



Owens Design

YOUR DESIGN + BUILD PARTNER

April 28, 2006
Mark Danna

Metrology and Inspection Tool Platform Solution

The Opportunity

New opportunities for small startup metrology companies are being driven by next generation process and device technology. Shrinking device geometries, new materials and challenging integration issues require new metrology and wafer inspection solutions.

The Problem

However, transitioning the technology from a manual analytical lab tool into a fully 300mm factory-ready production tool is a difficult and time-consuming task. The metrology startup faces a tight market window, limited resources and a core competency centered on metrology and inspection technology, not 300mm factory capable tool development. Compounding the problem, many leading integrated device manufactures will not even evaluate a new metrology tool unless it complies with their 300mm factory requirements. The fabs recognize the difficulty of transitioning the measurement / inspection technology and don't want to waste their time if it cannot be quickly integrated for high volume inspection.

The Solution

To address this problem, Owens Design has developed a fully automated tool platform that can be easily customized to a variety of metrology and inspection process components. The use of this tool platform drastically reduces overall tool development cost, time and risk. This allows the internal development team to focus on core competency of metrology and inspection technology.

Factory Interface Module (EFEM)

The metrology/inspection tool platform utilizes a well-established industry standard 300mm FOUP and/or 200mm SMIF capable equipment front-end module (EFEM). Wafers are cleanly aligned and transferred from the load ports to the inspection stage in an ISO class 2 environment. Overall airflow and pressure balance between the metrology/inspection module and the EFEM mini environment has been optimized through computation fluid dynamics to ensure clean wafer transfer.

OEM Specific Metrology/Inspection Module Integration

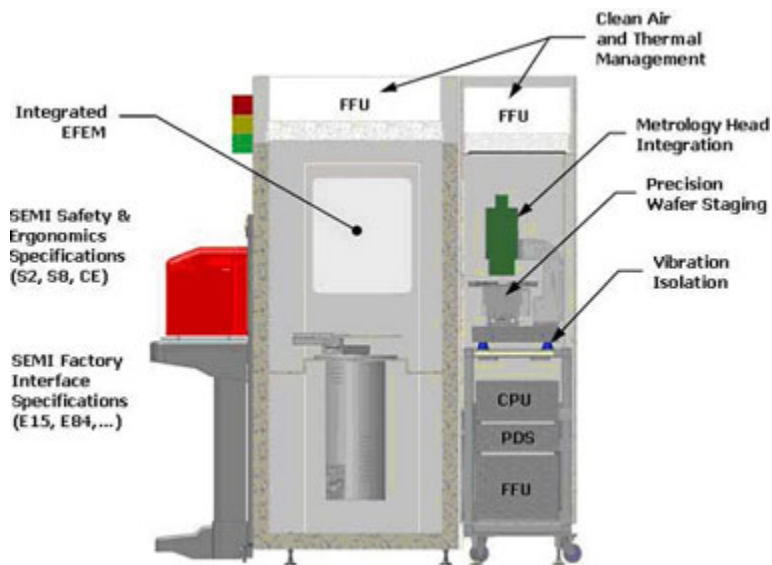
This OEM specific metrology / inspection module mounts and interfaces directly with the equipment front-end module (EFEM) providing the customer with a "Factory Ready" tool. This metrology / inspection module will be designed and optimized to meet all individual customer tool requirements. Owens Design will work closely with your internal engineering team to integrate your specific wafer staging, metrology head, optics, wafer alignment, and other components. Owens Design will also customize the tool frame, skins, airflow, wafer handling, and service access to meet your specific needs. The design will take into consideration process requirements for wafer level thermal and vibration isolation. The tool design will also allow for the incorporation of your process specific wafer chuck. A customized power distribution system



Owens Design

YOUR DESIGN + BUILD PARTNER

and control system with a standard GUI interface will be designed into the system. If required, third party factory connectivity software can also be integrated on the platform to ensure 300mm connectivity. The tool platform will be designed to meet all Semi factory interface (E15, E84,...), safety (S2) and ergonomic (S8) requirements.



Typical Tool Specifications

Substrate Handling

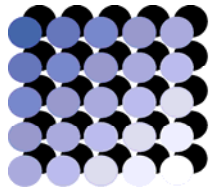
- Wafer Sizes: 200mm, 300mm
- Substrate Types: Si, Quartz

Repeatability (measured at wafer inspection station)

- Repeatability in X,Y,Z: 0.003 inches @ 3s
- Repeatability in Theta: 0.1 degrees @ 3s

System Throughput

- Steady State Throughput (excluding host tool process time): 150 wph
- Expected Time to First Wafer: 18 seconds
- Expected Swap Time (single end effector): 12 seconds



Owens Design

YOUR DESIGN + BUILD PARTNER

Cleanliness

- Topside Particles: < 0.01 @ 0.1mm, PWP
- Backside Particles: < 1,500 @ 0.2mm, PWP
- Mini-Environment: ISO Class 2

Reliability

- MTBF > 10,000 hrs MTBS > 6 months
- Availability > 98% MTTR < 2 hrs

Interface/Facilities

- Wafer and Carrier ID
 - OCR (SEMI T7, M12 and M13 scribes)
 - Carrier Auto ID
- UI: 15" Flat Panel Display, Trackball & Key Board
- Facilities (does not include metrology module requirements)
 - 110 VAC, 50/60 Hz, 8 amps
 - 22 – 26 in Hg Vacuum

Regulatory Compliance

- Certifications: SEMI S2, S8 and CE Mark E15.1, E44.1, E45, E46-95, E47.1, E57, E62, E63, E64, E84, E99
- I300I Integrated Mini-environment Design Best Practices
- I300I Factory Guidelines, Version 4.1