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Large Optic Drying Station: Summary of Dryer Certification Tests

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LLNL-TR-416579

Large Optic Cleaning Station (LOCS)

Summary of Dryer Certification Tests

August 27, 2009

Lawrence Livermore National Laboratory

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Introduction

The purpose of this document is to outline the methodology used to baseline and maintain the cleanliness status of the newly built and installed Large Optic Cleaning Station (LOCS). The station has currently been in use for eleven months; and after many cleaning studies and implementation of resulting improvements appears to be cleaning optics to a level that is acceptable for the fabrication of Nano-Laminates.

Summary of Wafer Certification Tests

Three different Wafer Certification Tests were performed in the LOCS system. These tests were performed in September 2008, December 2008 and May 2009. The first test was performed as soon as the LOCS system was functioning, the second test was performed after the system had been reasonably tested and cleaned, the third test was performed after a round of system upgrades and improvements were implemented. Although improvements to the LOCS were implemented, between certification tests, the actual tests were identical (same fixturing to hold wafers, same wafer types, same wafer layout inside the dryer and same procedures).

The wafers used in the certification tests were 8" silicon wafers. The wafers were purchased in cassettes of 25 from Wafer Reclaim Services [1]. The wafers were delivered scan maps created with a KLA-Tencor Surfscan SP1 machine. The same Surfscan was used to create the scan maps after the wafers were run through the LOCS dryer. The wafers were shipped in the cassettes, taped with ULO clean room tape and double bagged in ULO clean room bags. Several wafers were left untouched, in the cassette at all times, to use as the control in these tests.

The wafers were mounted in the LOCS using the fixtures shown in figure one. The fixtures were designed with input from QA Plastics and are designed to minimize any effects that could be introduced by the mounted. The wafers were mounted on the LOCS end-effector plate in the orientation shown in figure two. The wafers were strategically placed to avoid any potential contamination from neighboring mounting fixtures.

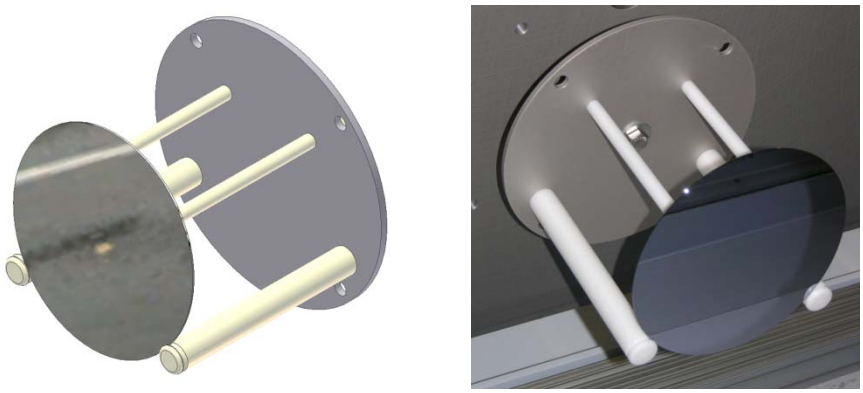


Figure 1. Wafer Mounting Fixture.

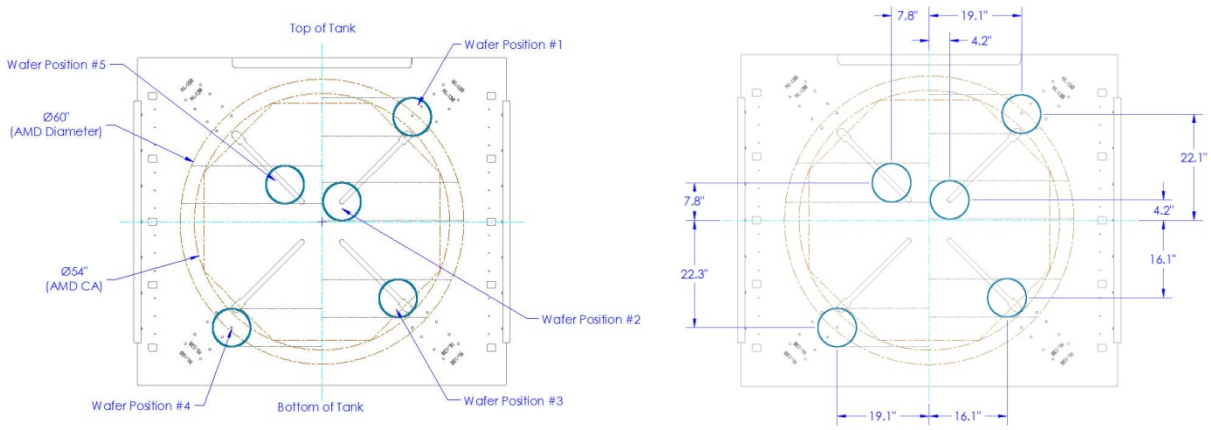


Figure 2. Wafer Layout on LOCS end-effector plate.

During these certification cleanings, clean room practices were observed. Prior to running the LOCS with wafers, the system was wiped with alcohol and run several times (without product), to rinse the system. Before the clean wafers were opened in the clean room, the floor was rolled with a clean room tacky roller. Clean room smocks, hair nets, booties and gloves were worn during all operations. When the wafer cassette and exposed wafers were handled, face masks were worn and gloves were changed often, to maintain cleanliness.

Summary of Wafer Certification Test Results

In comparing the results from the three certification tests, there is a general trend towards less dense particle distribution and smaller particle sizes. The results from the third test yielded the cleanest wafers, as expected.

In addition, each of the washes (there were at least three washes, per certification test) exhibited the same trend from the first to last wash. This can be easily seen by evaluating the average adders for each of the washes in the third round of tests, shown in appendix C.

The data from each of the certification tests can be found in appendices A through C. Detailed information comparing wafer location and post scan maps for certification test #3 can be found in appendices D and E.

Improvements Implemented before Third Round of Certification

Prior to the third certification test, the LOCS performance was analyzed and a whole series of upgrades and improvements were implemented. These improvements are described in table 1.

Table 1. Upgrades and Improvements implemented prior to certification test #3.

Upgrade or Improvement	Details	Result
Replace DI Water Supply Lines	Replaced existing 3/4:" Fuseseal water lines with 1" PTFE tubing	This improvement increased the water flow to the LOCS. The Fuseseal lines, being hard lines, had many unavoidable elbows and tees between the source and the LOCS. The joints in the Fuseseal lines had also been overheated during installation adding a signification number of unnecessary restrictions.
LOCS POU Filtration	Replaced the existing single 20" 0.5 um cartridge with two 10" 0.1 um cartridges (in parallel)	This improvement decreased the size of the particles introduced by the DI water, into the cleaning and drying process. It also increased the flow into the LOCS tank, as the filters are a large restriction in the supply water path.
Water Line Sanitization	Contracted with DI Water Company to Sanitize existing and newly installed water lines	All water lines supplying the DI water were sanitized. This ensured that no contamination from the installation was carried into the LOCS tank.
Uniform Cascade	Throttled the supply water to ensure uniform cascade over the entire weir in LOCS	This improvement increased the likelihood that any loose contamination would be carried over the weir and out of the LOCS tank, during the cascade time prior to the controlled drain of the marangoni process.
Differential Pressure Gauge	Installed a differential pressure gauge, to measure the difference in pressure between the LOCS tank and the clean room	This upgrade provided the ability to tune the LOCS exhaust ensuring the necessary positive pressure in the LOCS tank during the marangoni process.
Drain Vent	A drain vent was installed on the LOCS drain line	This improvement mitigated any burping that might have been taking place during the controlled drain during the marangoni process.

Improvements Implemented During Critical Optic Cleaning

In addition to the improvements that affected the certification tests; improvements, which affect the cleaning of a critical optic, are shown in table 2.

Table 2. Improvements implemented during critical optic cleaning.

Improvement	Details	Result
Pre-Wash LOCS tank	Wipe the LOCS tank with Ethyl Alcohol and TX1013 wipes, then rinse the tank with DI Water	This improvement helps to minimize any residual contamination that might be present from previous cleaning processes.
Pre-Wash optic mounting fixtures and LOCS end-effector plate	The LOCS end-effector plate is wiped with Ethyl Alcohol and TX1013 wipes, and then rinsed with DI water. The optic mounting fixtures are disassembled and placed in a hot ultrasonic bath for 30 minutes, then wiped with Ehtyl Alcohol and TX1013, then rinsed with DI water and blown dry with ionized N2.	This improvement helps minimize any residual contamination that might be present from previous cleaning processes. It also ensures that any contamination from the installation and removal of fixturing is minimized.
Increased the number pre-wash cycles, prior to processing	Prior to washing and drying product the complete LOCS drying process is run with the necessary fixturing installed on the end-effector plate	The number of complete drying processes has been increased from one to two or three with a tank pre-wash between the first and second.
DI Water Purge	Although the DI Water is constantly recirculating, the DI Water is purged from the supply lines and if necessary the storage tank is emptied and re-filled prior to a critical wash process	By replenishing the water in the DI supply lines and storage tank, the water quality and temperature throughout the entire wash cycle remains constant.
Optic Mounting Fixture Modifications	The optic mounting fixtures were modified with increased drain holes and the finish was changed from hard anodized to electroless nickel	These improvements not only help to minimize to mitigate any trapped water during the washing and drying process, the change in the plating decreased the roughness (and potential particle source) of all fixtures near the optical surface, during washing.
Preparation of Optic, prior to mounting in/on LOCS	The optic sides, back surface and annular step are well wiped with Acetone (if necessary) and Ethyl Alcohol, prior to loading onto LOCS	This helps to minimize contamination of the LOCS.

Improvement	Details	Result
Cleaning/Rinsing Procedure Modification	The amount of soap used during the washing process was decreased from 10% to 3% and 1.5% (depending on the step in the washing process). The addition of an agitated rinsing process was included in the standard washing procedures.	By decreasing the amount of soap used to wash the mandrel, increasing the rinsing time and adding an agitated rinse step, the likelihood of removing all the soap prior to putting the optic into the LOCS tank for drying is increased.
Increase the number of wash/dry cycles	The number wash/dry cycles during standard critical optic preparation was increased from one or two to a minimum of three (more as necessary). The concentration of soap used during the hand wash step is decreased from 3% to 1.5% to 0%, between drying cycles.	By increasing the number was washing/drying cycles, the system produces a cleaner and cleaner optic.
Hot water used for hand washing	60°C hot water is used during the hand washing.	The likelihood and effectiveness of removing any unknown contamination is increased by the utilization of hot water.

Summary

After all the studies and improvements the LOCS appears to be meeting the existing cleanliness needs of the Nano-Laminate program at LLNL. This system will undoubtedly see many more useful improvements as more is learned about the station and the cleaning process, but as it stands, it is an integral part of the current Nano-Laminate fabrication process.

Appendix A. Certification Test #1 Data

				Pre Scans			Post Scans			Post-Pre Scans		
Cassette Slot #	Wafer #	Certification Run #	Description	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)
25	1	1	Wafer Position #1	225	14	239	3132	143	3275	2907	129	3036
24	2		Handling Only - Witness	48	3	51	510	73	583	462	70	532
23	3		Wafer Position #2	17	1	18	529	97	626	512	96	608
22	4		Wafer Position #3	30	2	32	4094	166	4260	4064	164	4228
21	5		Wafer Position #4	50	3	53	12122	288	12410	12072	285	12357
20	6	2	Wafer Position #1	61	12	73	966	50	1016	905	38	943
19	7		Handling Only - Witness	18	3	21	150	29	179	132	26	158
18	8		Wafer Position #2	65	9	74	409	30	439	344	21	365
17	9		Wafer Position #3	78	2	80	1547	68	1615	1469	66	1535
16	10		Wafer Position #4	10	0	10	2211	126	2337	2201	126	2327
15	11	3	Wafer Position #1	7	0	7	2280	345	2625	2273	345	2618
14	12		Handling Only - Witness	4	0	4	477	122	599	473	122	595
13	13		Wafer Position #2	5	0	5	540	50	590	535	50	585
12	14		Wafer Position #3	21	4	25	1044	54	1098	1023	50	1073
11	15		Wafer Position #4	49	6	55	1138	96	1234	1089	90	1179
10	16	2	Misc. Position (Bottom of tank)	44	3	47	1490	140	1630	1446	137	1583
9	17	1	Wafer Position #5	17	4	21	542	56	598	525	52	577

				Pre Scans			Post Scans			Post-Pre Scans		
Cassette Slot #	Wafer #	Certification Run #	Description	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)
8	18	4	Wafer Position #5	13	2	15	1734	154	1888	1721	152	1873
7	19	-	Never Move from Box	9	0	9	53	2	55	44	2	46
6	20		Never Move from Box	27	1	28	43	2	45	16	1	17
5	21	4	Wafer Position #1	10	0	10	1714	169	1883	1704	169	1873
4	22		Handling Only - Witness	6	1	7	660	98	758	654	97	751
3	23		Wafer Position #2	10	2	12	928	48	976	918	46	964
2	24		Wafer Position #3	68	4	72	-	-				
1	25		Wafer Position #4	5	1	6	2054	105	2159	2049	104	2153

Appendix B. Certification Test #2 Data

				Pre Scans			Post Scans			Post-Pre Scans		
Cassette Slot #	Wafer #	Certification Run #	Description	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)
1	1	1	Wafer Position #1	0	2	2	6456	44	6500	6456	42	6498
2	2		Handling Only	3	0	3	1487	52	1539	1484	52	1536
3	3		Wafer Position #2	2	0	2	14954	80	15034	14952	80	15032
4	4		Wafer Position #3	2	0	2	83	12	95	81	12	93
5	5		Wafer Position #4	0	0	0	4615	133	4748	4615	133	4748
6	6		Wafer Position #5	2	0	2	11	0	11	9	0	9
7	7	2	Wafer Position #1	1	0	1	8	1	9	7	1	8
8	8		Handling Only	1	0	1	1447	30	1477	1446	30	1476
9	9		Wafer Position #2	2	0	2	692	38	730	690	38	728
10	10		Wafer Position #3	1	0	1	3641	156	3797	3640	156	3796
11	11		Wafer Position #4	0	1	1	576	19	595	576	18	594
12	12		Wafer Position #5	1	0	1	166	19	185	165	19	184
13	13	3	Wafer Position #1	572	58	630	2912	159	3071	2340	101	2441
14	14		Handling Only	3	0	3	4656	55	4711	4653	55	4708
15	15		Wafer Position #2	2	0	2	2571	21	2592	2569	21	2590
16	16		Wafer Position #3	2	0	2	3978	34	4012	3976	34	4010
17	17		Wafer Position #4	1	0	1	2742	33	2775	2741	33	2774
18	18		Wafer Position #5	0	0	0	195	22	217	195	22	217
19	19	-	Never Move from Box	3	0	3	2346	51	2397	2343	51	2394
20	20		Never Move from Box	1	0	1	7126	163	7289	7125	163	7288

Appendix C. Certification Test #3 Data

				Pre Scans			Post Scans			Post-Pre Scans		
Cassette Slot #	Wafer #	Certification Run #	Description	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)
1	1	1	Wafer Position #1	80	29	116	711	16	753	631	-13	637
2	2		Handling Only	66	29	100	86	38	133	20	9	33
3	3		Wafer Position #2	53	20	77	2540	203	2849	2487	183	2772
4	4		Wafer Position #3	36	13	53	4531	512	5164	4495	499	5111
5	5		Wafer Position #4	32	4	38	2544	76	2697	2512	72	2659
6	6		Wafer Position #5	31	3	36	36	13	51	5	10	15
7	7	2	Handling Only	31	5	38	63	13	79	32	8	41
8	8		Wafer Position #2	39	2	42	1838	313	2255	1799	311	2213
9	9		Wafer Position #3	48	4	53	4302	380	4876	4254	376	4823
10	10		Wafer Position #4	28	6	35	2559	339	2967	2531	333	2932
11	11		Wafer Position #5	48	6	56	1479	81	1577	1431	75	1521
12	12		Wafer Position #1	37	1	39	354	14	373	317	13	334
13	13	3	Wafer Position #1	38	8	49	259	9	272	221	1	223
14	14		Handling Only	38	9	51	49	18	75	11	9	24
15	15		Wafer Position #2	36	7	45	329	14	348	293	7	303
16	16		Wafer Position #3	44	6	51	405	18	429	361	12	378

				Pre Scans			Post Scans			Post-Pre Scans		
Cassette Slot #	Wafer #	Certification Run #	Description	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)	LDP Count	Area Count	Total (LDP + Area)
17	17	-	Never Move from Box	55	9	66	61	16	77	6	7	11
18	18		Never Move from Box	53	13	67	56	24	82	3	11	15
19	19	3	Wafer Position #4	46	11	60	136	13	153	90	2	93
20	20		Wafer Position #5	33	7	43	137	12	153	104	5	110
21	21	-	Never Move from Box	34	4	40	33	9	44	-1	5	4
22	22		Never Move from Box	41	1	43	47	13	66	6	12	23
23	23		Never Move from Box	32	2	35	44	9	55	12	7	20
24	24		Never Move from Box	31	10	41	42	15	59	11	5	18
25	25		Never Move from Box	81	53	138	124	83	217	43	30	79

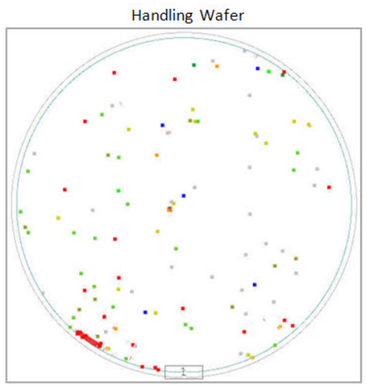
Description	Average Adders		
	LDP Count	Area Count	Total (LDP + Area)
Wafer Position #1	390	0	398
Handling Only	21	9	33
Wafer Position #2	1534	169	1773
Wafer Position #3	2990	292	3386
Wafer Position #4	1711	136	1895
Wafer Position #5	513	30	549
Never Move from Box	11	11	24

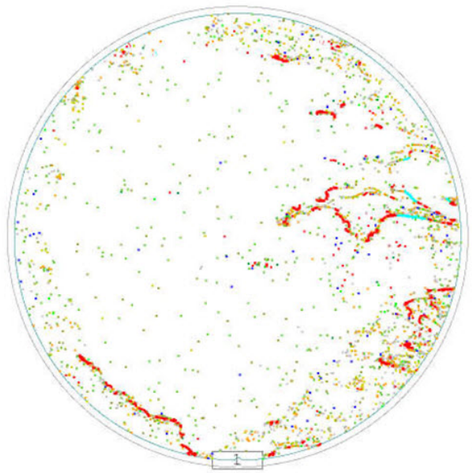
Description	Average Adders (Average - Handling Adders)		
	LDP Count	Area Count	Total (LDP + Area)
Wafer Position #1	369	-8	365
Wafer Position #2	1513	160	1740
Wafer Position #3	2969	283	3353
Wafer Position #4	1690	127	1862
Wafer Position #5	492	21	516

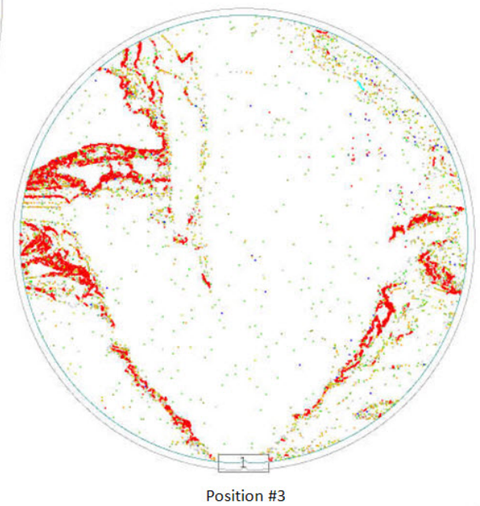
Description	Average Adders (Average - Handling Adders)		
	LDP Count	Area Count	Total (LDP + Area)
Run #1	2006	141	2206
Run #2	2034	214	2324
Run #3	203	-4	197

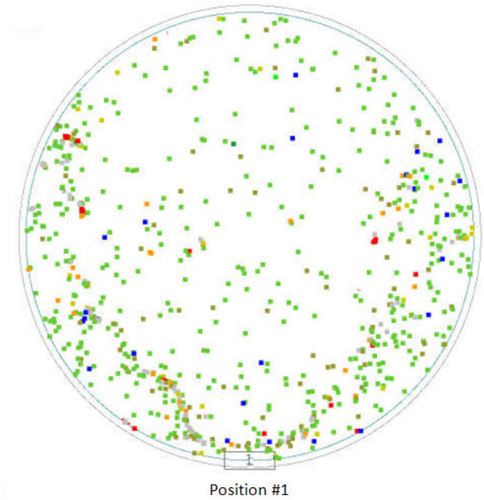
Appendix D. Certification Test #3 Post Scan Maps Orientated on LOCS

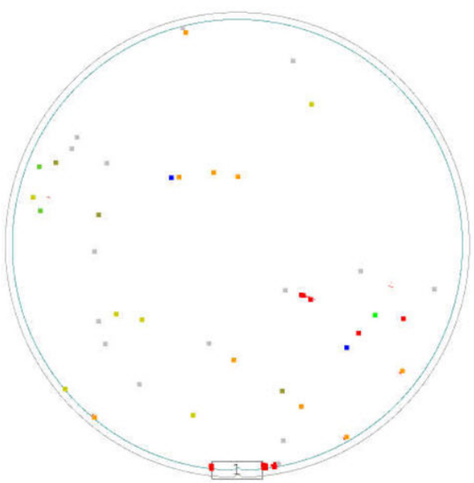
Wash #1

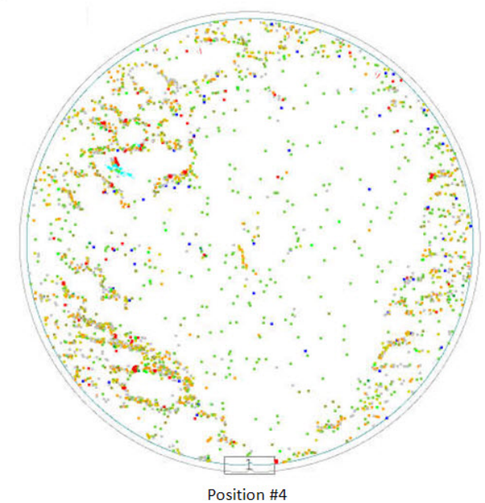




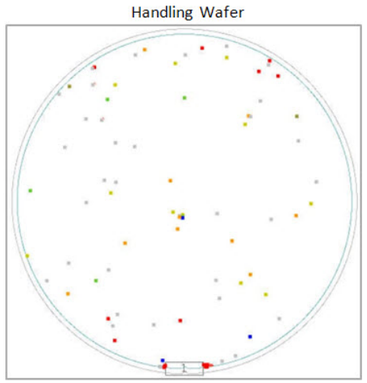


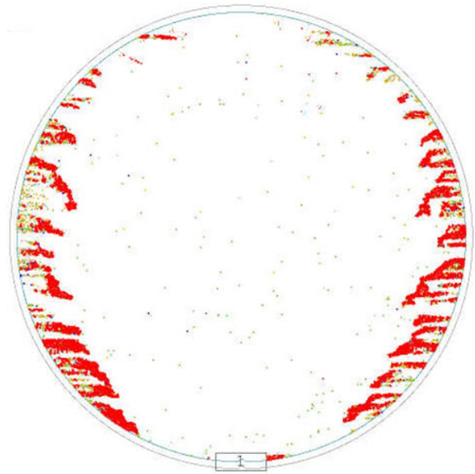


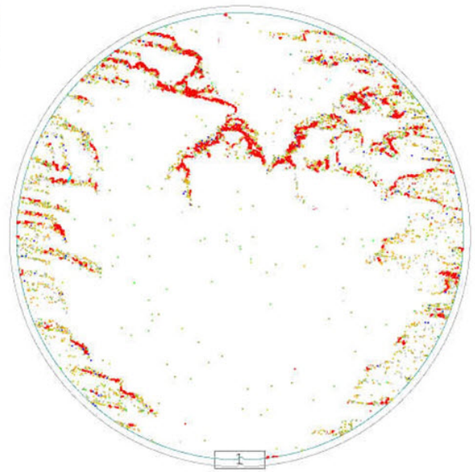


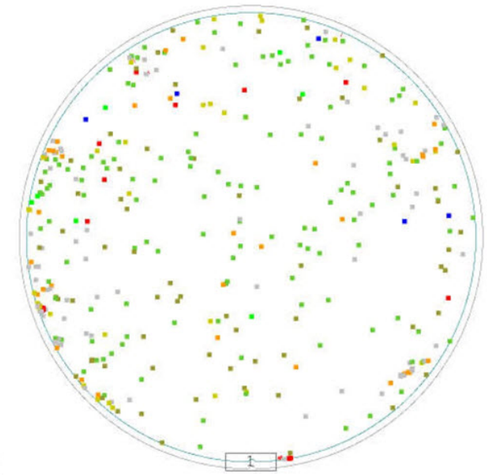


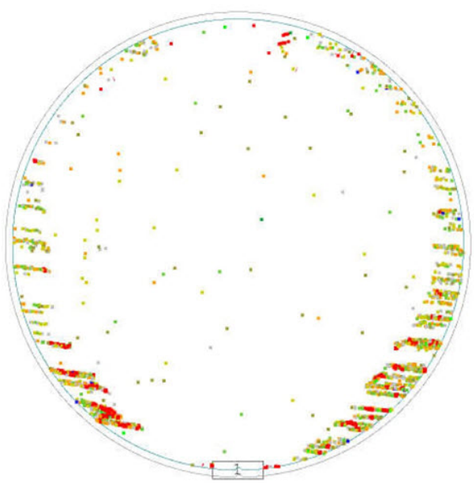
Wash #2

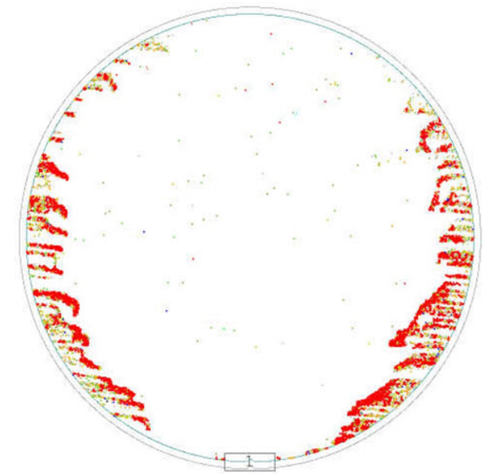

Handling Wafer


Position #2

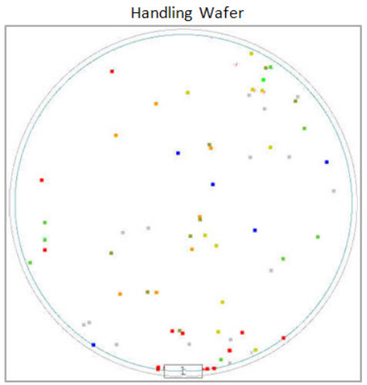

Position #3

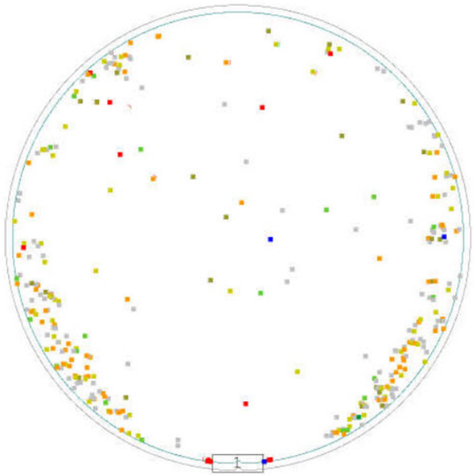

Position #1

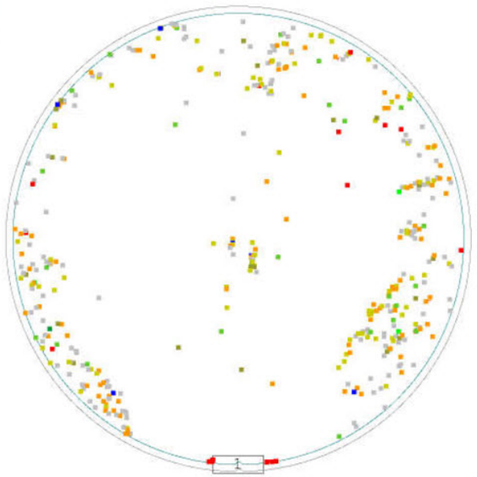

Position #5

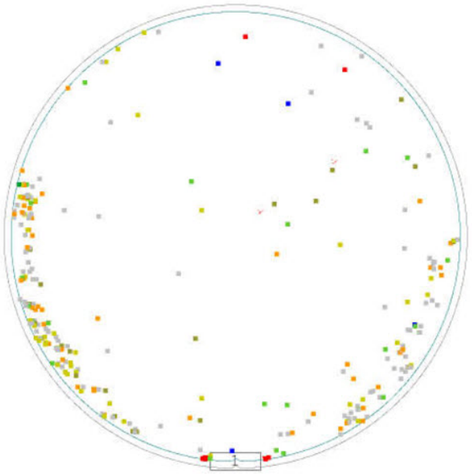

Position #4

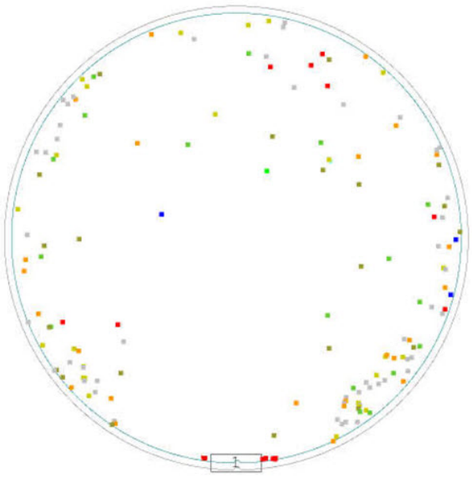
Wash #3

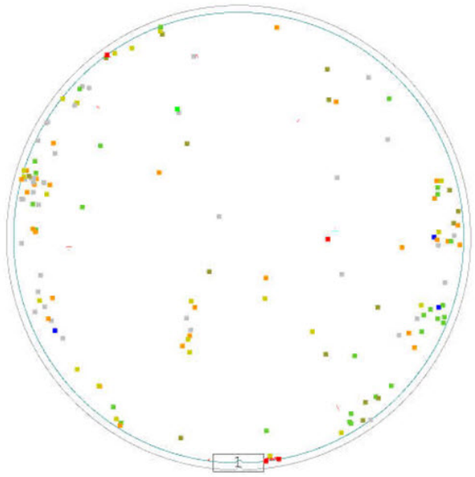

Handling Wafer


Position #2

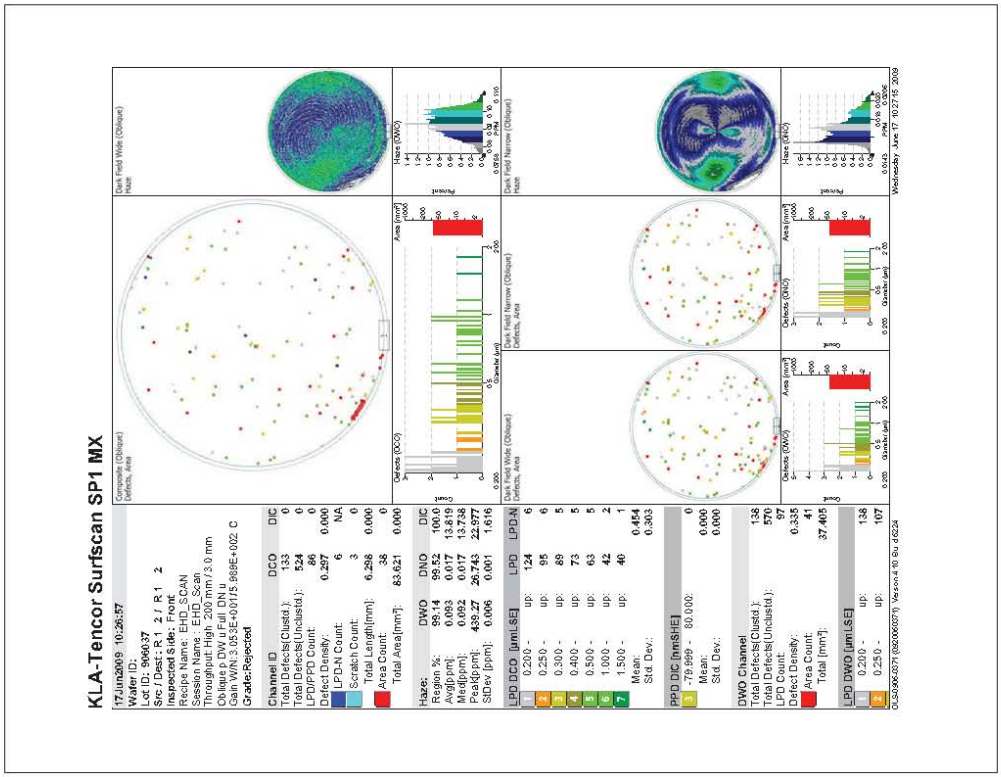

Position #3

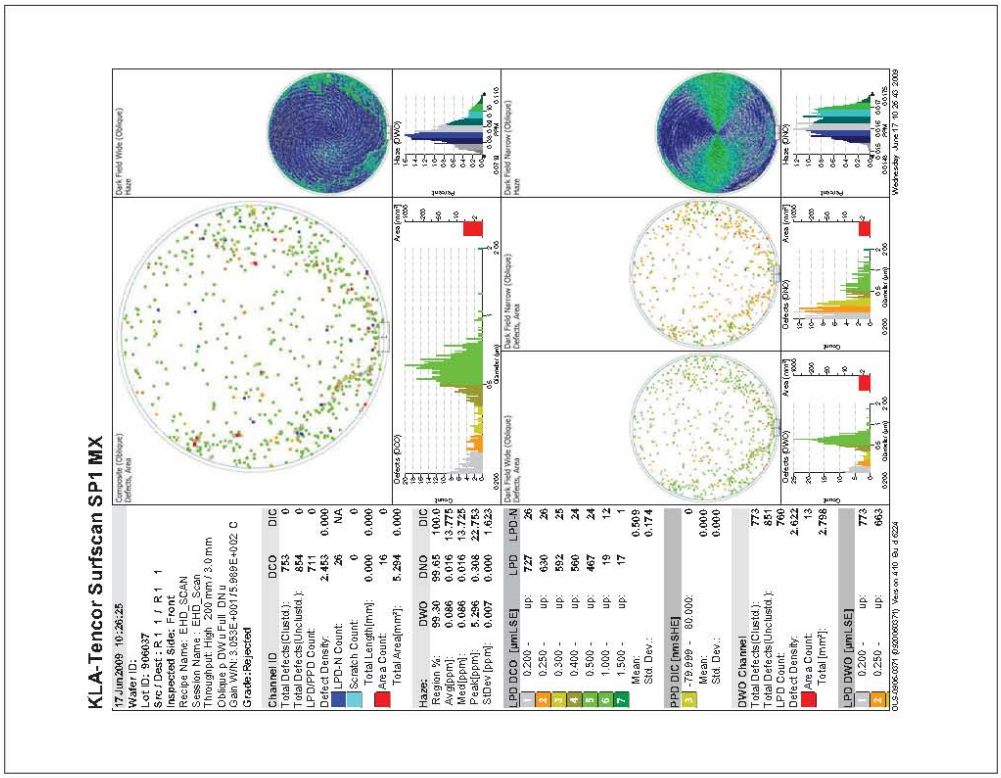

Position #1

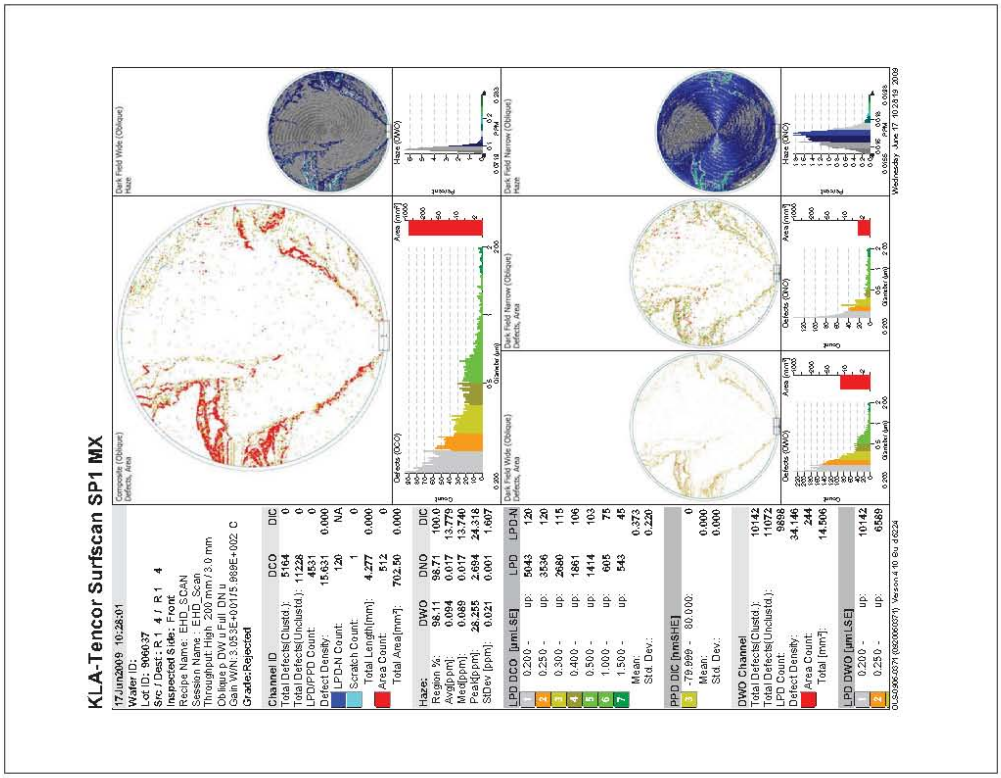

Position #5


Position #4

Appendix E. Certification Test #3 Post Scan Maps






KLA-Tencor Surfscan SP1 MX
17Jun2009 10:28:01
Wafer ID:
Lot ID: 9060.07
Src / Dest : R 1 4 / R 1 4
Inspection Mode : EHD_SCAN
Recipe Name : EHD_SCAN
Session Name : EHD_Scan
Throughput High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 5164 0
Total Defects(Unclustd.): 11226 0
LPD Count: 4531 0
Defect Density: 15.633 0.000
LPD-N Count: 120 NA
Scratch Count: 1 0
Total Length[mm]: 4.277 0.000
Area Count: 512 0
Total Area[mm²]: 702.50 0.000
Haze: DWO DIC
Range %: 98.11 100.0
Avg[ppm]: 0.094 13.779
Med[ppm]: 0.089 13.740
Peak[ppm]: 28.255 24.318
StDev [ppm]: 0.021 1.607
LPD DCO [µm].SE] LPD LPD-N
0.200 - up: 5043 120
0.250 - up: 3536 120
0.300 - up: 2680 115
0.400 - up: 1861 106
0.500 - up: 1414 103
1.000 - up: 605 75
1.500 - up: 543 45
Mean: 0.373
Std. Dev.: 0.220
PPD DIC [nm.SHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 10142
Total Defects(Unclustd.): 11072
LPD Count: 9898
Defect Density: 34.146
Area Count: 244
Total [mm²]: 14.506
LPD DWO [µm].SE] LPD LPD-N
0.200 - up: 10142 0
0.250 - up: 6589 0
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Haze (DWO)
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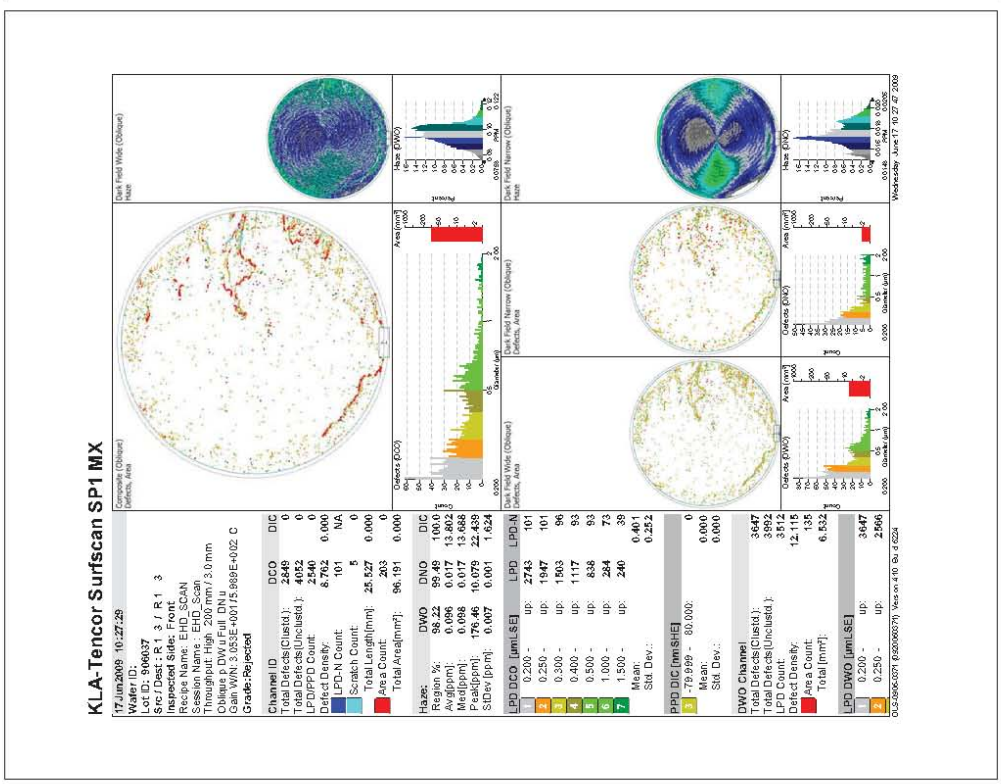
KLA-Tencor Surfscan SP1 MX
17Jun2009 10:27:29
Wafer ID:
Lot ID: 9060.07
Src / Dest : R 1 3 / R 1 3
Inspection Mode : EHD_SCAN
Recipe Name : EHD_SCAN
Session Name : EHD_Scan
Throughput High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 2849 0
Total Defects(Unclustd.): 4052 0
LPD Count: 2540 0
Defect Density: 8.782 0.000
LPD-N Count: 101 NA
Scratch Count: 5 0
Total Length[mm]: 25.527 0.000
Area Count: 203 0
Total Area[mm²]: 96.191 0.000
Haze: DWO DIC
Range %: 99.49 100.0
Avg[ppm]: 0.096 13.802
Med[ppm]: 0.098 13.688
Peak[ppm]: 176.46 10.079 22.438
StDev [ppm]: 0.007 0.001 1.624
LPD DCO [µm].SE] LPD LPD-N
0.200 - up: 2743 101
0.250 - up: 1947 101
0.300 - up: 1503 96
0.400 - up: 1117 93
0.500 - up: 838 93
1.000 - up: 284 73
1.500 - up: 240 39
Mean: 0.401
Std. Dev.: 0.252
PPD DIC [nm.SHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 3647
Total Defects(Unclustd.): 3992
LPD Count: 3512
Defect Density: 12.115
Area Count: 135
Total [mm²]: 6.532
LPD DWO [µm].SE] LPD LPD-N
0.200 - up: 3647 0
0.250 - up: 2566 0
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Haze (DWO)
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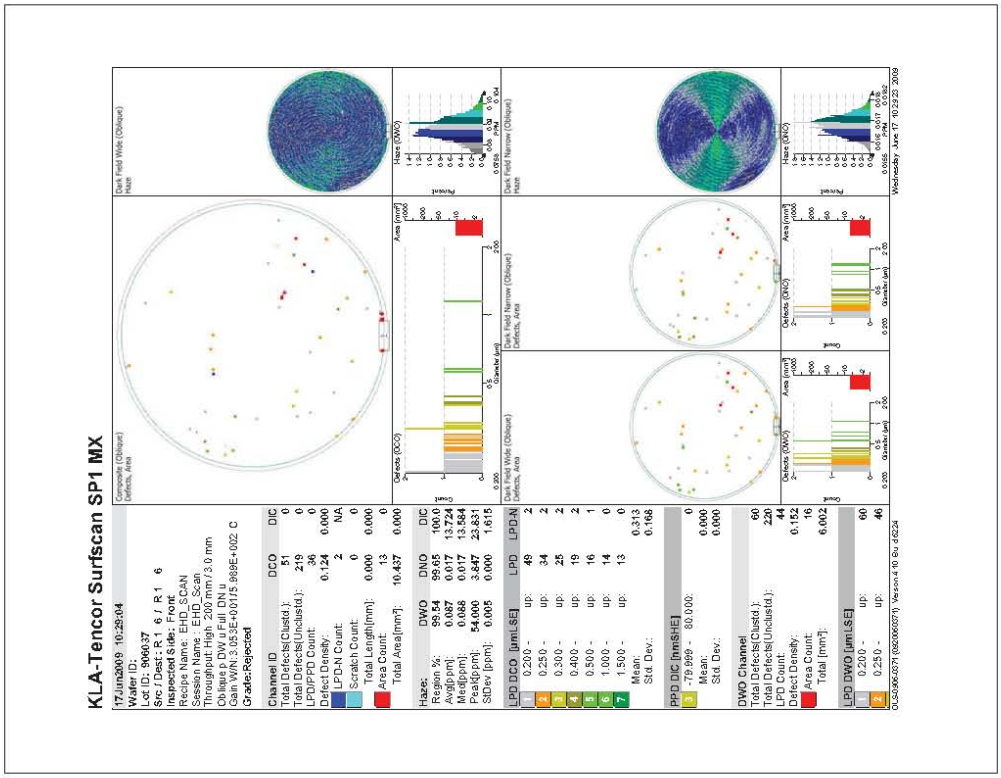
KLA-Tencor Surfscan SP1 MX
17Jun2009 10:29:04
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 6 / R 1 6
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/15.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 51 0
Total Defects(Unclustd.): 219 0
LPD/PPD Count: 36 0
Defect Density: 0.124 0.000
LPD-N Count: 2 NA
Scratch Count: 0 0
Total Length[mm]: 0.000 0.000
Area Count: 13 0
Total Area[mm²]: 10.437 0.000
Haze: DWO DNO DIC
Region %: 99.54 99.65 100.0
Avg[ppm]: 0.087 0.017 13.724
Med[ppm]: 0.088 0.017 13.584
Peak[ppm]: 54.000 3.847 23.831
StDev [ppm]: 0.005 0.000 1.615
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 49 2
0.250 - up: 34 2
0.300 - up: 25 2
0.400 - up: 19 2
0.500 - up: 16 1
1.000 - up: 14 0
1.500 - up: 13 0
Mean: 0.313
Std. Dev.: 0.168
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 60
Total Defects(Unclustd.): 220
LPD Count: 44
Defect Density: 0.152
Area Count: 16
Total [mm²]: 6.002
LPD DWO [µmLSE]
0.200 - up: 60
0.250 - up: 46
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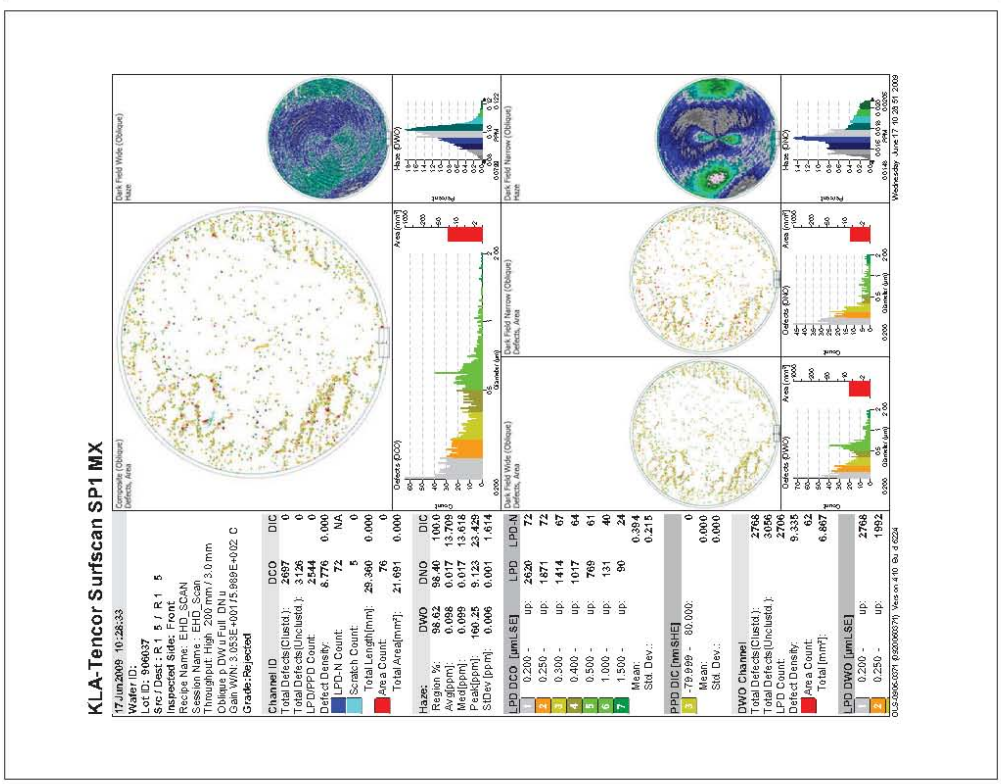
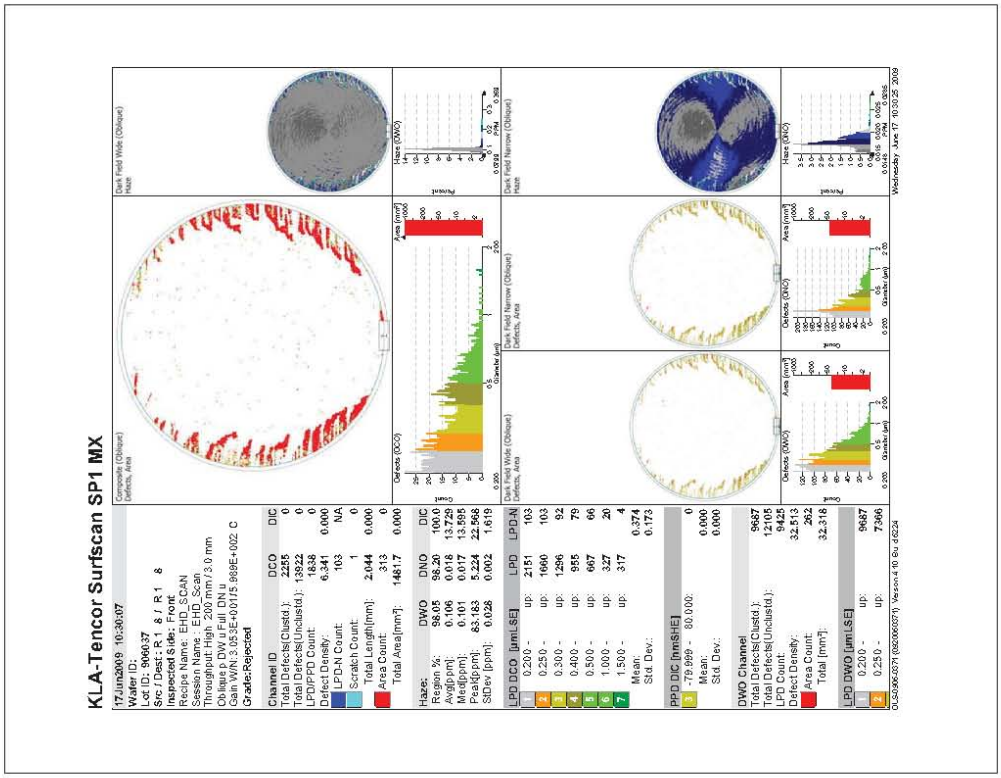

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:28:33
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 5 / R 1 5
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/15.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 2697 0
Total Defects(Unclustd.): 3126 0
LPD/PPD Count: 2544 0
Defect Density: 8.776 0.000
LPD-N Count: 72 NA
Scratch Count: 5 0
Total Length[mm]: 29.360 0.000
Area Count: 76 0
Total Area[mm²]: 21.691 0.000
Haze: DWO DNO DIC
Region %: 98.62 98.40 100.0
Avg[ppm]: 0.098 0.017 13.709
Med[ppm]: 0.099 0.017 13.618
Peak[ppm]: 160.25 9.123 23.429
StDev [ppm]: 0.006 0.001 1.614
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 2620 72
0.250 - up: 1871 72
0.300 - up: 1414 67
0.400 - up: 1017 64
0.500 - up: 769 61
1.000 - up: 131 40
1.500 - up: 90 24
Mean: 0.394
Std. Dev.: 0.215
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 2768
Total Defects(Unclustd.): 3056
LPD Count: 2706
Defect Density: 9.335
Area Count: 62
Total [mm²]: 6.867
LPD DWO [µmLSE]
0.200 - up: 2768
0.250 - up: 1992
Wednesday June 17 10:28:51 2009


KLA-Tencor Surfscan SP1 MX
17Jun2009 10:30:07
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 8 / R 1 8
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 2255 0
Total Defects(Unclustd.): 13922 0
LPD/PPD Count: 1838 0
Defect Density: 6.341 0.000
LPD-N Count: 103 NA
Scratch Count: 1 0
Total Length[mm]: 2.044 0.000
Area Count: 313 0
Total Area[mm²]: 1481.7 0.000
Haze: DWO DNO DIC
Region %: 98.05 98.20 100.0
Avg[ppm]: 0.106 0.018 13.729
Med[ppm]: 0.101 0.017 13.595
Peak[ppm]: 83.183 5.224 22.568
StDev [ppm]: 0.028 0.002 1.619
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 2151 103
0.250 - up: 1660 103
0.300 - up: 1296 92
0.400 - up: 955 79
0.500 - up: 667 66
1.000 - up: 327 20
1.500 - up: 317 4
Mean: 0.374
Std. Dev.: 0.173
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 9687
Total Defects(Unclustd.): 12105
LPD Count: 9425
Defect Density: 32.513
Area Count: 262
Total [mm²]: 32.318
LPD DWO [µmLSE]
0.200 - up: 9687
0.250 - up: 7366
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Area (mm²)
Grainsize (µm)
Haze (DWO)
Percent
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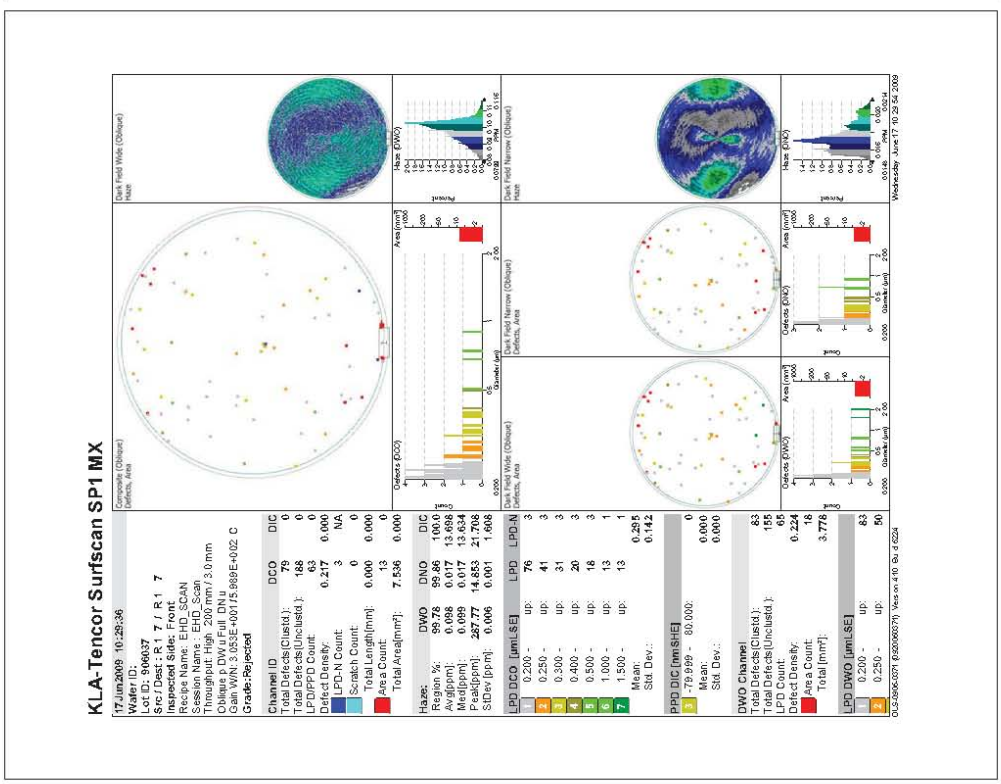
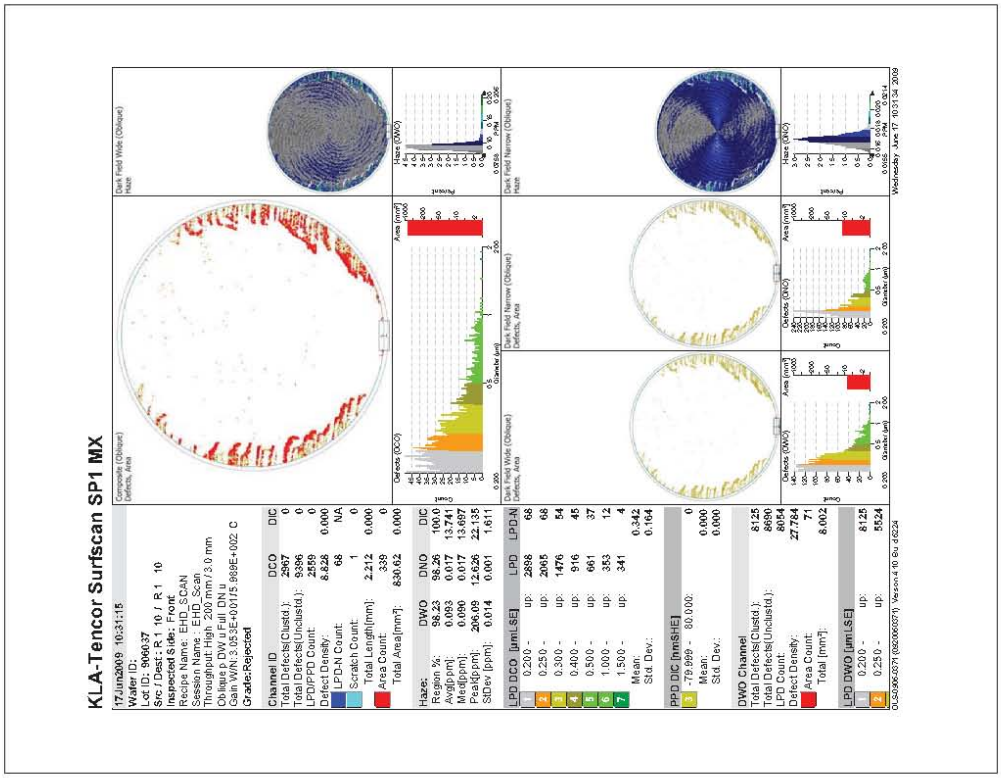
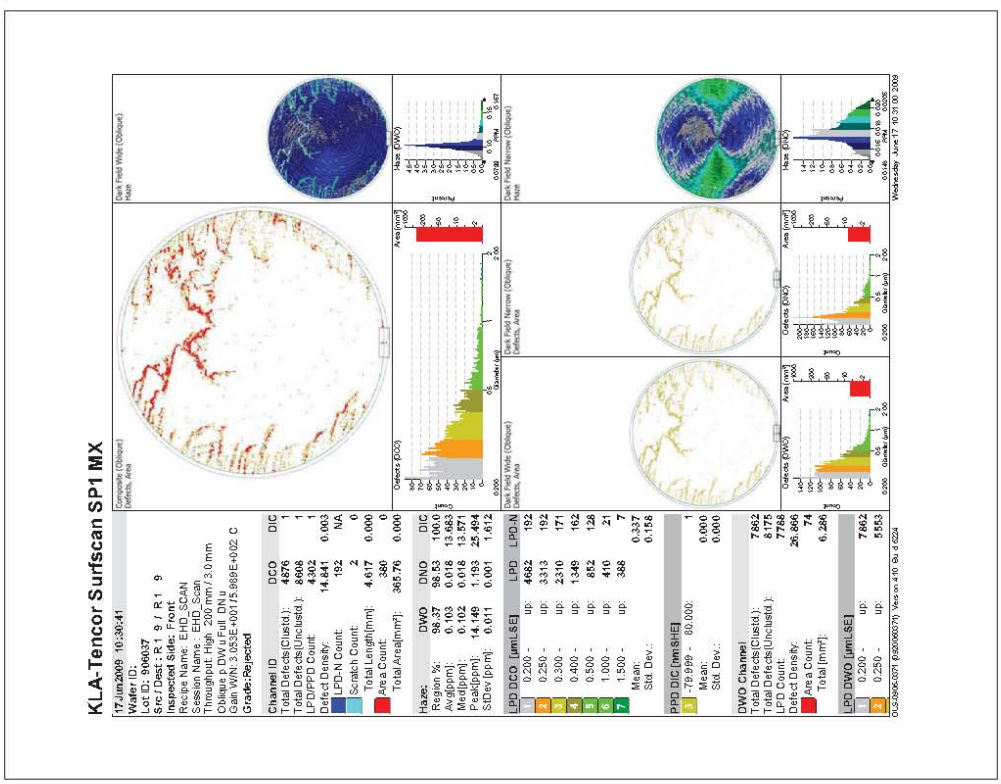
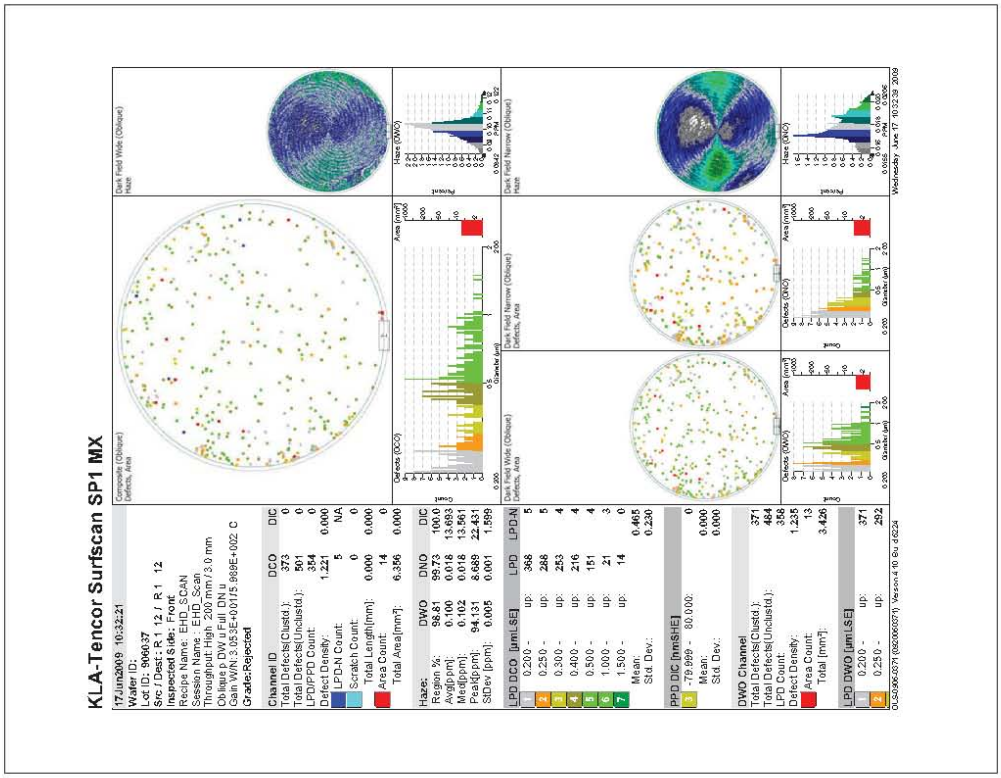
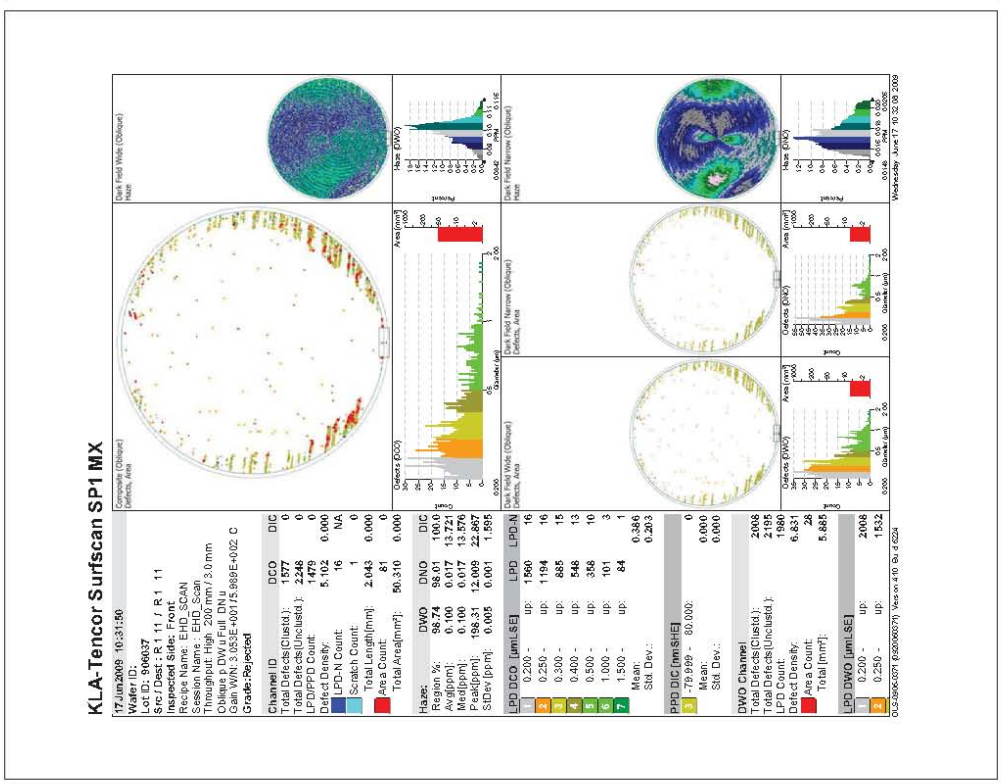
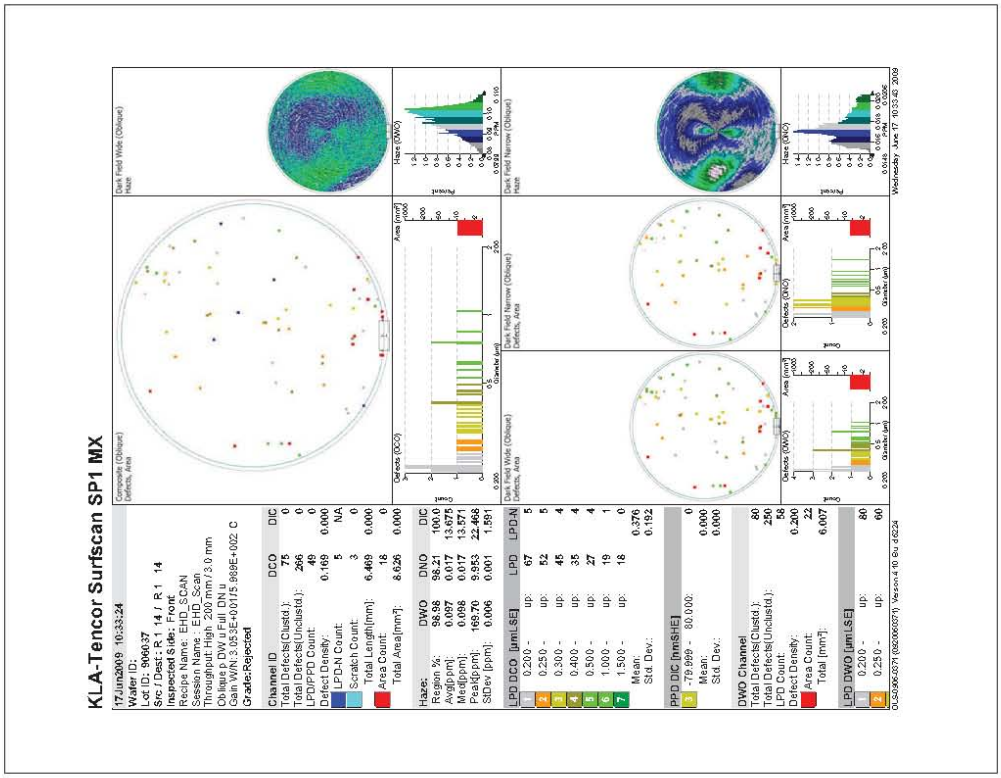

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:29:36
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 7 / R 1 7
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 79 0
Total Defects(Unclustd.): 188 0
LPD/PPD Count: 63 0
Defect Density: 0.217 0.000
LPD-N Count: 3 NA
Scratch Count: 0 0
Total Length[mm]: 0.000 0.000
Area Count: 13 0
Total Area[mm²]: 7.536 0.000
Haze: DWO DNO DIC
Region %: 99.78 99.86 100.0
Avg[ppm]: 0.098 0.017 13.698
Med[ppm]: 0.099 0.017 13.634
Peak[ppm]: 287.77 14.853 21.708
StDev [ppm]: 0.006 0.001 1.608
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 76 3
0.250 - up: 41 3
0.300 - up: 31 3
0.400 - up: 20 3
0.500 - up: 18 3
1.000 - up: 13 1
1.500 - up: 13 1
Mean: 0.295
Std. Dev.: 0.142
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 83
Total Defects(Unclustd.): 155
LPD Count: 65
Defect Density: 0.224
Area Count: 18
Total [mm²]: 3.778
LPD DWO [µmLSE]
0.200 - up: 83
0.250 - up: 50
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Area (mm²)
Grainsize (µm)
Haze (DWO)
Percent
Wednesday June 17 10:29:54 2009

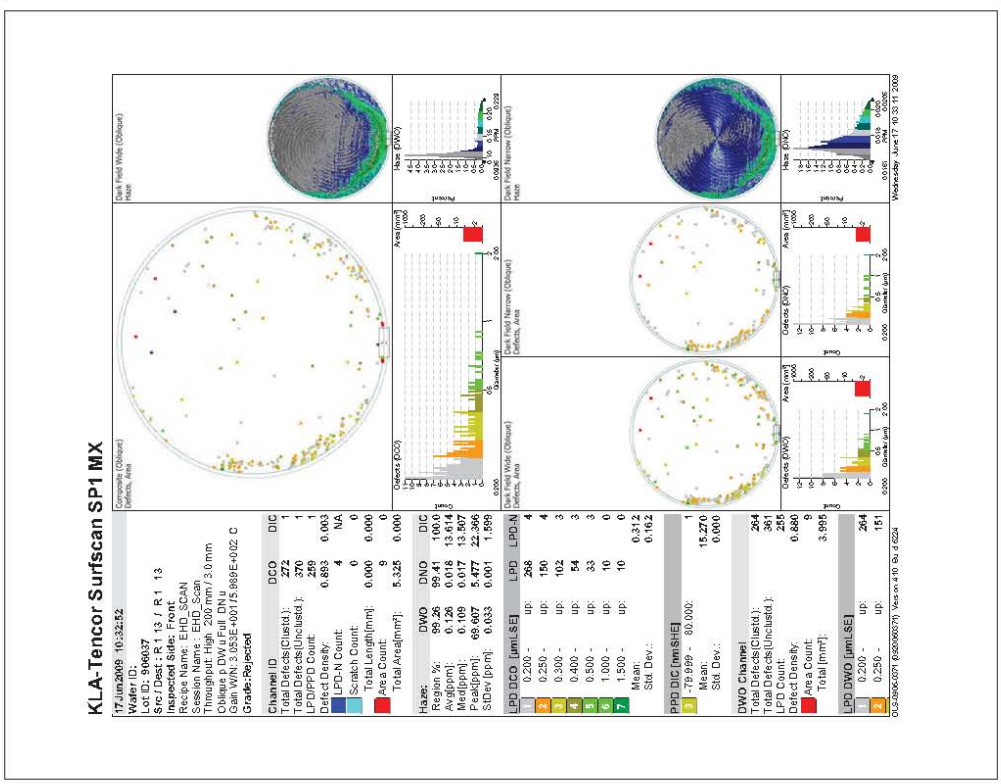

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:31:15
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 10 / R 1 10
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 2967 0
Total Defects(Unclustd.): 9396 0
LPD/PPD Count: 2559 0
Defect Density: 8.828 0.000
LPD-N Count: 68 NA
Scratch Count: 1 0
Total Length[mm]: 2.212 0.000
Area Count: 339 0
Total Area[mm²]: 830.62 0.000
Haze: DWO DNO DIC
Region %: 98.23 98.26 100.0
Avg[ppm]: 0.093 0.017 13.741
Med[ppm]: 0.090 0.017 13.697
Peak[ppm]: 206.09 12.626 22.135
StDev [ppm]: 0.014 0.001 1.611
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 2898 68
0.250 - up: 2065 68
0.300 - up: 1476 54
0.400 - up: 916 45
0.500 - up: 661 37
1.000 - up: 353 12
1.500 - up: 341 4
Mean: 0.342
Std. Dev.: 0.164
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 8125
Total Defects(Unclustd.): 8690
LPD Count: 8054
Defect Density: 27.784
Area Count: 71
Total [mm²]: 8.002
LPD DWO [µmLSE]
0.200 - up: 8125
0.250 - up: 5524
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Dark Field Wide (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Area (mm²)
Haze (DWO)
Count
Grainbar (µm)
Percent
Wednesday June 17 10:31:34 2009

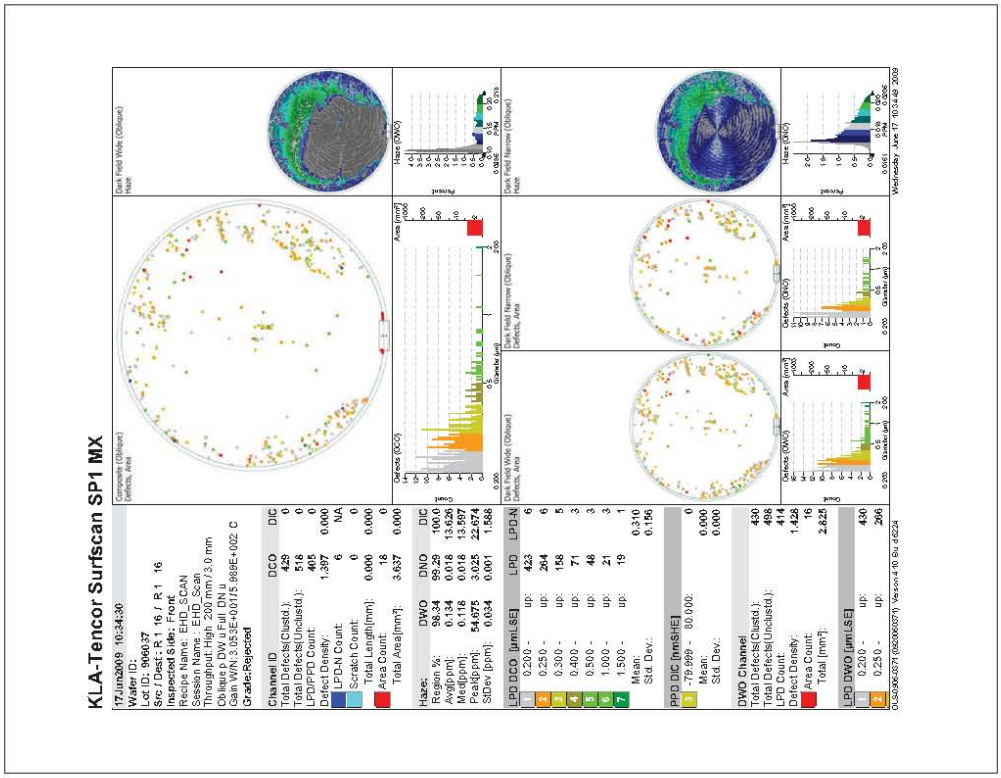

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:30:41
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 9 / R 1 9
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 4876 1
Total Defects(Unclustd.): 8608 1
LPD/PPD Count: 4302 1
Defect Density: 14.841 0.003
LPD-N Count: 192 NA
Scratch Count: 2 0
Total Length[mm]: 4.617 0.000
Area Count: 380 0
Total Area[mm²]: 365.76 0.000
Haze: DWO DNO DIC
Region %: 98.37 98.53 100.0
Avg[ppm]: 0.103 0.018 13.683
Med[ppm]: 0.102 0.018 13.571
Peak[ppm]: 14.149 1.193 25.494
StDev [ppm]: 0.011 0.001 1.612
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 4682 192
0.250 - up: 3313 192
0.300 - up: 2310 171
0.400 - up: 1349 162
0.500 - up: 852 128
1.000 - up: 410 21
1.500 - up: 388 7
Mean: 0.337
Std. Dev.: 0.158
PPD DIC [nmSHE]
-79.999 - 80.000: 1
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 7862
Total Defects(Unclustd.): 8175
LPD Count: 7788
Defect Density: 26.866
Area Count: 74
Total [mm²]: 6.286
LPD DWO [µmLSE]
0.200 - up: 7862
0.250 - up: 5553
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Dark Field Wide (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Area (mm²)
Haze (DWO)
Count
Grainbar (µm)
Percent
Wednesday June 17 10:31:00 2009

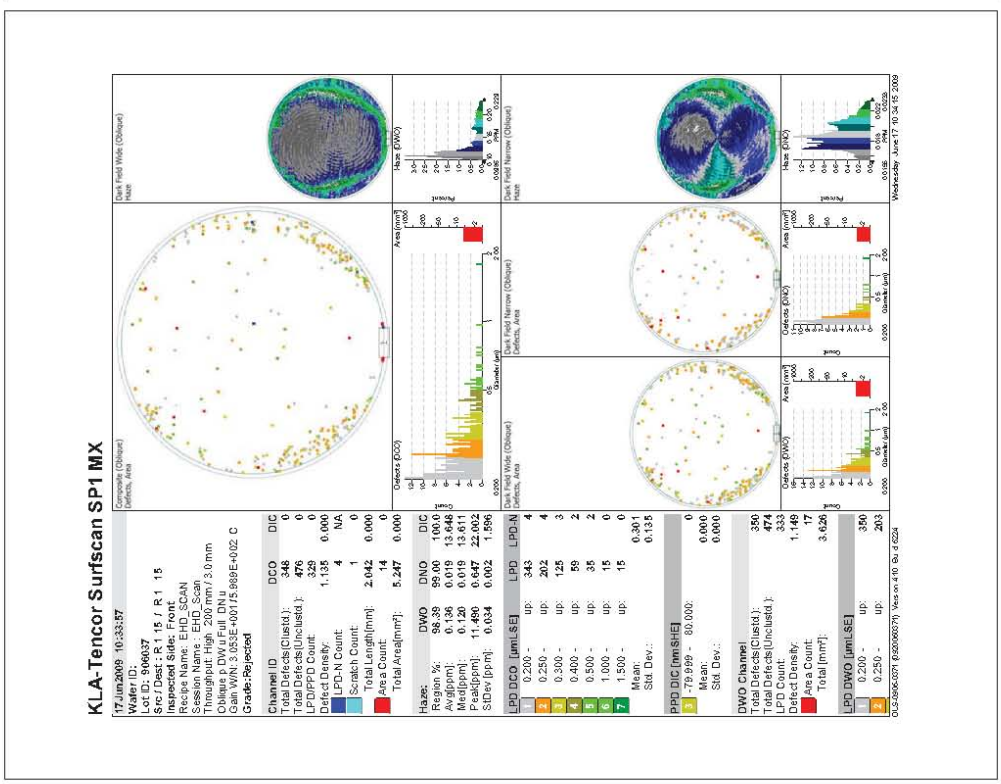

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:32:21
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 12 / R 1 12
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/15.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 373 0
Total Defects(Unclustd.): 501 0
LPD/PPD Count: 354 0
Defect Density: 1.221 0.000
LPD-N Count: 5 NA
Scratch Count: 0 0
Total Length[mm]: 0.000 0.000
Area Count: 14 0
Total Area[mm²]: 6.356 0.000
Haze: DWO DIC
Region %: 98.81 99.73 100.0
Avg[ppm]: 0.100 0.018 13.693
Med[ppm]: 0.102 0.018 13.561
Peak[ppm]: 94.131 8.689 22.431
StDev [ppm]: 0.005 0.001 1.595
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 368 5
0.250 - up: 288 5
0.300 - up: 253 4
0.400 - up: 216 4
0.500 - up: 151 4
1.000 - up: 21 3
1.500 - up: 14 0
Mean: 0.465
Std. Dev.: 0.230
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 371
Total Defects(Unclustd.): 484
LPD Count: 358
Defect Density: 1.235
Area Count: 13
Total [mm²]: 3.426
LPD DWO [µmLSE]
0.200 - up: 371
0.250 - up: 292
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Dark Field Wide (Oblique) Defects, Area
Dark Field Narrow (Oblique) Haze
Defects (DCO)
Defects (DWO)
Area (mm²)
Count
Gramm (µm)
Haze (DWO)
Percent
Wednesday June 17 10:32:39 2009

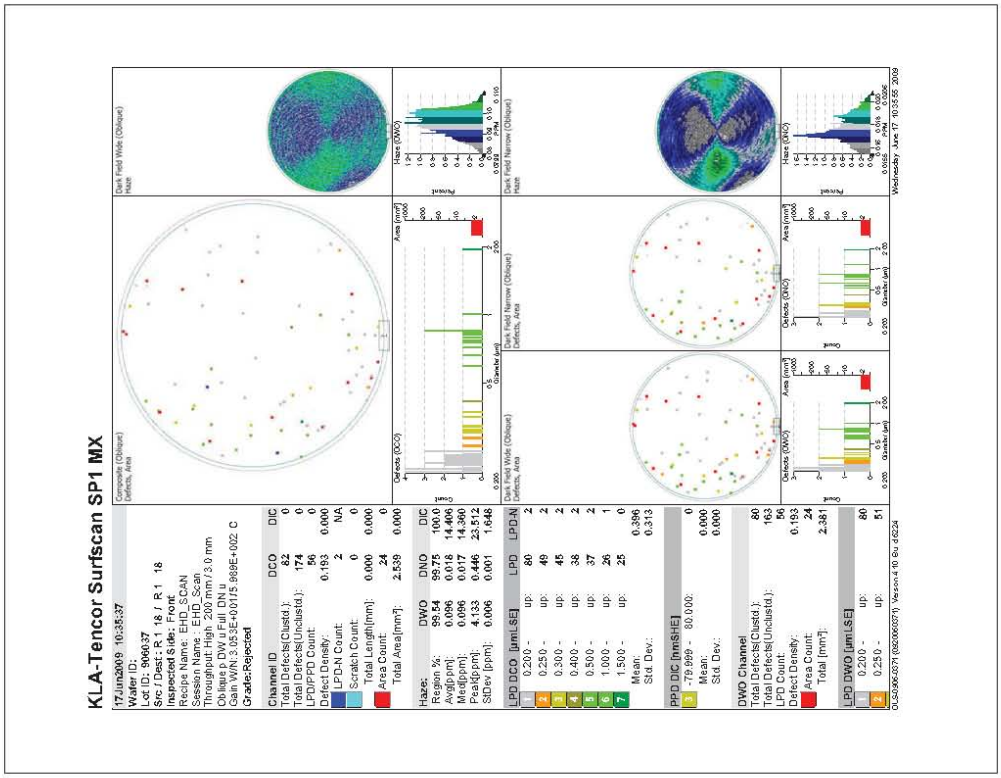

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:31:50
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 11 / R 1 11
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/15.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 1577 0
Total Defects(Unclustd.): 2248 0
LPD/PPD Count: 1479 0
Defect Density: 5.102 0.000
LPD-N Count: 16 NA
Scratch Count: 1 0
Total Length[mm]: 2.043 0.000
Area Count: 81 0
Total Area[mm²]: 50.310 0.000
Haze: DWO DIC
Region %: 98.74 98.01 100.0
Avg[ppm]: 0.100 0.017 13.721
Med[ppm]: 0.100 0.017 13.576
Peak[ppm]: 198.31 12.009 22.867
StDev [ppm]: 0.005 0.001 1.595
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 1560 16
0.250 - up: 1194 16
0.300 - up: 885 15
0.400 - up: 548 13
0.500 - up: 358 10
1.000 - up: 101 3
1.500 - up: 84 1
Mean: 0.386
Std. Dev.: 0.203
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 2008
Total Defects(Unclustd.): 2195
LPD Count: 1980
Defect Density: 6.831
Area Count: 28
Total [mm²]: 5.885
LPD DWO [µmLSE]
0.200 - up: 2008
0.250 - up: 1532
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Dark Field Wide (Oblique) Defects, Area
Dark Field Narrow (Oblique) Haze
Defects (DCO)
Defects (DWO)
Area (mm²)
Count
Gramm (µm)
Haze (DWO)
Percent
Wednesday June 17 10:32:08 2009

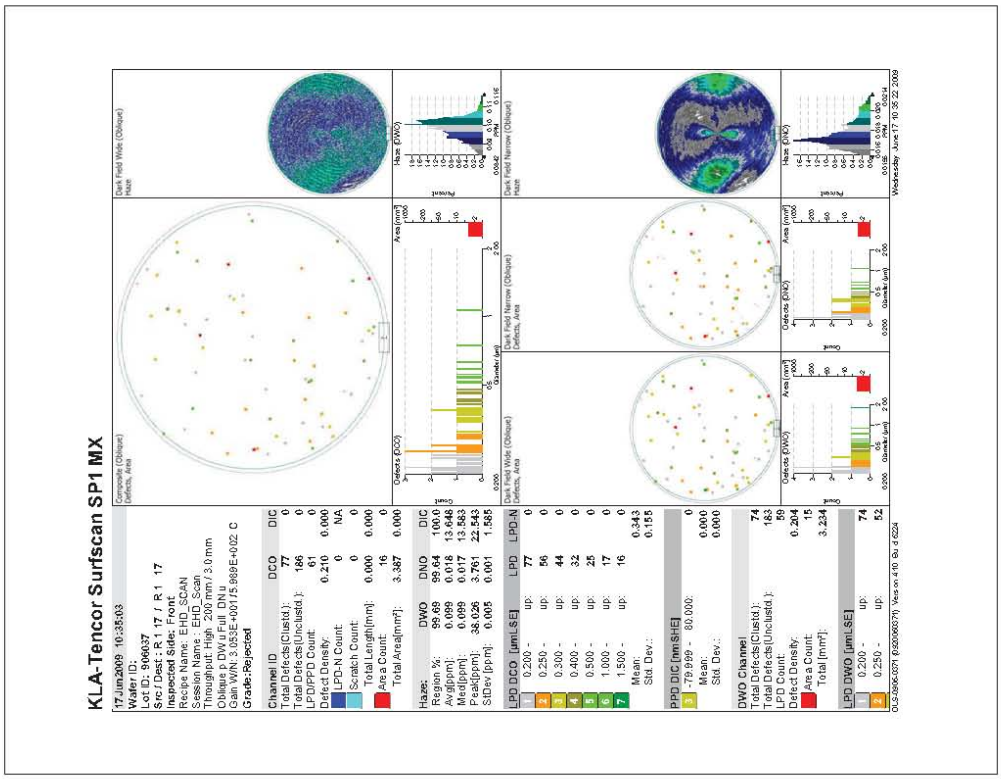

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:33:24
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 14 / R 1 14
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 75 0
Total Defects(Unclustd.): 266 0
LPD/PPD Count: 49 0
Defect Density: 0.169 0.000
LPD-N Count: 5 NA
Scratch Count: 3 0
Total Length[mm]: 6.469 0.000
Area Count: 18 0
Total Area[mm²]: 8.626 0.000
Haze: DWO DNO DIC
Region %: 98.98 98.21 100.0
Avg[ppm]: 0.097 0.017 13.675
Med[ppm]: 0.098 0.017 13.571
Peak[ppm]: 169.70 9.953 22.468
StDev [ppm]: 0.006 0.001 1.591
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 67 5
0.250 - up: 52 5
0.300 - up: 45 4
0.400 - up: 35 4
0.500 - up: 27 4
1.000 - up: 19 1
1.500 - up: 18 0
Mean: 0.376
Std. Dev.: 0.192
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 80
Total Defects(Unclustd.): 250
LPD Count: 58
Defect Density: 0.200
Area Count: 22
Total [mm²]: 6.007
LPD DWO [µmLSE]
0.200 - up: 80
0.250 - up: 60
Wednesday June 17 10:33:43 2009

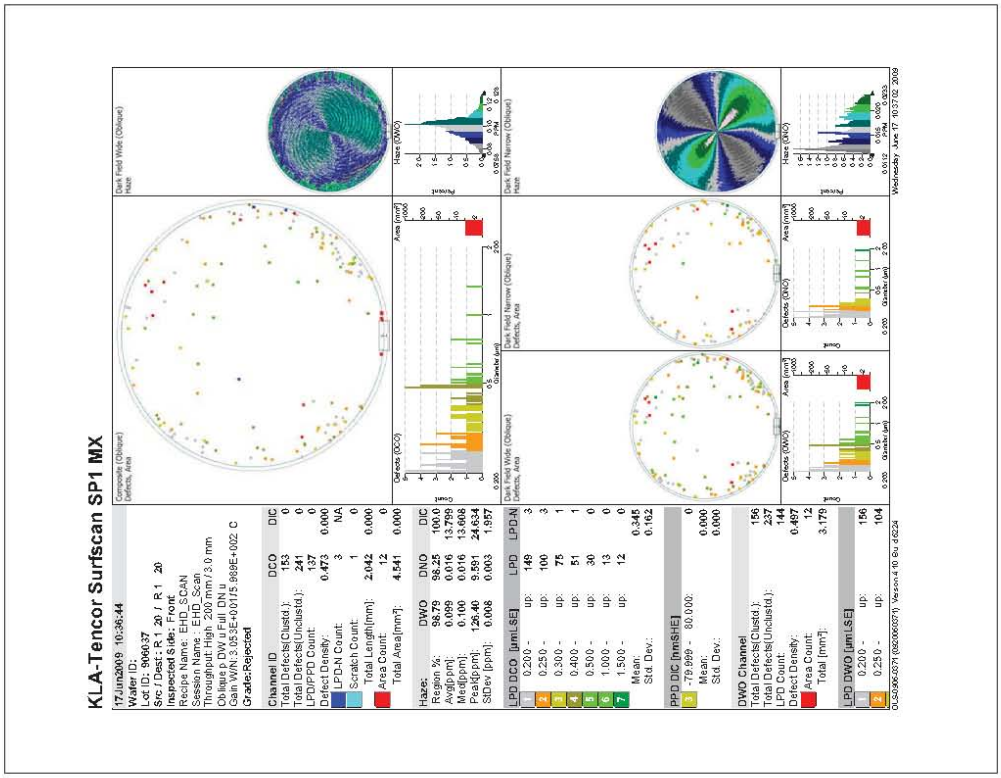

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:32:52
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 13 / R 1 13
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 272 1
Total Defects(Unclustd.): 370 1
LPD/PPD Count: 259 1
Defect Density: 0.893 0.003
LPD-N Count: 4 NA
Scratch Count: 0 0
Total Length[mm]: 0.000 0.000
Area Count: 9 0
Total Area[mm²]: 5.325 0.000
Haze: DWO DNO DIC
Region %: 99.26 99.41 100.0
Avg[ppm]: 0.126 0.018 13.614
Med[ppm]: 0.109 0.017 13.507
Peak[ppm]: 69.607 5.477 22.366
StDev [ppm]: 0.033 0.001 1.599
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 268 4
0.250 - up: 150 4
0.300 - up: 102 3
0.400 - up: 54 3
0.500 - up: 33 3
1.000 - up: 10 0
1.500 - up: 10 0
Mean: 0.312
Std. Dev.: 0.162
PPD DIC [nmSHE]
-79.999 - 80.000: 1
Mean: 15.270
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 264
Total Defects(Unclustd.): 361
LPD Count: 255
Defect Density: 0.880
Area Count: 9
Total [mm²]: 3.995
LPD DWO [µmLSE]
0.200 - up: 264
0.250 - up: 151
Wednesday June 17 10:33:11 2009

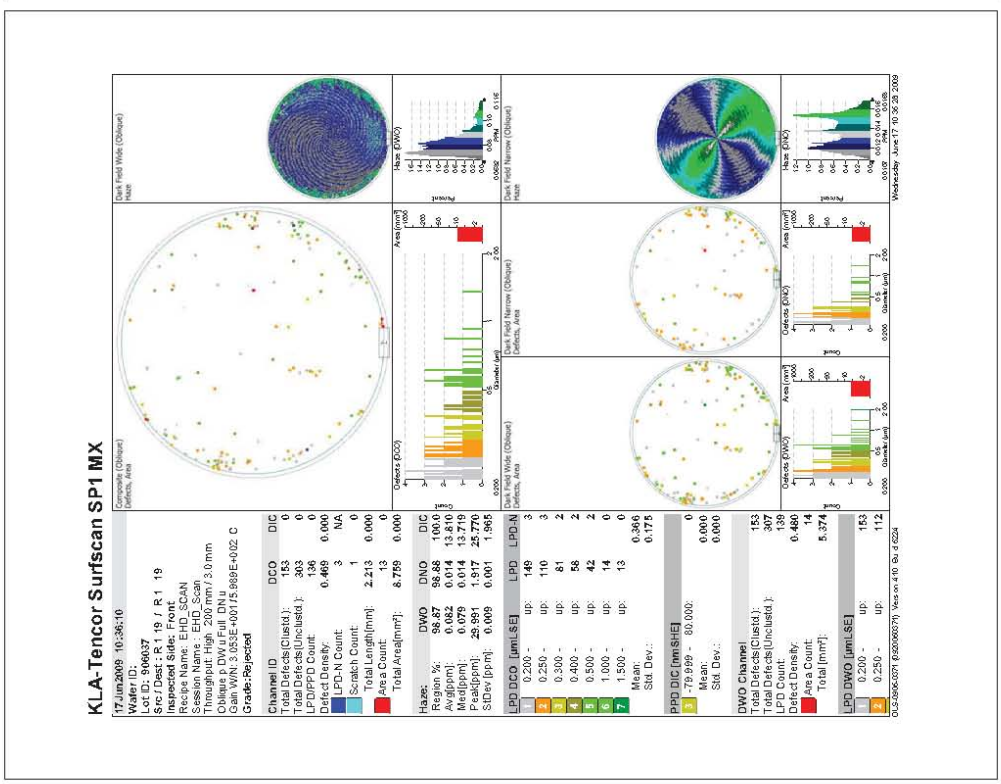

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:34:30
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 16 / R 1 16
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 429 0
Total Defects(Unclustd.): 518 0
LPD/PPD Count: 405 0
Defect Density: 1.397 0.000
LPD-N Count: 6 NA
Scratch Count: 0 0
Total Length[mm]: 0.000 0.000
Area Count: 18 0
Total Area[mm²]: 3.637 0.000
Haze: DWO DIC
Region %: 98.34 99.29 100.0
Avg[ppm]: 0.134 0.018 13.626
Med[ppm]: 0.118 0.018 13.597
Peak[ppm]: 54.675 3.025 22.674
StDev [ppm]: 0.034 0.001 1.588
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 423 6
0.250 - up: 264 6
0.300 - up: 158 5
0.400 - up: 71 3
0.500 - up: 48 3
1.000 - up: 21 3
1.500 - up: 19 1
Mean: 0.310
Std. Dev.: 0.156
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 430
Total Defects(Unclustd.): 498
LPD Count: 414
Defect Density: 1.426
Area Count: 16
Total [mm²]: 2.825
LPD DWO [µmLSE]
0.200 - up: 430
0.250 - up: 266
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Count
Area (mm²)
Gramter (µm)
Haze (DWO)
Percent
Wednesday June 17 10:34:49 2009

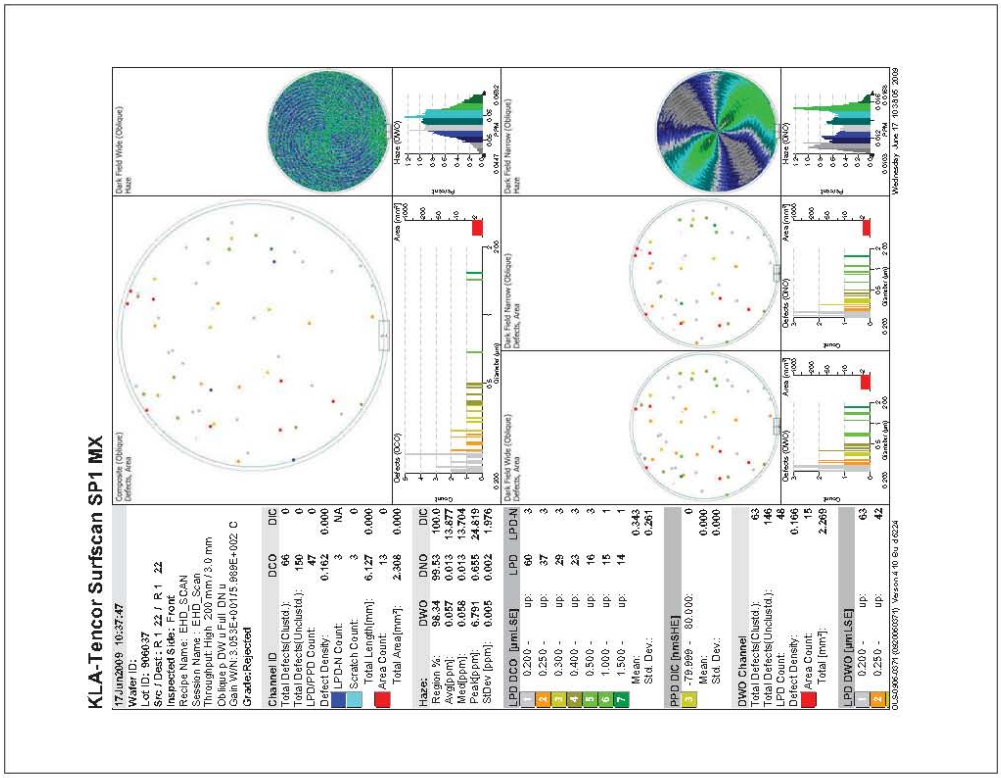

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:33:57
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 15 / R 1 15
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 348 0
Total Defects(Unclustd.): 476 0
LPD/PPD Count: 329 0
Defect Density: 1.135 0.000
LPD-N Count: 4 NA
Scratch Count: 1 0
Total Length[mm]: 2.042 0.000
Area Count: 14 0
Total Area[mm²]: 5.247 0.000
Haze: DWO DIC
Region %: 98.39 99.00 100.0
Avg[ppm]: 0.136 0.019 13.648
Med[ppm]: 0.120 0.019 13.611
Peak[ppm]: 11.490 0.647 22.002
StDev [ppm]: 0.034 0.002 1.596
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 343 4
0.250 - up: 202 4
0.300 - up: 125 3
0.400 - up: 59 2
0.500 - up: 35 2
1.000 - up: 15 0
1.500 - up: 15 0
Mean: 0.301
Std. Dev.: 0.135
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 350
Total Defects(Unclustd.): 474
LPD Count: 333
Defect Density: 1.149
Area Count: 17
Total [mm²]: 3.626
LPD DWO [µmLSE]
0.200 - up: 350
0.250 - up: 203
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Count
Area (mm²)
Gramter (µm)
Haze (DWO)
Percent
Wednesday June 17 10:34:15 2009

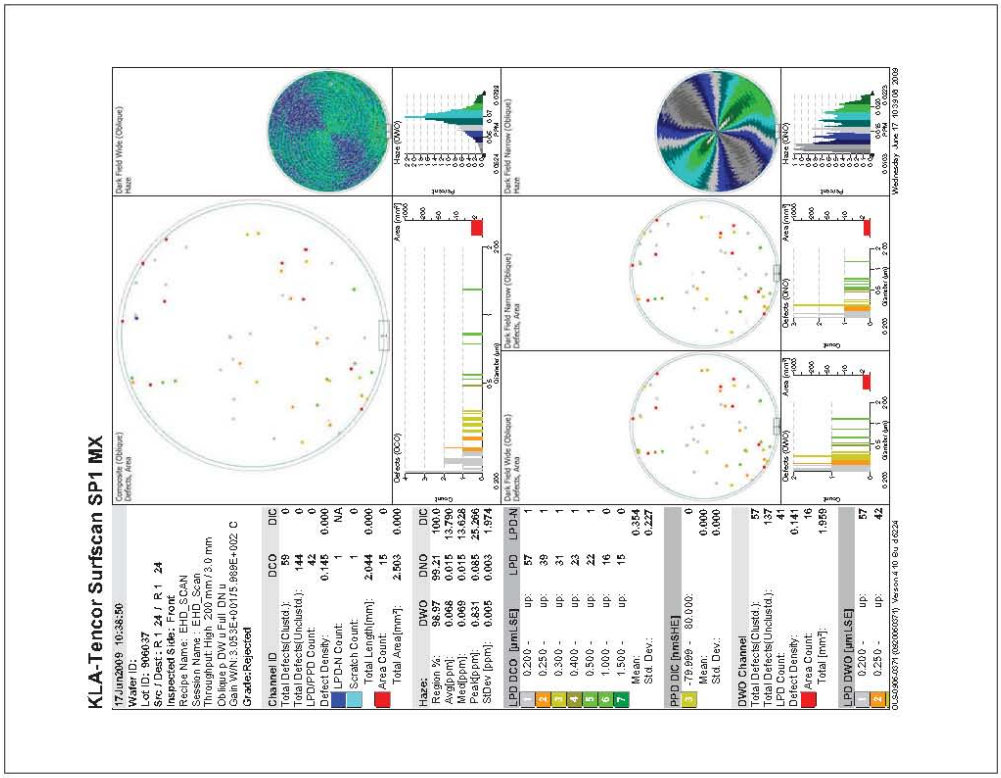

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:35:37
Wafer ID:
Lot ID: 9060.07
Src / Dest : R 1 18 / R 1 18
Recipe Name : EHD_SCAN
Session Name : EHD_Scan
Throughput High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 82 0
Total Defects(Unclustd.): 174 0
LPD Count: 56 0
Defect Density: 0.193 0.000
LPD-N Count: 2 NA
Scratch Count: 0 0
Total Length[mm]: 0.000 0.000
Area Count: 24 0
Total Area[mm²]: 2.539 0.000
Haze: DWO DIC
Range %: 99.75 100.0
Avg[ppm]: 0.096 0.018 14.406
Med[ppm]: 0.096 0.017 14.390
Peak[ppm]: 4.133 0.446 23.512
StDev [ppm]: 0.006 0.001 1.646
LPD DCO [µm:LSE] LPD LPD-N
0.200 - up: 80 2
0.250 - up: 49 2
0.300 - up: 45 2
0.400 - up: 38 2
0.500 - up: 37 2
1.000 - up: 26 1
1.500 - up: 25 0
Mean: 0.396
Std. Dev.: 0.313
PPD DIC [nm:SHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 80
Total Defects(Unclustd.): 163
LPD Count: 56
Defect Density: 0.193
Area Count: 24
Total [mm²]: 2.381
LPD DWO [µm:LSE]
0.200 - up: 80
0.250 - up: 51
Wednesday June 17 10:35:55 2009

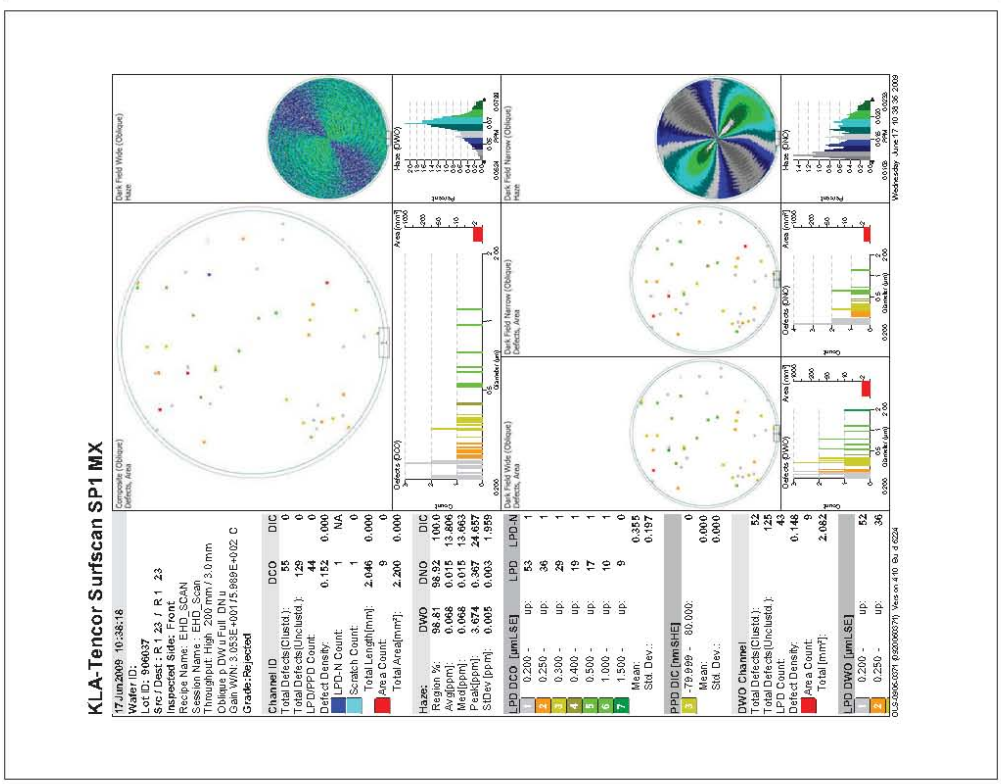

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:35:03
Wafer ID:
Lot ID: 9060.07
Src / Dest : R 1 17 / R 1 17
Recipe Name : EHD_SCAN
Session Name : EHD_Scan
Throughput High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 77 0
Total Defects(Unclustd.): 186 0
LPD Count: 61 0
Defect Density: 0.210 0.000
LPD-N Count: 0 NA
Scratch Count: 0 0
Total Length[mm]: 0.000 0.000
Area Count: 16 0
Total Area[mm²]: 3.387 0.000
Haze: DWO DIC
Range %: 99.69 100.0
Avg[ppm]: 0.099 0.018 13.648
Med[ppm]: 0.099 0.017 13.583
Peak[ppm]: 38.026 3.761 22.543
StDev [ppm]: 0.005 0.001 1.585
LPD DCO [µm:LSE] LPD LPD-N
0.200 - up: 77 0
0.250 - up: 56 0
0.300 - up: 44 0
0.400 - up: 32 0
0.500 - up: 25 0
1.000 - up: 17 0
1.500 - up: 16 0
Mean: 0.343
Std. Dev.: 0.155
PPD DIC [nm:SHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 74
Total Defects(Unclustd.): 183
LPD Count: 59
Defect Density: 0.204
Area Count: 15
Total [mm²]: 3.224
LPD DWO [µm:LSE]
0.200 - up: 74
0.250 - up: 52
Wednesday June 17 10:35:22 2009

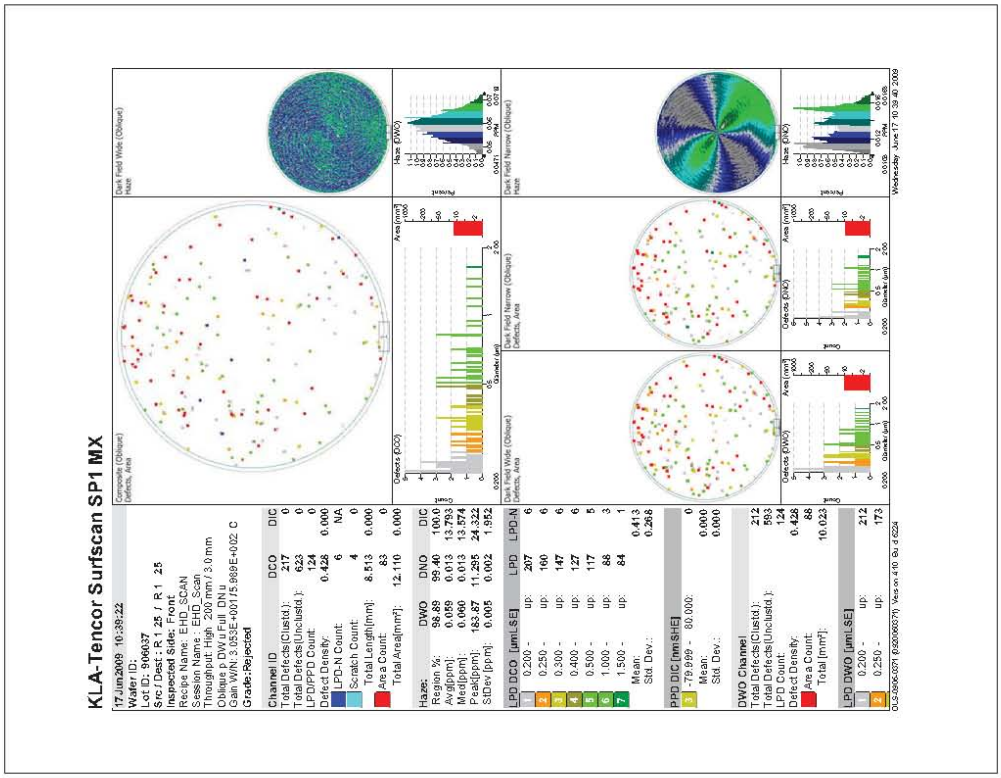

KLA-Tencor Surfscan SP1 MX
17Jun2009 10:36:44
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 20 / R 1 20
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 153 0
Total Defects(Unclustd.): 241 0
LPD/PPD Count: 137 0
Defect Density: 0.473 0.000
LPD-N Count: 3 NA
Scratch Count: 1 0
Total Length[mm]: 2.042 0.000
Area Count: 12 0
Total Area[mm²]: 4.541 0.000
Haze: DWO DIC
Region %: 98.79 98.25 100.0
Avg[ppm]: 0.099 0.016 13.799
Med[ppm]: 0.100 0.016 13.608
Peak[ppm]: 126.40 9.591 24.634
StDev [ppm]: 0.008 0.003 1.957
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 149 3
0.250 - up: 100 3
0.300 - up: 75 1
0.400 - up: 51 1
0.500 - up: 30 0
1.000 - up: 13 0
1.500 - up: 12 0
Mean: 0.345
Std. Dev.: 0.162
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 156
Total Defects(Unclustd.): 237
LPD Count: 144
Defect Density: 0.497
Area Count: 12
Total [mm²]: 3.179
LPD DWO [µmLSE]
0.200 - up: 156
0.250 - up: 104
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Area (mm²)
Count
Gramter (µm)
Haze (DWO)
Percent
Wednesday June 17 10:37:02 2009


KLA-Tencor Surfscan SP1 MX
17Jun2009 10:36:10
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 19 / R 1 19
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 153 0
Total Defects(Unclustd.): 303 0
LPD/PPD Count: 136 0
Defect Density: 0.469 0.000
LPD-N Count: 3 NA
Scratch Count: 1 0
Total Length[mm]: 2.213 0.000
Area Count: 13 0
Total Area[mm²]: 8.759 0.000
Haze: DWO DIC
Region %: 98.87 98.88 100.0
Avg[ppm]: 0.082 0.014 13.810
Med[ppm]: 0.079 0.014 13.719
Peak[ppm]: 29.991 1.917 25.770
StDev [ppm]: 0.009 0.001 1.965
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 149 3
0.250 - up: 110 3
0.300 - up: 81 2
0.400 - up: 58 2
0.500 - up: 42 2
1.000 - up: 14 0
1.500 - up: 13 0
Mean: 0.366
Std. Dev.: 0.175
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 153
Total Defects(Unclustd.): 307
LPD Count: 139
Defect Density: 0.480
Area Count: 14
Total [mm²]: 5.374
LPD DWO [µmLSE]
0.200 - up: 153
0.250 - up: 112
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Defects (DCO)
Defects (DWO)
Area (mm²)
Count
Gramter (µm)
Haze (DWO)
Percent
Wednesday June 17 10:36:28 2009


KLA-Tencor Surfscan SP1 MX
17-Jun-2009 10:37:15
Wafer ID:
Lot ID: 9060.37
Src / Dest : R1 21 / R1 21
Inspected Area Short
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/15.969E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 44 0
Total Defects(Unclustd.): 94 0
LPD Count: 33 0
Defect Density: 0.114 0.000
LPD-N Count: 1 NA
Scratch Count: 0
Total Length[mm]: 2.211 0.000
Area Count: 9 0
Total Area[mm²]: 1.526 0.000
Haze: DWO DIC
Range %: 99.20 98.91 100.0
Avg[ppm]: 0.068 0.015 13.749
Med[ppm]: 0.069 0.015 13.638
Peak[ppm]: 2.369 0.249 24.173
StDev [ppm]: 0.005 0.003 1.578
LPD DCO [µm:LSE] LPD LPD-N
1 0.200 - up: 42 1
2 0.250 - up: 26 1
3 0.300 - up: 17 0
4 0.400 - up: 13 0
5 0.500 - up: 12 0
6 1.000 - up: 10 0
7 1.500 - up: 10 0
Mean: 0.347
Std. Dev.: 0.322
PPD DIC [nm:SHE]
5 -79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 40
Total Defects(Unclustd.): 89
LPD Count: 30
Defect Density: 0.103
Area Count: 10
Total [mm²]: 1.607
LPD DWO [µm:LSE]
1 0.200 - up: 40
2 0.250 - up: 26
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Wide (Oblique) Defects, Area
Dark Field Narrow (Oblique) Defects, Area
Dark Field Narrow (Oblique) Haze
Defects (DCO)
Defects (DWO)
Haze (DWO)
Haze (DIC)
Count
Granule [µm]
Area [mm²]
Percent
PPM
0.047
0.052
0.034
0.036
0.009
0.009
0.054
0.059
0.0009
0.0009
0.0009


KLA-Tencor Surfscan SP1 MX
17Jun2009 10:38:50
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 24 / R 1 24
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 59 0
Total Defects(Unclustd.): 144 0
LPD/PPD Count: 42 0
Defect Density: 0.145 0.000
LPD-N Count: 1 NA
Scratch Count: 1 0
Total Length[mm]: 2.044 0.000
Area Count: 15 0
Total Area[mm²]: 2.503 0.000
Haze: DWO DNO DIC
Region %: 98.97 99.21 100.0
Avg[ppm]: 0.068 0.015 13.790
Med[ppm]: 0.069 0.015 13.628
Peak[ppm]: 0.831 0.085 25.266
StDev [ppm]: 0.005 0.003 1.974
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 57 1
0.250 - up: 39 1
0.300 - up: 31 1
0.400 - up: 23 1
0.500 - up: 22 1
1.000 - up: 16 0
1.500 - up: 15 0
Mean: 0.354
Std. Dev.: 0.227
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 57
Total Defects(Unclustd.): 137
LPD Count: 41
Defect Density: 0.141
Area Count: 16
Total [mm²]: 1.959
LPD DWO [µmLSE]
0.200 - up: 57
0.250 - up: 42
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Dark Field Wide (Oblique) Defects, Area
Dark Field Narrow (Oblique) Defects, Area
Haze (DWO)
Percent
Count
Gamma (µm)
Wednesday June 17 10:39:08 2009


KLA-Tencor Surfscan SP1 MX
17Jun2009 10:38:18
Wafer ID:
Lot ID: 906037
Src / Dest: R 1 23 / R 1 23
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name: EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00115.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 55 0
Total Defects(Unclustd.): 129 0
LPD/PPD Count: 44 0
Defect Density: 0.152 0.000
LPD-N Count: 1 NA
Scratch Count: 1 0
Total Length[mm]: 2.046 0.000
Area Count: 9 0
Total Area[mm²]: 2.200 0.000
Haze: DWO DNO DIC
Region %: 98.81 98.92 100.0
Avg[ppm]: 0.068 0.015 13.806
Med[ppm]: 0.068 0.015 13.663
Peak[ppm]: 3.674 0.367 24.657
StDev [ppm]: 0.005 0.003 1.959
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 53 1
0.250 - up: 36 1
0.300 - up: 29 1
0.400 - up: 19 1
0.500 - up: 17 1
1.000 - up: 10 1
1.500 - up: 9 0
Mean: 0.355
Std. Dev.: 0.197
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 52
Total Defects(Unclustd.): 125
LPD Count: 43
Defect Density: 0.148
Area Count: 9
Total [mm²]: 2.082
LPD DWO [µmLSE]
0.200 - up: 52
0.250 - up: 36
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Narrow (Oblique) Defects, Area
Dark Field Wide (Oblique) Defects, Area
Dark Field Narrow (Oblique) Defects, Area
Haze (DWO)
Percent
Count
Gamma (µm)
Wednesday June 17 10:38:36 2009


KLA-Tencor Surfscan SP1 MX
17Jun2009 10:39:22
Wafer ID:
Lot ID: 906037
Src / Dest : R 1 25 / R 1 25
Inspected Side: Front
Recipe Name: EHD_SCAN
Session Name : EHD_Scan
Throughput: High 200 mm / 3.0 mm
Oblique p DW u Full DN u
Gain W/N: 3.053E+00/175.989E+002 C
Grade:Rejected
Channel ID DCO DIC
Total Defects(Clustd.): 217 0
Total Defects(Unclustd.): 623 0
LPD/PPD Count: 124 0
Defect Density: 0.428 0.000
LPD-N Count: 6 NA
Scratch Count: 4 0
Total Length[mm]: 8.513 0.000
Area Count: 83 0
Total Area[mm²]: 12.110 0.000
Haze: DWO DNO DIC
Range %: 98.89 99.40 100.0
Avg[ppm]: 0.059 0.013 13.793
Med[ppm]: 0.060 0.013 13.574
Peak[ppm]: 183.87 11.295 24.322
StDev [ppm]: 0.005 0.002 1.952
LPD DCO [µmLSE] LPD LPD-N
0.200 - up: 207 6
0.250 - up: 160 6
0.300 - up: 147 6
0.400 - up: 127 6
0.500 - up: 117 5
1.000 - up: 88 3
1.500 - up: 84 1
Mean: 0.413
Std. Dev.: 0.268
PPD DIC [nmSHE]
-79.999 - 80.000: 0
Mean: 0.000
Std. Dev.: 0.000
DWO Channel
Total Defects(Clustd.): 212
Total Defects(Unclustd.): 593
LPD Count: 124
Defect Density: 0.428
Area Count: 88
Total [mm²]: 10.023
LPD DWO [µmLSE]
0.200 - up: 212
0.250 - up: 173
Composite (Oblique) Defects, Area
Dark Field Wide (Oblique) Haze
Dark Field Wide (Oblique) Defects, Area
Dark Field Narrow (Oblique) Defects, Area
Dark Field Narrow (Oblique) Haze
Defects (DCO)
Defects (DWO)
Area (mm²)
Gamma (µm)
Count
Percent
Haze (DWO)
Wednesday June 17 10:39:40 2009