

Particle Detection for Photomasks



Particle Detection Leads to Higher Yields

Particle contamination can disrupt and delay the photolithography process of LCDs / AMOLEDs, resulting in yield and productivity losses. In order to avoid this, masks need to be routinely **re-qualified**.

The **solution is Pollux** – the **automated Particle Detection System** of Dr. Schenk. Pollux enables fabs to perform a complete inspection on each reticle prior to its use. This approach provides a more cost-effective and more reliable solution than the method of visual inspection.

Applications

Pollux has been designed for integration into:

- LCD / AMOLED steppers
- Reticle stockers / libraries
- Reticle handling systems

Benefits

- Cost-Effectiveness
- Easy Operation
- High Speed
- Low Maintenance

Pollux Offers

- High Return on Investment
- Low Capital Investment
- Low Cost of Ownership

Pollux Leads to

- Process Optimization
- Yield Enhancement
- Cost Reduction



Specification

Pollux inspects the surface of the glass side and the pellicle surface of the chrome side for imperfections down to 10 µm equivalent sphere diameter (ESD*). Pollux detects particulate contamination and defects such as glass scratches and holes in the pellicle. Each fab can individually determine the threshold according to the minimum size of particles that are of interest.

Pollux offers highly reliable contamination control for the lithography process, independent of an operator performing a visual inspection. Pollux automatically determines the frame height and the inspection area. No manual adjustment or parameter setting is needed to adapt the system to the reticle to be inspected. The average cycle time is between 45 and 70 seconds!

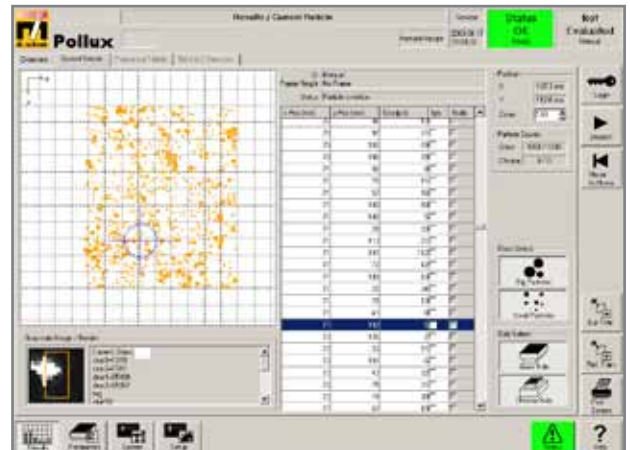
Optical Setup

Pollux uses a far dark-field laser inspection principle. Highly sensitive CCD line scan cameras collect the scattered light from any imperfection. The size of detected particles is determined according to the number and intensity of bright pixels.

Presentation of Results

Pollux offers a user-friendly graphical user interface (GUI) according to SEMI standards.

Pollux reports the number of detected particles on the surfaces of both sides of the reticle. Contamination data, such as the number of detected particles, ESD* size and xy-coordinates, are displayed in a defect map, defect table and defect size histogram, providing a quick overview.



Conclusion

Pollux is a unique tool, offering objective evaluation data for the pass/fail decision of lithographic photomasks. Its low cost-of-ownership, small footprint and high speed make it an ideal solution for 100% inspection of all photomasks in a LCD / AMOLED fab, thus enabling process optimization and yield enhancement wherever photomasks are processed.

Technical Data

Reticle Size:	6" or 5" or 3" x 5" reticle (different system versions)
Detectability:	> 10 µm (ESD*)
Repeatability:	Particles 10...20 µm (ESD*) ≥ 90% Particles > 20 µm (ESD*) ≥ 98%
Threshold:	Adjustable by customer according to the minimum size of particles of interest
Av. Cycle Time:	≈ 45...85 s
Autofocus:	for Frame Height Detection

* ESD: Equivalent Sphere Diameter

User Interface:	User-friendly GUI according to SEMI standards
Communication Interface:	TCP/IP Ethernet-network with Windows DCOM or ActiveX Digital I/O
Cleanroom:	Class 1 compatible
Laser Class:	Class 1 Laser and LED product
Size (LxWxH):	713 mm x 341 mm x 400 mm
System Weight:	approx. 30 kg
Power Supply:	100...240 VAC, 50...60 Hz, 115 VA
Electro Static Discharge safe	
CE Conformity	
Plug and Play	

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