Full Wafer Submicron Defect Detection Systems

Polishing and Grinding Marks

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• Dimples and depressed areas show up as bright spots

• Mounds and raised areas show up as dark spots
Optical Technique

- Halogen Lamp with Band-Pass Filter
- Series of Lenses Create Broad Beam Collimated Light Column
- Parallel Rays of Light Reflect Perpendicular to the Polished Surface – Min. 3% reflectivity required
- Reflected Rays Projected onto De-focused CCD Detector.
Magic Mirror™ Method

**Magic Mirror™ Optical Imaging Principle**
Reflected image resulting from concavity

**Magic Mirror™ Optics Schematic**

- **Light Source**
- **Optical Module**
- **Collimator**
- **Projection Lens**
- **Wafer**
- **CCD Camera**
- **PC Image Processor**
- **Dark**
- **Bright**
- **Reflected Image**
- **Focus**
- **Imaging Plane**
Hologenix YIS-MM-2N Magic Mirror™
2, 3 or 4 Cassette Wafer Surface Inspection Systems

- Automatic Defect Detection with Hologenix ADDS Image Processing Software
- Detection Sensitivity better than 0.05 Micron Depth with <1M-100M Radius of Curvature using the Proprietary Magic Mirror™ Method
- Defect Size Range: 0.4 μm height difference over a 10 mm lateral distance to 0.05 μm over a 0.5 mm lateral distance
- Adjustable Defect Detection and Classification Recipes
- Non-Contact Notch, Flat-Finding and Centering Technology
- 150-200 mm Wafer Inspection
- Throughput: Approx. 150 Wafers per Hour
- 2, 3 or 4 cassettes or SMIF pods. The -2N model # is for 2 open cassettes
- Class 1 Clean Room Compatible
- Windows 10 Environment
- Standalone Sorter Capability with optional OCR

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• High Resolution Camera and Optical Components – 5 MegaPixel Camera

• IR (Infrared) Camera and Optics

• Long Focal Length Version – Greater Detection Capability for Shallow Defects

• Computer Controlled Optical Settings

• Latest Automation Capabilities – Edge handling, Wafer Sorting
Optics are controlled via a Software Interface:
- Brightness
- Sensitivity

Settings can be stored in a recipe and easily recalled

No operator involvement needed.
200mm or 300m Magic Mirror™ YIS-200SP or YIS-300SP
Defect Detection System – Manual System

- Detection Sensitivity better than 0.05 Micron Depth
- Full View and 3.5X Zoom
- 200SP – Up to 200 mm Wafer Sizes
- 300SP – Up to 300mm Wafer Sizes
- Computer Controlled Sensitivity
- Computer Controlled Intensity
- Manual Loading
- Rotating Wafer Chuck
- Broad Beam Illumination with Narrow Band-Pass Filtered White Lamp
- Defect Detection and Image Enhancement Software

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300mm Magic Mirror™ YIS-300SP-2
Automated Defect Detection System

- Detection Sensitivity better than 0.05 Microns Depth
- 13 or 25 Wafer Capacity FOUP or Open Cassette
- Class 0.1 Mini-Environment
- 200-300 mm Wafer Sizes
- Edge Grip Wafer Handling
- Non-contact Notch Finder & Aligner
- SECS II - GEM
- Optional OCR
- Windows 10 Based Defect Detection Software - ADDS
Automatic Defect Classification

Dimples, Mounds, Flaws, Flares, Edge Dimples, etc.

[Image of a software interface with inspection parameters for defect classification, including options for detection, analysis, and preprocessing.]
The Magic Mirror™ is useful for detecting problems with many types of wafer processes:

- Polishing
- Epitaxy
- Oxidation, Diffusion, CVD
- Post Implant Annealing, RTP
- CMP
- SOI
Polishing Scratches
Dimples – Example 1
Dimples – Example 2
Dimples and Wax Defects
Polishing Defects
Slip
Slip at 3.5X Zoom
Back-Side Grinding
Back-Side Grinding
Good Wafer