User ID: ST 18

Shot #	Z (um)	X (ppm)	Y (ppm)
1	0.006	0.600	-0.900
2	-0.009	0.300	1.200
3	0.007	0.100	0.200
4	0.019	-0.300	0.800
5	-0.010	0.700	1.100
6	0.021	0.300	-0.100
7	0.033	-0.600	0.100
8	-0.003	0.500	-0.200
9	-0.006	-0.900	-2.200
10	-0.003	-1.500	0.300
11	-0.019	-0.700	0.800
12	-0.009	-0.100	-0.500
13	-0.016	0.100	-1.300
14	-0.009	0.400	-1.200
15	-0.012	1.400	0.900
16	0.020	-0.200	1.000
17	-0.017	0.600	0.800
18	0.009	-0.900	1.700
19	-0.002	0.600	0.900
20	0.011	0.000	1.000
21	0.008	-0.500	-0.300
22	0.002	-0.300	0.300
23	-0.044	0.200	1.300
24	-0.018	0.100	-0.300
25	0.004	-0.200	-0.500
26	0.008	1.000	-0.400
27	0.000	1.100	-0.100
28	-0.018	0.600	-0.500
29	-0.053	0.200	1.500
30	0.015	-0.900	0.600
31	0.023	-0.400	0.900
32	0.011	-1.100	0.600
AVE.	-0.002	0.000	0.200
3sigma	0.055	2.000	2.700

Focus:	0.055	[um]
Tilt X:	2.0	[ppm]
Y:	2.7	[ppm]

Item: **STEPPING ACCURACY**
(1st Wafer)

Date: 12-Dec-14
Engineer: C.Perry
Machine No.: 00112664
User ID: Stepper 18

Shot	XX	YY	Shot	XX	YY
1	0.019	0.014	47	0.014	0.016
2	0.012	***	48	0.020	0.017
3	0.024	0.012	49	0.020	0.015
4	***	0.017	50	0.018	0.016
5	0.025	***	51	0.009	0.015
6	0.013	***	52	0.026	0.010
7	0.024	0.014	53	0.020	0.017
8	0.018	0.014	54	0.023	0.024
9	0.011	0.015	55	0.019	0.008
10	0.010	0.011	56	0.019	0.013
11	0.021	0.014	57	0.021	0.014
12	0.018	0.013	58	0.007	0.017
13	0.018	0.009	59	0.017	0.019
14	0.014	0.010	60	0.026	0.020
15	0.018	0.008	61	0.021	0.018
16	0.015	0.009	62	0.017	0.020
17	0.013	0.006	63	0.021	0.016
18	0.018	0.011	64	0.019	0.015
19	0.017	0.005	65	0.011	0.021
20	0.023	0.008	66	0.022	0.020
21	0.011	0.014	67	0.016	0.017
22	0.023	0.019	68	0.013	0.019
23	0.018	0.011	69	0.026	0.014
24	0.020	0.007	70	0.016	0.008
25	0.015	0.013	71	0.018	0.014
26	0.016	0.011	72	0.024	0.015
27	0.020	0.012	73	0.017	0.020
28	0.011	0.013	74	0.020	0.021
29	0.025	0.013	75	0.020	0.017
30	0.016	0.007	76	0.018	0.019
31	0.015	0.016	77	0.024	0.017
32	0.019	0.020	78	0.020	0.019
33	0.019	0.015	79	0.015	0.016
34	0.014	0.017	80	0.020	0.021
35	0.016	0.010	81	0.017	0.020
36	0.013	0.014	82	0.017	0.016
37	0.019	0.016	83	0.021	0.020
38	0.015	0.019	84	0.022	0.022
39	0.017	0.009	85	0.020	0.026
40	0.014	0.011	86	0.020	0.024
41	0.028	0.011			
42	0.027	0.013			
43	0.014	0.019			
44	0.022	0.014			
45	0.019	0.010			
46	0.017	0.023			

3sigma:	13.1	12.6	[um]
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NOTE: *** Indicates IVS No Measure

3sigma XX : 13.1 [nm]
 YY : 12.6 [nm]

Canon FPA-3000 i5+

Item: **STEPPING ACCURACY**
(2nd Wafer)

Date: 12-Dec-14
Engineer: C.Perry
Machine No.: 00112664
User ID: Stepper 18

Shot	XX	YY	Shot	XX	YY
1	0.018	***	47	0.017	0.017
2	0.015	***	48	0.015	0.016
3	0.015	***	49	0.023	0.018
4	0.020	***	50	0.020	0.018
5	0.019	0.015	51	0.027	0.018
6	0.018	***	52	0.014	0.015
7	0.013	0.017	53	0.016	0.016
8	0.018	0.017	54	0.016	0.023
9	0.018	0.018	55	0.026	0.013
10	0.018	0.017	56	0.013	0.013
11	0.025	0.018	57	0.015	0.016
12	0.025	0.022	58	0.018	0.021
13	0.015	0.012	59	0.014	0.019
14	0.025	0.011	60	0.020	0.019
15	0.022	0.014	61	0.024	0.019
16	0.017	0.020	62	0.025	0.019
17	0.017	0.021	63	0.008	0.019
18	0.020	0.017	64	0.018	0.016
19	0.022	0.015	65	0.026	0.021
20	0.018	0.020	66	0.016	0.023
21	0.015	0.024	67	0.021	0.022
22	0.027	0.026	68	0.019	0.020
23	0.015	0.018	69	0.018	0.015
24	0.017	0.007	70	0.016	0.011
25	0.020	0.011	71	0.019	0.018
26	0.011	0.016	72	0.022	0.018
27	0.022	0.020	73	0.019	0.026
28	0.019	0.015	74	0.018	0.023
29	0.016	0.018	75	0.019	0.014
30	0.020	0.014	76	0.025	0.016
31	0.010	0.019	77	0.023	0.016
32	0.021	0.023	78	0.018	0.022
33	0.013	0.015	79	0.020	0.021
34	0.021	0.016	80	0.016	0.021
35	0.011	0.008	81	0.020	0.023
36	0.023	0.012	82	0.017	0.022
37	0.015	0.019	83	0.018	0.023
38	0.023	0.012	84	0.020	0.020
39	0.012	0.017	85	0.015	0.027
40	0.022	0.014	86	0.016	0.027
41	0.022	0.011			
42	0.022	0.012			
43	0.013	0.017			
44	0.020	0.018			
45	0.022	0.013			
46	0.018	0.019			

3sigma:

12.9	12.5
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 [um]

NOTE: *** Indicates IVS No Measure

3sigma XX : 12.9 [nm]
YY : 12.5 [nm]

Item: **STEPPING ACCURACY**
(3rd Wafer)

Date: 12-Dec-14
Engineer: C.Perry
Machine No.: 00112664
User ID: Stepper 18

Shot	XX	YY	Shot	XX	YY
1	***	0.016	47	0.018	0.019
2	***	0.022	48	0.021	0.019
3	0.020	0.018	49	0.022	0.019
4	0.010	0.022	50	0.024	0.018
5	***	0.012	51	0.022	0.024
6	***	***	52	0.020	0.013
7	0.018	***	53	0.024	0.022
8	0.014	0.014	54	0.024	0.020
9	0.020	0.023	55	0.024	0.019
10	0.016	0.014	56	0.021	0.014
11	0.021	***	57	0.016	0.016
12	0.016	***	58	0.017	0.017
13	0.020	0.014	59	0.023	0.019
14	0.011	0.019	60	0.025	0.020
15	0.025	0.017	61	0.025	0.016
16	0.019	0.021	62	0.020	0.020
17	0.011	0.016	63	0.020	0.017
18	0.022	0.013	64	0.020	0.018
19	0.020	0.009	65	0.023	0.020
20	0.022	0.015	66	0.015	0.028
21	0.026	0.020	67	0.027	0.019
22	0.024	0.018	68	0.011	0.019
23	0.019	0.014	69	0.025	0.018
24	0.026	0.014	70	0.027	0.019
25	0.017	0.021	71	0.023	0.023
26	0.019	0.019	72	0.020	0.017
27	0.016	0.014	73	0.022	0.018
28	0.023	0.016	74	0.018	0.024
29	0.028	0.012	75	0.023	0.018
30	0.019	0.012	76	0.015	0.021
31	0.021	0.023	77	0.025	0.024
32	0.020	0.024	78	0.028	0.023
33	0.022	0.016	79	0.018	0.023
34	0.025	0.016	80	0.026	0.023
35	0.020	0.017	81	0.024	0.026
36	0.016	0.015	82	0.025	0.026
37	0.025	0.021	83	0.020	0.025
38	0.016	0.021	84	0.023	0.024
39	0.021	0.018	85	0.024	0.027
40	0.033	0.014	86	0.019	0.023
41	0.014	0.019			
42	0.028	0.017			
43	0.018	0.025			
44	0.022	0.016			
45	0.021	0.019			
46	0.028	0.019			

3sigma:

13.7	11.8
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 [um]

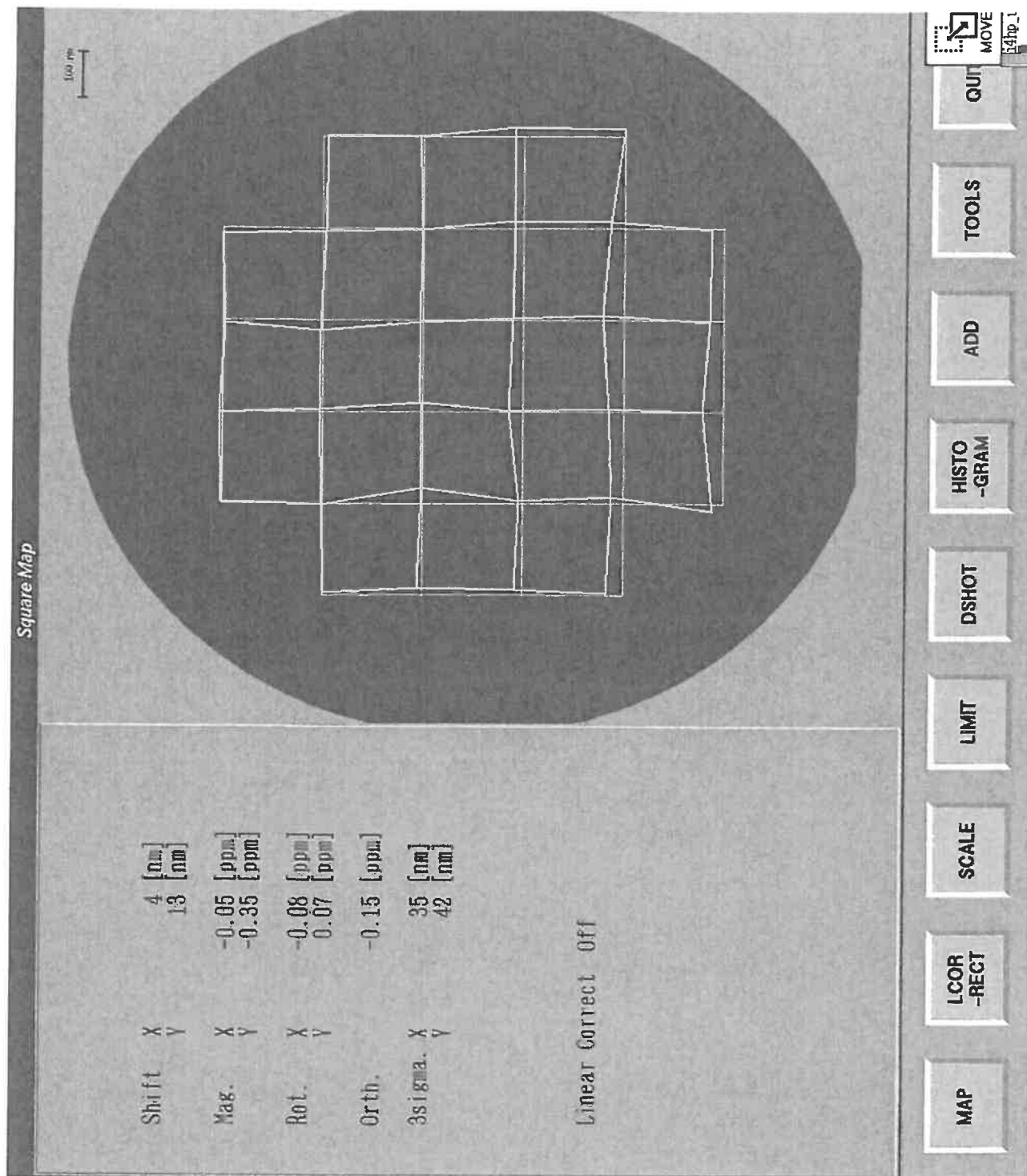
NOTE: *** Indicates IVS No Measure

3sigma XX : 13.7 [nm]
YY : 11.8 [nm]

Canon FPA-3000i5+

Item: *XYSA Matching
Quartz Wafer*

Date : 11-Dec-14
Engineer : C.Perry
Machine No. : 0112664
User ID : Stepper 18



Magnification X= -0.05
Magnification Y= -0.35
Orthogonality = -0.15

Date : 22-Oct-14

Item : MECHANICAL

Engineer : Wells

**PRE-ALIGNMENT
ACCURACY**

Machine No. : 0112664

User ID : Stepper 18

```
=====xl=====
Sample count   =           28
AVERAG =       -1085.5
3-SIGMA =       8289.88
=====xr=====
Sample count   =           28
AVERAG =       -23.286
3-SIGMA =       9010.07
=====yl=====
Sample count   =           28
AVERAG =       2915.14
3-SIGMA =       5744.43
=====yr=====
Sample count   =           28
AVERAG =       -308.54
3-SIGMA =       4959.21
=====END=====
i4hp_user[61]
```

XL:	8.3	[um]
XR:	9.0	[um]
YL:	5.7	[um]
YR:	5.0	[um]

Canon *FPA-3000i5+*

Item: TV PA ACCURACY

Date: 22-Oct-14

Engineer: Wells

Machine No. : 0112664

User ID: Stepper 18

***** TvpaHelp V6.0 *****

torikomishotsuu: 100

Ave:	X	0.023	Y	-0.126
3sigma:	X	0.162	Y	0.538
Max:	Xmax	0.200	Ymax	0.490

Xmax + Crotmax	0.260	um
Ymax + Crotmax	0.550	um

Canon FPA-3000i5+

Item: **THROUGHPUT**

Sub 0 Main 4

Auxtet 90ms

DXD Tilt ON

Date : 10-Dec-14

Engineer: C.Perry

Machine No. : 0112664

User ID : Stepper 18

Machine FPA-3000 i5

Job Name

/canon/Installation/BCSCOPE.job

Tilt Compensation Mode

Die by Die

TVPA Measurement on Chuck Bypass Loop Mode

Open Loop

Auto Focus Mode Smoothing AF Performance

Normal

Hot Line Inte Enable

wno	Unload_wafer	Load_wafer	TV_pre_align	AGA	Index [ms]	Throughput[WPH]
1	3430	106971	2810	44162	170699	
2	3430	5319	2864	4044	29574	121.7
3	3433	5353	1227	4059	28376	126.9
4	3459	5315	1244	4060	28719	125.4
5	3444	5347	1224	7650	32016	112.4
6	3433	5331	1230	4065	28249	127.4
7	3437	5332	1263	4082	28604	125.9
8	3431	5354	1224	4033	28641	125.7
9	3431	5347	1223	4039	27526	130.8
10	3436	5315	1219	7750	29126	123.6
11	3449	5370	1268	4058	25541	140.9
0						

<SUMMARY>

	Unload_wafer	Load_wafer	TV_pre_align	AGA	Index [ms]	Throughput[WPH]
ave.	3438	5338	1398	4784	28637	125.7

W no	1st-step	step	SF_posi	SF_focus	Expo	Shot[ms]
2	431	318.8	405.3	10.9	112.4	431.1
3	439	331	418	10.9	112.5	443.5
4	432	342.4	428.9	10.9	112.3	454.7
5	432	333.1	420	10.9	112.2	445.4
6	432	327.9	414.5	10.9	112.2	440.1
7	435	336.9	423.8	10.9	112.8	449.8
8	432	341.1	428	10.9	112.2	453.3
9	432	305.4	392.2	10.9	112	417.4
10	432	237.6	324.9	10.9	112.7	350.4
11	432	237.2	324.9	10.9	112.8	350.1
	ave. 432.9	311.1	398.1	10.9	112.4	423.6

Throughput 126 W/hr

Canon FPA-3000i5+

Item: **THROUGHPUT**

Sub 0 Main 4

Auxtet 90ms

DXD Tilt OFF

Date : 10-Dec-14

Engineer: C.Perry

Machine No. : 0112664

User ID : Stepper 18

Machine FPA-3000 i5

Job Name

/canon/Installation/BCSCOPE.job

Tilt Compensation Mode

Bypass

TVPA Measurement on Chuck

Bypass

Loop Mode

Open Loop

Auto Focus Mode

Smoothing AF

Performance

Normal

Hot Line Inte Enable

wno	Unload_wafer	Load_wafer	TV_pre_align	AGA	Index [ms]	Throughput[WPH]
1	3460	22189	1456	43473	83740	
2	3444	5355	1214	4152	27614	130.4
3	3433	5344	1246	4128	27867	129.2
4	3444	5355	1250	4106	28348	127
5	3434	5342	1235	4087	28597	125.9
6	3431	5326	1221	4148	28406	126.7
7	3430	5334	2870	4105	29996	120
8	3432	5334	2856	4026	30008	120
9	3431	5338	1265	4052	27809	129.5
10	3429	5356	1219	4073	25437	141.5
11	3455	5382	1239	4053	25486	141.3
0						

<SUMMARY>

	Unload_wafer	Load_wafer	TV_pre_align	AGA	Index [ms]	Throughput[WPH]
ave.	3436	5346	1561	4093	27956	128.8

W no	1st-step	step	SF_posi	SF_focus	Expo	Shot[ms]
2	431	303.8	390.8	10.9	112.4	416.2
3	432	312.6	399.5	10.9	112.3	424.9
4	432	328	415.4	10.9	112.2	440.3
5	432	337.8	424.5	10.9	112.3	450.1
6	431	330.7	417.8	10.9	112.3	443.1
7	440	329.2	416.1	11.1	112.9	442.1
8	432	333.2	419.8	10.9	112.5	445.6
9	431	312.7	399.8	10.9	112.4	425.1
10	432	236	323.4	10.9	112.8	348.8
11	431	236.3	322.8	10.9	112.5	348.8
	ave.	432.4	306	393	10.9	112.5

Throughput 128.8 W/hr

Canon *FPA-3000i5+*

Item: **PPC CLEANLINESS**

Date: 14-Dec-10

Engineer: DAY

Machine No.: 0112664

User ID: Stepper 18

BL A	BL B	BL Total	PU A	PU B	PU Total
4	8	12	0	0	0
4	8	12	0	0	0
3	8	11	0	0	0
4	8	12	0	0	0
4	8	12	0	0	0
4	8	12	0	0	0
4	8	12	0	0	0
4	8	12	0	0	0
3	9	12	0	0	0
4	8	12	0	0	0
		1			0

CLEANLINESS **1.0** Particle

Canon *FPA-3000i5+*

Item: PPC REPEATABILITY

Date: 14-Dec-10

Engineer: DAY

Machine No.: 0112664

User ID: Stepper 18

BL 15um

PU 20um

REPEATABILITY	A	BL	98.551	%
REPEATABILITY	B	BL	99.022	%
REPEATABILITY	A	PU	99.700	%
REPEATABILITY	B	PU	99.700	%

REPEATABILITY >95% **98.6%**

Stepper 18 Lens Performance

FPA-3000i5+ #0012664

26/11/14

ON Semiconductor

Canon Europa N.V.

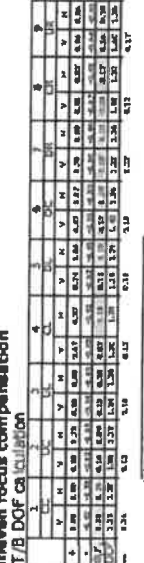
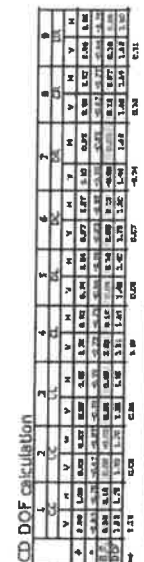
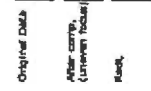
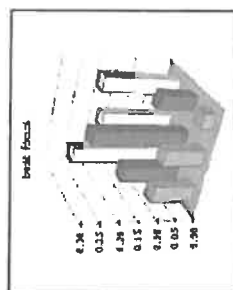
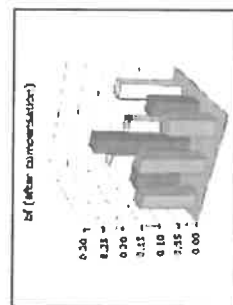
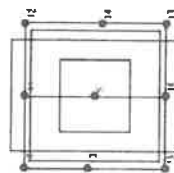
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Results of lens performance

† Lens Performance Results @ 0.35um NA 0.63 Sig 0.65

Item	#2	Specification
Distortion	0.030μm	≤0.035μm
Resolution	0.35μm	0.35μm
Depth of Focus @0.35μm	1.20μm	1.20μm
Image Field Deviation	0.19μm	≤0.35μm
Astigmatism	0.11μm	≤0.20μm

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[illegible]

76 November 1974

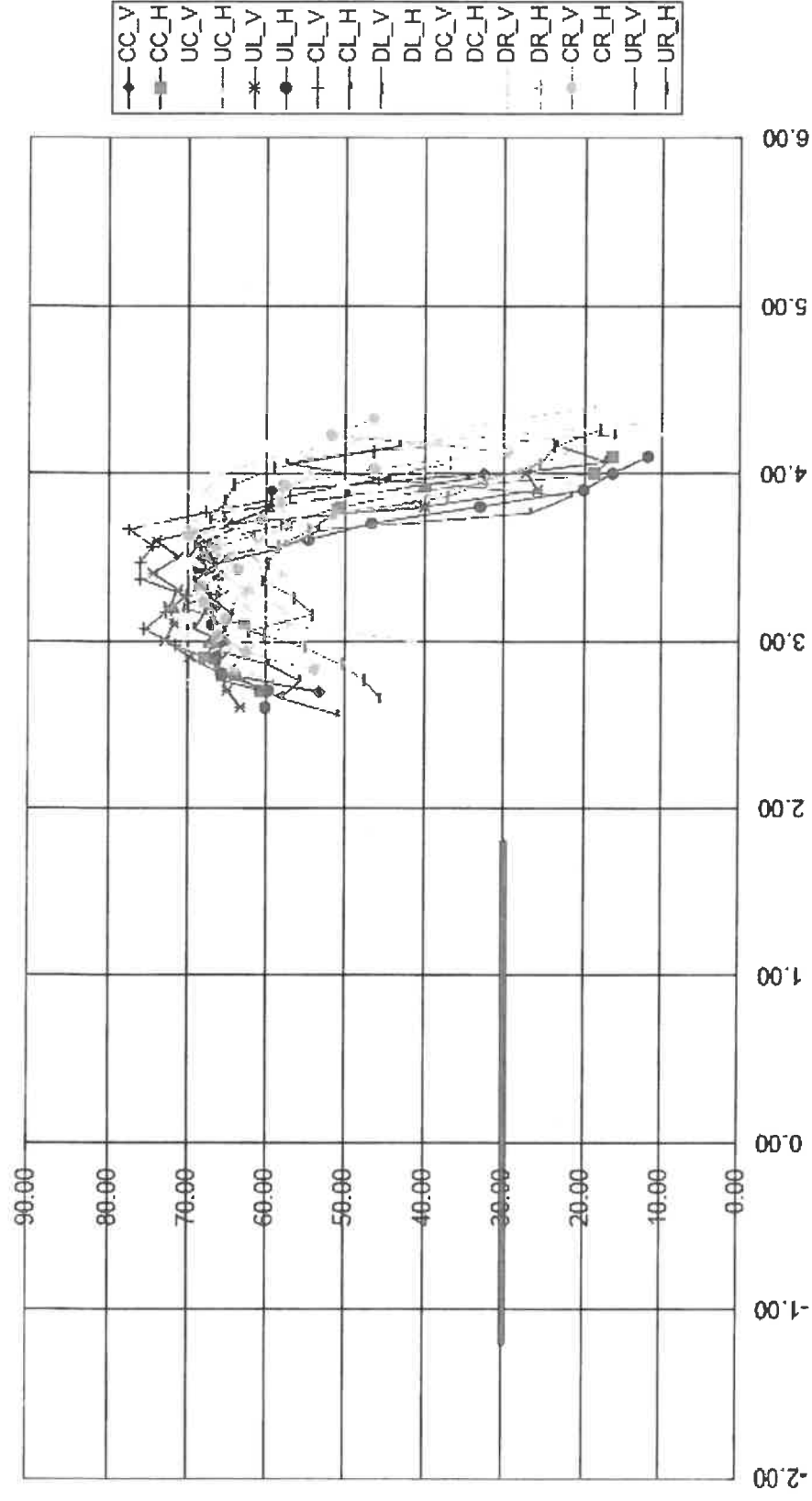
γ -GluTase =	0.87	69
α -GluTase =	-0.29	107

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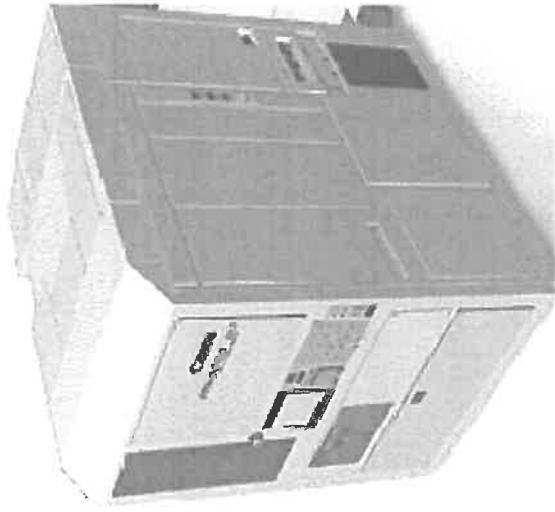
Final DOF Data

T/B DOF (Tilt Compensated)



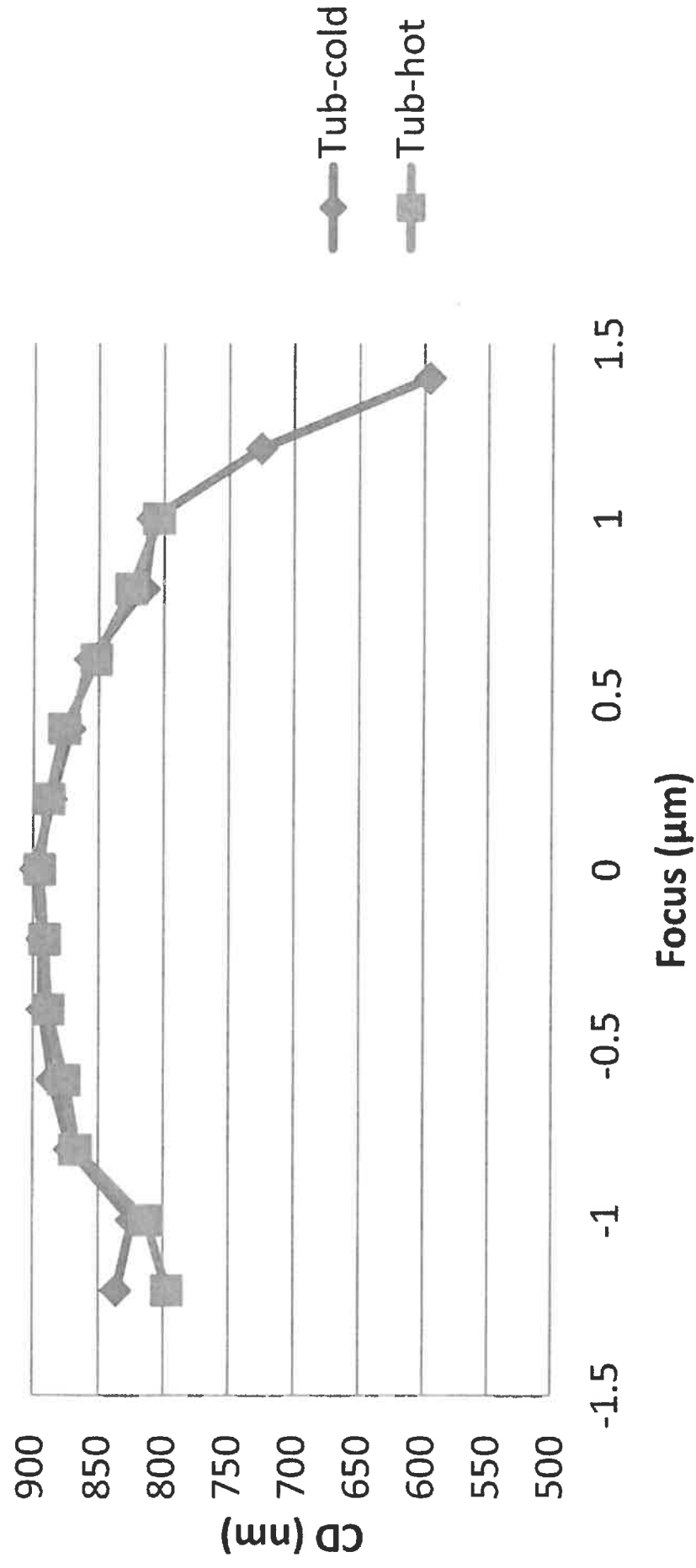
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Stepper18 Metal2 tub



Stepper18 CD-Bar Metal2

