Measuring Tasks

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Multi-Sensor Measurement for Highest Metrology Flexibility

The MicroProf® FS is a fully automated wafer metrology tool, configurable for a wide range of applications in the wafer foundry, using both – standard and customized solutions. With its huge universality, MicroProf® FS becomes a real “Jack of all Trades” in any state-of-the-art foundry’s shop floor. This is why we call it the Foundry Star!

Flexibility and versatility are keywords when it comes to metrology solutions for nowadays silicon foundry applications. MicroProf® FS provides a modular approach to create a fully automated multi-sensor tool that can solve all the required measurement tasks.

For its core component, the metrology part, a well proven MicroProf® 300 multi-sensor metrology tool is used to allow both, the measurement of different products and – by using a hybrid metrology concept – to enhance the precision of measurements on samples where a single sensor or measuring principle is just not enough.

The measurement system of the MicroProf® FS is equipped with a granite base setup, with a three point sample fixture or a vacuum chuck.

Handling Capability of Various Substrate Types

Also on the automation part, flexibility is written in capital letters. The included robot handling unit can be configured for 300 mm, 200 mm, and 150 mm wafers, both exclusive or as a bridge tool allowing the handling of two wafer sizes within one system. Moreover, it can be also configured for the handling of non SEMI-standard wafers, such as highly warped wafers or thin wafers. The handling unit features a single arm robot with end-effector, two load ports including mapper and RFID reader, pre-aligner and if needed OCR reader stations. The MicroProf® FS is equipped with filter fan units (FFU) providing ISO class 3 clean room conditions within the tool.
POWERFUL SOFTWARE FOR FULLY AUTOMATED WAFER METROLOGY

The tool is run by the SEMI-compliant FRT Acquire Automation XT software. This software allows recipe based measurement and data analysis of structured and unstructured wafers. Choose the suitable measurement and evaluation routine for your measuring task from a variety of packages.

For recurring structures, a layout wizard with a graphical user interface (GUI) can support you in teaching the measuring positions. In addition, fine sample alignment via pattern recognition is available as an option.

This software provides comprehensive capabilities, from manual measurement on the device to fully automated measurement with one-button operation and integration into production control systems, e.g. via a SECS/GEM interface. You can easily configure various measurement tasks using different sensors to run consecutively as a measurement sequence. This includes the execution of measurements, processing and analysis using intelligent algorithms, output and visualization of results in the form of reports and the export of results in various data formats.

### Typical Applications

**MicroProf® FS**

- coated wafers
- structured wafers at various lithographic process steps, measurement of conductor tracks, bumps, etc.
- MEMS product wafers featuring acceleration sensors, pressure sensors, micro optics, etc.
- wafers at different 3D packaging process steps, e.g. with through silicon vias or trenches after etching
- thin film layer stacks

### Capabilities

- Automated hybrid metrology
- Measurement of wafer geometry
- Nanotopography
- Roughness / waviness
- Film thickness / layer stack
- Flatness
- Roll-off amount
- Topography
- Wafer taper
- Stress

**Measurement software**

- Analysis software FRT Mark III
- (standard or customized)

**SoftWare**

- Additional packages (if needed):
  - Measurement of bump dimensions and coplanarity
  - SEMI-compliant measurement of wafer taper
  - SEMI-compliant measurement of roll-off amount
  - Standard topography measurement
  - Topography measurement on both wafer surfaces, simultaneously
  - Measurement of wafer stress e.g. induced by layer deposition

**Post processing**

- Calculation of sample properties using individual results generated by different sensors/measurement principles

**FR T Acquire Automation XT**

- FRT Acquire Automation XT
- Automated measurement process sequence
CONFIGURE YOUR MICROPROF® FS

**METROLOGY UNIT**

- MicroProf® 300
- Chromatic point sensors FRT CWL
- TTV Setup
- Film thickness sensor FRT CWL FT/IRT
- Thin film sensor FRT FTR
- Chromatic line sensor FRT SLS
- Confocal microscope FRT CFM/CFM DT
- White light interferometer FRT WLI FL/WLI PL
- Standard positioning camera with illumination
- High resolution camera with illumination
- Brightfield IR illumination + IR camera for inspection
- Pattern recognition software
- 3-point fixture for 1 or 2 wafer sizes
- Fully supporting wafer fixture with vacuum for one or two wafer sizes
- Thermo unit (controlled hot & cold chuck)

**WAFER HANDLING UNIT**

- Single arm robot unit
- Pre-aligner
- 2 load ports for open cassette SEMI-standard
  - for 150 mm (6 inch) wafers
  - for 200 mm (8 inch) wafers
  - for 300 mm (12 inch) wafers
- Bridge tool option
- RFID reader
- Vacuum end-effector handling
- Edge grip handling
- Handling of warped wafers (e.g. eWLB)
- Bernoulli-handling (non-contact)
- OCR reader (front/back)
- Ionizer bar

**EFEM ENCLOSURE**

- ISO Class 3 clean room conformal housing
- 2 filter fan units, one for handling and one for metrology area

**SOFTWARE**

- FRT Acquire Automation XT incl. one evaluation package + additional packages (if needed):
  - Step Height and Film Thickness
  - TTV, Bow, Warp
  - Bumps
  - Wafer Geometry
  - Roughness and Waviness
  - Saw Marks
  - Customized Evaluation Package
  - Nanotopography
- SECS/GEM Interface (standard or customized)
- Analysis software FRT Mark III
- Measurement software FRT Acquire

Questions? Talk to an expert!

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