

PLu

4300

SENSOFAR®

## High-end 3D Optical Profiler

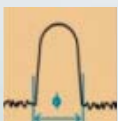
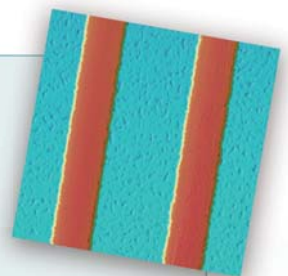
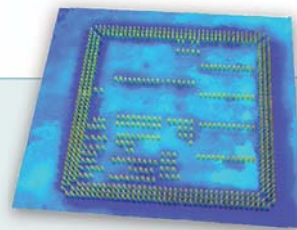
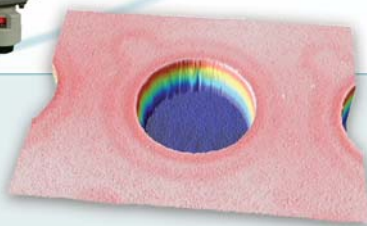
High Resolution Thin Film Metrology



## IC Packaging Solution

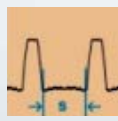
- Fast and accurate non-contact 3D inspection
- Fully automated acquisition and pass/fail reporting
- High throughput for in-line process monitoring
- Large sample size: 610 x 610 mm

Monitoring of back-end IC packaging manufacturing is a key aspect of quality assessment of the full IC production process. The complex structures found in leading-edge flip chip technology require the use of 3D non-contact metrology tools. Sensofar provides a complete solution for IC packaging 3D metrology. This solution is based on the well-proven **PLu 4300** optical profiler.



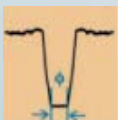
### ■ BGA

- Number of balls
- Position, height and diameter of each ball
- Flip chip coplanarity



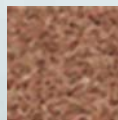
### ■ Traces

- Trace height
- Trace and space width
- Trace and space roughness



### ■ Via and SR open

- Top and bottom diameter
- Via ellipticity and height
- Top surface and bottom Via/SR roughness



### ■ Others

- Anchor

The 4300 sensorhead is an optical 3D profiler based on white-light interferometry and PSI technologies. It provides accurate and fast measurements of the microstructure and nanostructure of samples. It is based on a dual Z scanner (an on-axis piezo and a motorized stage) and can measure samples from the micron range to several millimeters with accuracy better than 1% and repeatability up to 0.1%. The use of blue LED provides high lateral resolution and proper illumination for PSI, while a white LED is used for white-light interferometry.

The **PLu 4300** is the ideal sensorhead for back-end process monitoring.

## Gantry-based XY stage

A gantry granite XY stage can accommodate the large samples used in IC packaging. This stage is based on a granite platform and can handle samples up to 610 x 610 mm.

Multiple and interchangeable fixtures and holders enable a wide range of samples to be inspected: from large panels (like PCBs) to several individual, finished flip chips. A simple loading/unloading mechanism allows fast fixture change, which maximizes throughput.



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### SENSOPRO

Sensofar also provides a complete software solution for this application. The **SensoPRO** software suite is used to fully automate the monitoring of the production process. It enables the 3D data acquisition parameters to be adjusted and automatic pass/fail reporting to be undertaken.

**SensoPRO** interacts with **SensoSCAN** to load and execute an acquisition recipe. It also performs an online data analysis. Thus, it provides fast and reliable statistics on the quality of the production process.

**SensoPRO** also controls the external devices that are used to handle the samples, such as wafer loaders or SCARA robots, using the industry standard SECS protocol.

Plug-in based data analysis algorithms provide a high degree of flexibility. Current capabilities incorporated in the IC packaging module include BGA bump, Via, copper traces, solder resistance (SR) and anchor critical dimension (CD) analysis. New modules can be easily customized to other needs.

This powerful software solution is easy for a system supervisor to set up, as the user interface is simple. Only the acquisition recipe, the type of analysis and the tolerance limits for the current lot are needed to define the operation. Once it is configured, a simple, guided step-by-step operation user interface allows operators with no expert skills to use the system.

## Performance

**3D Profiling Techniques:** PSI, ePSI and VSI

**Objectives:** 2.5X, 5X, 10X, 20X, 50X and 100X

**Field of View:** from 5.0 x 3.8 mm to 0.06 x 0.045 mm

**Field Lens:** fixed 0.5X or 1X lens

**Measurement Array:** 768 x 576

**Light Source:** Blue LED (460 nm) and White LED

**Z Axis Measuring Range:** up to 10 mm

**Z Axis Range:** 50 mm

**Height Repeatability:** 0.1 nm (0.03 nm with optional Piezo)

**Scan Speed:** from 3 to 15  $\mu\text{m/s}$

**Step Height Accuracy:** <0.8%

**Step Height Repeatability:** <0.1%

**Thin Film Thickness Resolution:** 0.1 nm

**Thin Film Thickness Repeatability:** 0.3 nm

**Smallest Spot Size for Thin Film Thickness:** 7  $\mu\text{m}$

## System

**XY Stages:** 100x75, 150x150, 250x200, 300x300 and 610x610mm.

Larger XY Stages available on request

**Computer System:** Latest Intel-based computer

**Software:** SensoSCAN. SensoMAP and SensoPRO optional

**Vibration Isolation**

## Power Requirements

**Input Voltage:** 110/220Vac, single phase 50/60Hz

## Environment

**Temperature Range:** 20 +/- 2 degree °C

**Humidity Range:** 50 +/- 5% RH

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