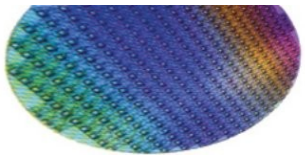

System Evaluation & Audit Report

Machine: SDI ID 99287

Type: PAS 5500 /400C

Report date: February , 2020

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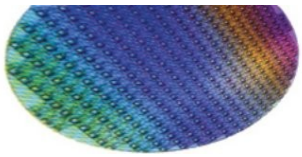


1.0 Introduction

- Fab facilities were up (temperature- and humidity- control, CDU/vacuum and lens gas)

Machine SDI ID 99287:

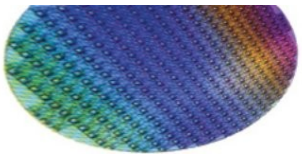
Executed audit steps:

- Setup and Imaging lens qualification
- Record tests, as result from setup.
- Full visual inspection by picture making
- (historical) data collection

Situation at start of the audit:

- System was in production end 2019 (customer info) and idled down in December, 2019
- Facilities/supplies were connected including lens gas.
-

The audit results are used to determine the quality of the system. Results and conclusions are part of this report.



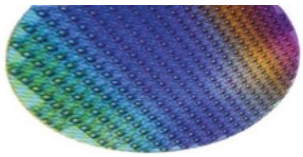
2.0 Background Information

2.1 General information

System #	SDI ID 99287
Type	PAS 5500 / 400C
12NC	9428.999.60490
Construction year	2001
Owner	
Location	
Last maintained (ASML)	2020

2.2 Configuration

EQUIPMENT CLASSIFICATION	
Characteristic Description	Value
Valid ATP-document	
Hertz	60 Hertz
Power	380 Volt
MES machine type	/400C
Position of Signal Tower	Local
1: Software release 5500	Sw rel. 8.8.6
SPM (ScribelanePrim.Mrk) Align	Standard
Optical Prealign (Mark Sensor)	Standard
Wafer size	200 mm
Wafer type	Notch
FAT Attendance	No (Data Review Only)
Standard warranty	1 Year
ATP Matching /500 /550	No ATP matching
Cassette (elevator) position	Cassette position 1 and 2
Wafer Track Interface	SCREEN (SOKUDO) 80/ D-Spin 200
SECS I and II Interface	Yes
Batch streaming	Advanced RMS
Tape streamer OCU-MK4 or less	Yes
Single Reticle Smif Handling	Yes
Signall (SW-only)	Yes
ASML TESTING: ProductivMonitor	Yes
ASML TESTING: ReliabilityMonit	Yes
PEP400B = /400B to /400C upgr	Standard
BA Reticle Tilt Measurement	Yes
Sourcing Level	Local Sourcing



3.0 Visual Inspection

3.1 General

The goal of the visual inspection is to determine:

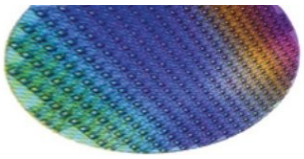
- Configuration & Completeness
- Technical status: defect- damaged- parts, contamination and corrosion, wear and tear.

System was in a working, operational state prior the visual inspection. A full visual inspection was done by making detailed pictures of all modules.

3.2 Visual inspection Analysis

	Legend:	1	No deviations
		2	Deviations found, medium performance impact/ris
		3	Deviations found, high performance impact/risk
		4	No information available

PROJECTION LENS	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
ILLUMINATION	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
RETICLE MANAGEMENT SYSTEM	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
RETICLE STAG	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
WAFER STAGE	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
LEVEL SENSOR (SP)	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
WAFER HANDLING (WTS+WPS)	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
MAIN BODY	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
ELECTRONIC CABINET	COMPLETENESS	2		
	DAMAGES	1	missing panels, functional issue:	
	CONTAMINATION	1	contamination	Replace missing panels
OPERATOR CONSOLE UNIT	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
S&T CABINET	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
AIR CONTROL CABINET	COMPLETENESS	1		
	DAMAGES	1		
	CONTAMINATION	1		
CABLES & HOSES	COMPLETENESS	1		
	DAMAGES	2	water lines are original and should be	
	CONTAMINATION	1	replaced.	may develop water leak.



4.0 Performance checks

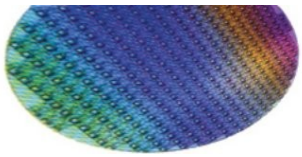
4.1 General

- Input for the performance analysis:
- Performance test reports generated during Lens Qual. 2019/11
- Historical test data generated by the user until the end of 2019.

ASML engineering specialists analyzed the performance data.
In chapter 4.2 the performance analysis is presented.

4.2 Results

Legend:	1	Performance ok	
	2	Performance issue, medium impact/risk	
	3	Performance issue, high impact/risk	
	4	No performance data available	
ILLUMINATION	1	Slit Uniformity and scanning Dose in ATP spec	
IMAGING / LENS PERFORMANC	1		
Dynamics	1	Dynamic Performance all values in spec.	
FOCUS & LEVELLING	1		
Alignment	2	TTL Repro and TTL laser power in spec. OA Repro oos , OA red/Green laser in spec.	System need Athina setup after Green laser replacment.
Scanning Waferstage	1		
Scanning Reticle stage	1		
Waferhandling	1	Mark Sensor Repro and Edge Sensor repro, all values are in spec.	
ARMS	1		
C&T	1		
Overlay & Throughput	1		expect no issue since system performance is OK



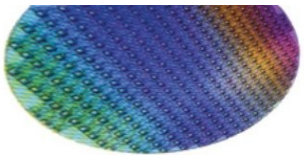
5.0 Summary

General:

- System is complete and in a working state (February, 2020)
- The system has high stray light uniformity values. This may be corrected by cleaning the lens.
- All modules are performing well, no major issues found Due to wear and tear some parts like hoses, connection and consumables need to be replaced.

6.0 Recommendations

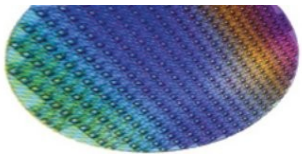
- Pro-actively replace parts (e.g. hoses/connections, consumables, periodic maintenance items).
- Periodic Maintenance actions (re-adjustments, cleaning, greasing, etc.)
- Lens Repair (in case ATP spec is required)



7.0 Appendices

7.1 Performance reports

1	Straylight Uniformity	1/10/2020	out of spec	< 2.5%	3.76%
2	Max Dx	1/10/2020	In spec	< 50	6.5
3	Max DY	1/10/2020	In spec	< 50	8.9
4	Max DX - RES X	1/10/2020	In spec	< 25	0.5
5	Max DY - RES Y	1/10/2020	In spec	< 25	4.5
6	Asym Rot: Correction	1/10/2020	In spec	0 +/- 0.5	-0.016
7	Asym Mag: Correction	1/10/2020	In spec	0 +/- 0.5	0.067
8	Dyn Z Height of Element 1	1/10/2020	In spec	0 +/- 5.0	-2.305
9	Dyn Z Focus Height	1/10/2020	In spec	0 +/- 0.1	0.042
10	Image Tilt Ry	1/10/2020	out of spec	0 +/- 3.0	-4.739
11	LENS QUALIFICATION				
12	Isolated Through Focus	11/27/2019	In spec	≤50nm	26nm
13	Isolated Best Focus	11/27/2019	In spec	≤25nm	17nm
14	Dense Through Focus	11/27/2019	In spec	≤35nm	31nm
15	Dense Best Focus	11/27/2019	In spec	≤25nm	20nm
16					



8.0 Material list

8.2 Material list (to make system functionally complete)

ELECTRONIC CABINET PANELS	2