MACRO INTELLIGENCE

Insights for Increasing Yield and Reliability through Smarter Macro Defect Inspection #8

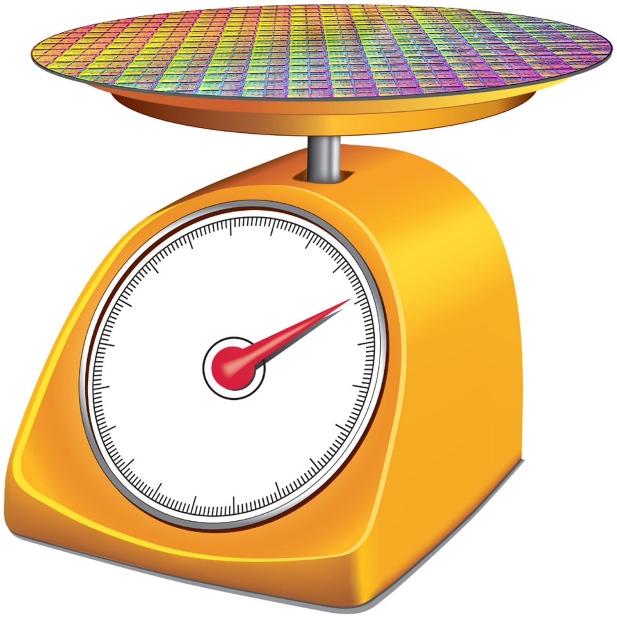
A Technical Bulletin from Microtronic – the Industry Specialists in Macro Defect Inspection

Now you can weigh wafers at the same time you're inspecting for macro defects.

Versatile EAGLEview 6 macro defect inspection can add *WaferWeight* for enhanced production control

Not all wafer production problems can be detected visually or electrically. Some can only be caught by tracking changes in wafer mass that occur during processing – especially in deposition, etch, plating, backgrinding, bonding, TSV, and similar steps. To date, however, wafer weight measurement methods have been slow and expensive, requiring a separate tool…

Now, Microtronic's patented *WaferWeigh*t gives fabs a way to track wafer mass quickly, accurately, and economically – *concurrently* with macro defect inspection, all on one tool: the Microtronic *EAGLEview*™. WaferWeight can be added to the newest EAGLEview 6 and also to previous models.



The advanced *WaferWeight* capability is being used by many top-tier fabs around the world.

EAGLEview 6 Macro Inspection System

High system speed makes it viable

In order to accurately and comprehensively monitor changes in wafer weight, it's important for fabs to get data from every wafer in every lot. EAGLEview's unique high speed makes that possible,..

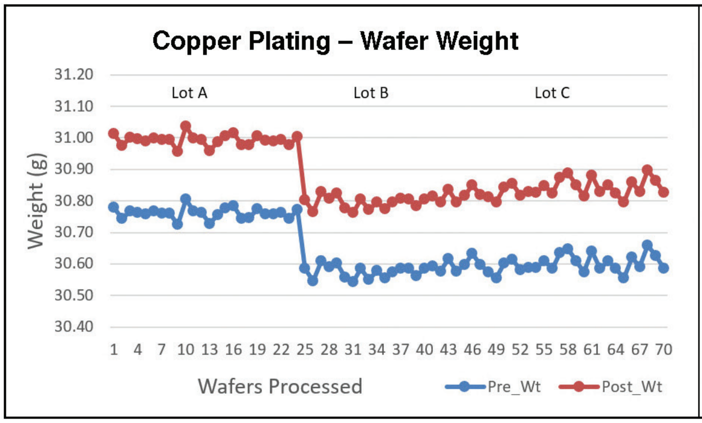
This versatile tool can macro-inspect the frontside and backside and also weigh every single wafer in every lot. By comparison, most other inspection tools can only sample a small area on a small number of wafers per batch.

High-resolution wafer weight data – in a powerfully informative database

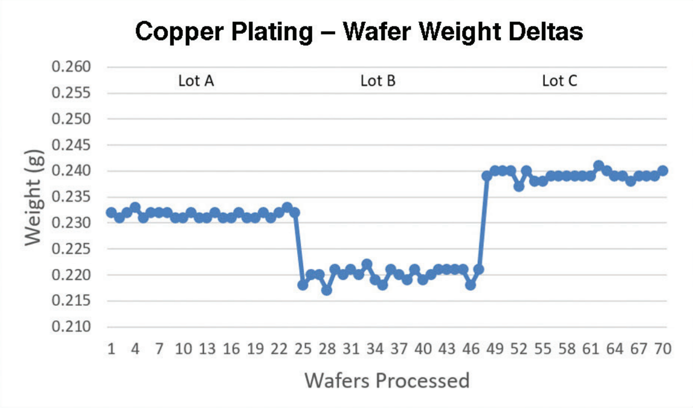
WaferWeight measurements may have a resolution as low as 0.1mg. This enables tracking of wafer mass changes between process steps, and also between different wafers in a lot. A wafer weight change that exceeds allowable ranges can immediately flag an issue needing further inspection or correction.

Weight data is stored in EAGLEview's powerful ProcessGuard™ software to show information on every wafer run through the tool – by lot, date and time. The system can automatically randomize wafers and track incoming and outgoing slot positions of every wafer.

Tracking pre/post processing wafer weights – to see lot-to-lot differences

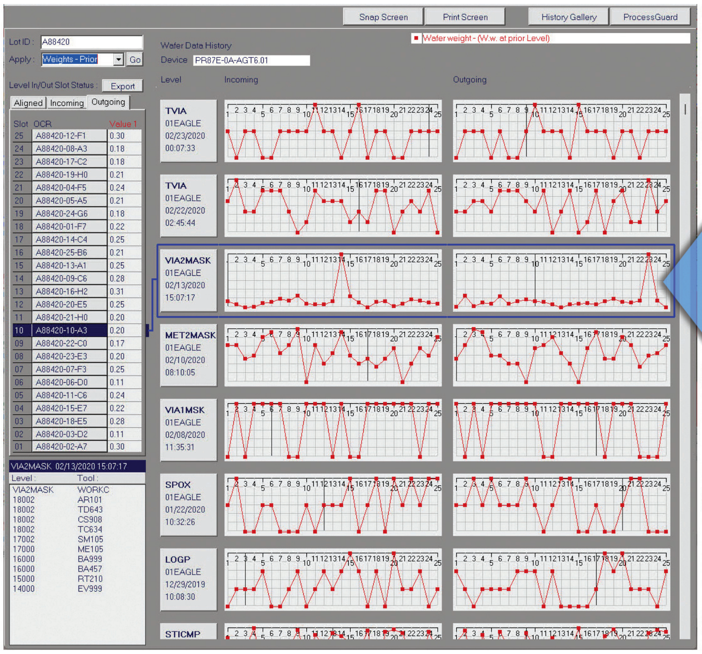


Each graph point is a wafer weight from three 25-wafer lots. Blue is pre-process; red is post-process.



This graph shows lot-to-lot difference for each wafer in the three lots.

Integrated slot-positional analysis – to see wafer-to-wafer differences



Lot ID : A88420

Apply : Weights - Prior

Level In/Out Slot Status :

Wafer Data History

Device PR87E-0A-AGT6.01

Slot	OCR	Value 1
25	A88420-12-F1	0.30
24	A88420-08-A3	0.18
23	A88420-17-C2	0.18
22	A88420-19-H0	0.21
21	A88420-04-F5	0.24
20	A88420-05-A5	0.21
19	A88420-24-G6	0.18
18	A88420-01-F7	0.22
17	A88420-14-C4	0.25
16	A88420-25-B6	0.21
15	A88420-13-A1	0.25
14	A88420-09-C6	0.28
13	A88420-16-H2	0.31
12	A88420-20-E5	0.25
11	A88420-21-H0	0.20
10	A88420-10-A3	0.20
09	A88420-22-C0	0.17
08	A88420-23-E3	0.20
07	A88420-07-F3	0.25
06	A88420-06-D0	0.11
05	A88420-11-C6	0.24
04	A88420-15-E7	0.22
03	A88420-18-E5	0.28
02	A88420-03-D2	0.11
01	A88420-02-A7	0.30

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Level :	Tool :
VIA2MASK	WORKC
18002	AR101
18002	TD643
18002	CS908
18002	TC634
17002	SM105
17000	ME105
16000	BA999
16000	BA457
15000	RT210
14000	EV999

Level

TVIA
01EAGLE
02/23/2020
00:07:33

TVIA
01EAGLE
02/22/2020
02:45:44

VIA2MASK
01EAGLE
02/13/2020
15:07:17

MET2MASK
01EAGLE
02/10/2020
08:10:05

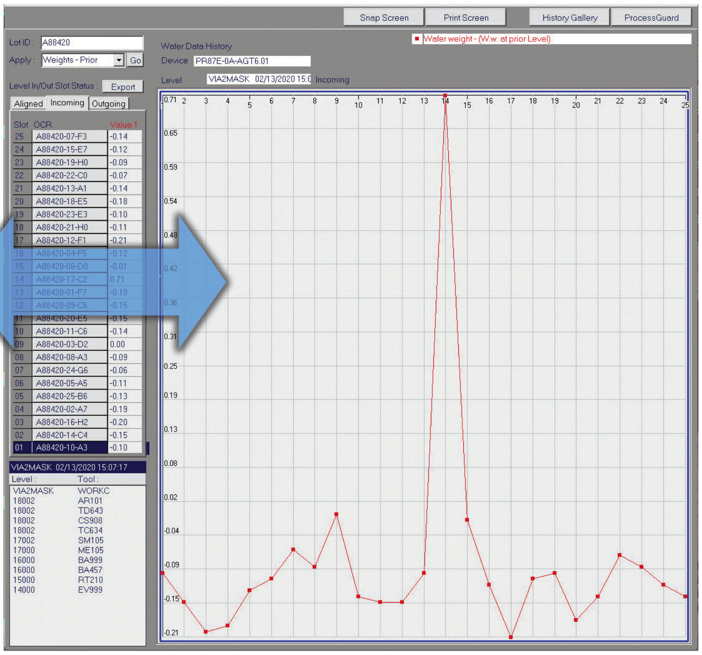
VIA1MSK
01EAGLE
02/08/2020
11:35:31

SPOX
01EAGLE
01/22/2020
10:32:26

LOGP
01EAGLE
12/29/2019
10:08:30

STICMP

This shows the incoming/outgoing slot positions of every wafer. Graph points show deltas between current and previous EAGLEview inspection.



Lot ID : A88420

Apply : Weights - Prior

Level In/Out Slot Status :

Wafer Data History

Device PR87E-0A-AGT6.01

Level VIA2MASK 02/13/2020 15:0 Incoming

Slot	OCR	Value 1
25	A88420-07-F3	-0.14
24	A88420-15-E7	-0.12
23	A88420-19-H0	-0.09
22	A88420-22-C0	-0.07
21	A88420-13-A1	-0.14
20	A88420-18-E5	-0.18
19	A88420-23-E3	-0.10
18	A88420-21-H0	-0.11
17	A88420-12-F1	-0.21
16	A88420-04-F5	-0.12
15	A88420-06-D0	-0.01
14	A88420-17-C2	0.71
13	A88420-01-F7	-0.10
12	A88420-09-C6	-0.15
11	A88420-20-E5	-0.15
10	A88420-11-C6	-0.14
09	A88420-03-D2	0.00
08	A88420-08-A3	-0.09
07	A88420-24-G6	-0.06
06	A88420-05-A5	-0.11
05	A88420-25-B6	-0.13
04	A88420-02-A7	-0.19
03	A88420-16-H2	-0.20
02	A88420-14-C4	-0.15
01	A88420-10-A3	-0.10

VIA2MASK 02/13/2020 15:07:17

Level :	Tool :
VIA2MASK	WORKC
18002	AR101
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18002	TC634
17002	SM105
17000	ME105
16000	BA999
16000	BA457
15000	RT210
14000	EV999

This expanded SlotTrack plot of the selected wafer shows a significant difference between that wafer and the rest of the lot.

The highly-informative SlotTrack tool

As the above example shows, EAGLEview's powerful ProcessGuard software integrates proprietary *SlotTrack* analysis – which can automatically randomize wafers and track the incoming and outgoing slot positions of every wafer.

SlotTrack can automatically record the slot positions of every wafer in every EAGLEview inspection and correlate them with various types of data – such as electrical test parameters, multiprobe bin results, defect density, and more. With WaferWeight monitoring, SlotTrack will plot each wafer's weight and pre/post processing deltas by slot position, which can quickly signal wafer-to-wafer differences.

EAGLEview 6: the industry's fastest and most versatile macro defect inspection tool – now incorporating WaferWeight

EAGLEview delivers an unparalleled macro defect inspection speed, which enables it to examine 100% of every wafer in every lot, rather than just sampling small areas on a small number of wafers per batch as other tools do.

This unique system – now including WaferWeight – enables fabs to see a great deal more, earlier in the overall process. This allows any needed rework to be done sooner, reducing scrap and permitting fewer defects to get through to become end-product quality problems.

For more about EAGLEview 6 or WaferWeight, please visit www.microtronic.com or email us at info@microtronic.com. And subscribe to our tech bulletins to stay informed on our latest advances.

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Specialists

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macro defect management

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