Brochure

KLA

Surfscan® SP2 / SP2^{XP}

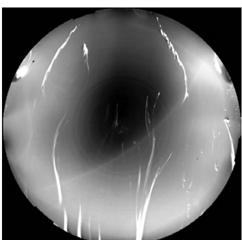
Unpatterned Wafer Defect Inspection Systems

The Surfscan® SP2 and SP2^{XP} systems are the 2nd generation of KLA's revolutionary Surfscan SP1 platform for unpatterned wafer inspection. Incorporating revolutionary ultraviolet (UV) laser technology, new darkfield optics and advanced algorithms, the Surfscan SP2 finds defects as small as 37nm, and throughputs up to 2x faster than the prior-generation tool at the same sensitivity. Designed for emerging technologies such as RF, automotive, SiC, GaN, LED and mature process nodes to the ≥4xnm design rule, the SP2 facilitates the qualification and monitoring of processes and tools required by substrate, IC, equipment and materials manufacturers across the semiconductor ecosystem.

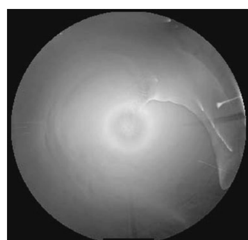
The Surfscan series unpatterned inspectors are designed to capture and classify critical defects in real-time on bare wafers, smooth & rough films and stacks, photoresists and litho stacks. By discovering and identifying critical defects and surface quality issues early on, the Surfscan tools enable faster identification of process and tool issues, driving faster ramp, higher yield and improved profitability. The SP2 Pro series tools satisfy R&D pathfinding applications and are equally suited to provide critical tool monitoring inspection points in a full manufacturing environment, all in a single tool.

- **Normal and Oblique illumination modes** provide a variety of methods to capture a wide range of defects and characterization of wafer quality
- **Multiple spot / throughput / sensitivity modes** to optimize the best performance required for each application
- Silicon based tool qualifications and process monitoring for >37nm sensitivities in 200mm/300mm wafer formats
- High sensitivity mode extends capabilities for R&D applications
- **SURFimage™** data channel enables identification of spatially extended surface anomalies, such as local variations in surface micro-roughness, in a full wafer map image.
- Product manufacturing restarted for increased serviceability and predictability of supply
- Standardized handler for flexible configurations

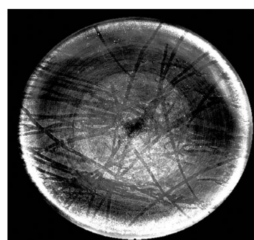
SURFimage Application Examples



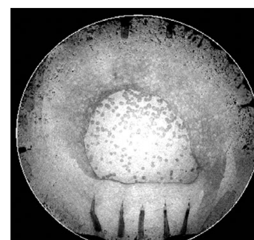
Wet clean residue



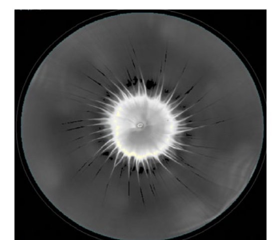
Cu ECD Swirl



Slurry residue

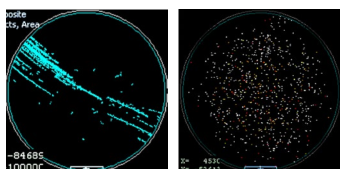


Bad polish



Cleaning damage

Defect Sensitivity

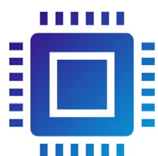


Normal illumination (left) and Oblique illumination (right) may be combined into a single recipe

- **Dual Scan** is a single recipe option to inspect wafers using both Oblique Illumination for particle detection and **Normal** Illumination for mechanical scratch and slip detection and automatically combine all results in a single wafer map/results file (SP2^{XP} only)
- **Brightfield Differential Interference Contrast (BF-DIC)** improves capture of defects with surface height changes (SP2^{XP} only)
- **Defect & SURFimage** results can be combined into a single map output
- **eXtended Film Sensitivity (XFS) masks** helps maximize defect detection on polysilicon, tungsten, and copper (upgrade option)

Productivity

- **Throughput** increased at sensitivities beyond those achievable by visible wavelength inspection tools allow for increased sampling and lower CoO
- **Coordinate Accuracy** improved for darkfield defects allows easy review on SEMs to enable faster problem identification and root cause determination.
- **Extended Dynamic Range (EDR) and Rule Based Binning (RBB)** improve defect separation for easier classification (SP2^{XP} only)
- **Solid State Laser** provides longer life with less need for service
- **KLA Ecosystem** compatibility with Klarity + eDR SEM review
- **Full Factory Automation** meets SEMI Standards

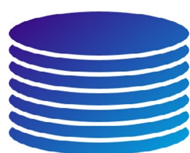


Device Manufacturers Choice for Automotive, RF, & μLED

- Measure at critical process inspection points to monitor and control process tools
- Flexible optical configurations accommodates a wide range process conditions
- 200mm or 300mm wafer diameter capable

Substrate Manufacturing for Bare Si, SOI, & Epi

- Industry standard for wafer qualification – wafer manufacturer OQC and wafer fab IQC
- Capable of measuring 200mm substrates up to 1500μm thickness and up to 75μm warp
- Onboard grading capability with up to 4 x 200mm load port sorting stations



Materials and Equipment Manufacturing

- Industry standard for process tool qualification
- Inspection can be optimized for Epi GaN-on-Si, AlN, and other exotic films
- High sensitivity mode extends capabilities for R&D

KLA SUPPORT

Maintaining system productivity is an integral part of KLA's yield optimization solution. Efforts in this area include system maintenance, global supply chain management, cost reduction and obsolescence mitigation, system relocation, performance and productivity enhancements, and certified tool resale.

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