Toho Technology

FLX 3300-T

THERMAL
Stress Measurement

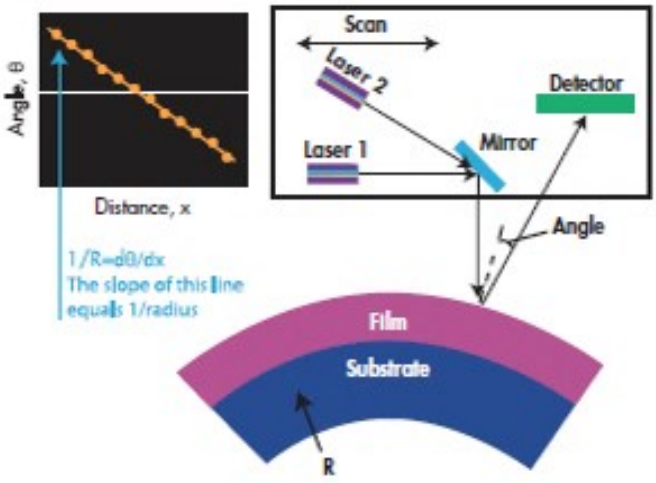
Toho FLX-3300-T Thin Film Stress Measurement Systems offer industry standard capabilities for mass production and research facilities that demand accurate stress measurements on various films and substrates up to 300mm. Incorporating KLA-Tencor's patented "Dual Wavelength" technology, Toho FLX Series tools determine and analyze surface stress caused by deposited thin films. The Toho FLX systems offer outstanding value in a variety of comprehensive Stress Measurement Solutions that utilize advanced measurement principles.

Standard Features

Comprehensive Data Analysis
Intuitive Windows 7 based analysis software displays any combination of stress, time, surface deflection, or reflected light intensity measurements.

- Calculation of biaxial modulus of elasticity, linear expansion coefficient, stress uniformity, and file subtraction
- Trend plotting for Statistical Process Control (SPC)
- Calculation of water diffusion coefficient in dielectric films
- Automatic recalculation of stress when film or substrate thickness is corrected
- 2-D and 3-D views of wafer topography
- Plotting of the measured stress-temperature curve

Advanced Laser Technology
The FLX series features KLA-Tencor's patented dual wavelength technology, which enables the system to select the wavelength most suitable for challenging films such as silicon nitride. Only one moving element in the optical component ensures low vibration and high accuracy.



FLX stress measurement systems use the laser lever technique to measure changes in pre and post deposition surface radii and then correlate these measurements into a stress value.

Applications

In general, stress is induced when materials of dissimilar coefficients of thermal expansion are bonded together. Films may behave similarly at high temperatures but as films are cooled, materials may contract/expand differently, thus causing stress in the film. With a stressed film, defects such as dislocations, voids, and cracking may occur. The FLX stress measurement system helps troubleshoot applications listed below:

- Aluminum stress-induced voids
- Passivation cracking (nitride/oxide)
- Stress-induced dislocations in Si
- Tungsten Silicide cracking
- Stress increase in oxides during temperature cycling
- Matching metallization expansion on GaAs
- Si cracking due to high film stress

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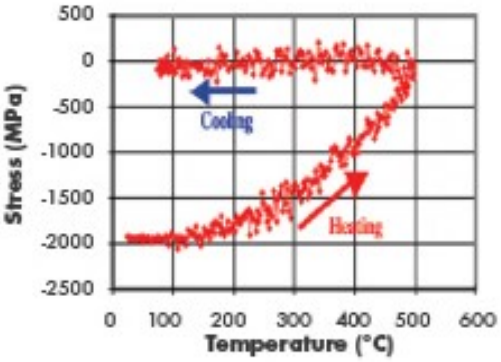
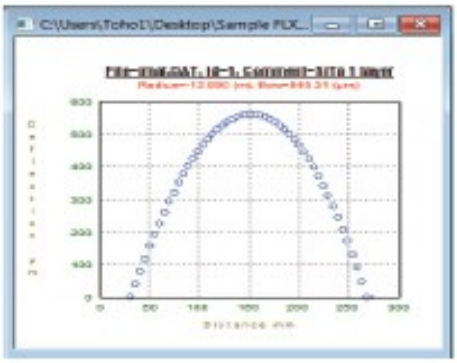
Temperature measurements are essential for characterizing material properties such as stress relaxation, moisture evolution, and phase changes. Specifically designed for thermal stress applications, the 3300-T is ideal for stress temperature correlations.

Capable of In-situ stress measurements from -65°C to 500°C with heating rates up to 30°C per minute. The cooling unit which uses LN2 to -65°C is optional.

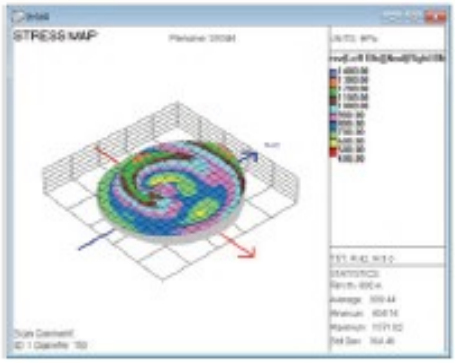
Fully Programmable Temperature Steps



Stress Temperature Graph



Deflection Over Distance Graph



3-D Stress Map

Specifications

Performance

Scan Range	Programmable up to 300mm
Measurement Range	1 to 3,500MPa[1]
Repeatability	1.3MPa[2]
Accuracy	Less than 2.5% or 1 MPa *(whichever is larger)*
Minimim Radius	2.0m
Maximum Radius	33km
Wafer Sizes (mm)	100, 150, 200, 300mm
Minimum Scan Step	0.02mm
Compliance	Class IIIa 670nm / 780nm 4mW lasers compliant with 21CFR, Chapter 1 Subchapter J

Notes:
[1]725µm wafer thickness for 10,000Å thin film
[2](1s): 1 x 10^7 dyne/cm^2

U.S. Patent Nos 5134303 and 5248889

Options

- 3D Analysis Software
- Calibration Mirror Standards
- Calibration Wafer Standards
- Sub Ambient (-65°C) capability
- Substrate Adaptor Rings
  100mm to 200mm
- Gas Panel with all flow meters and pressure gauges
- Offline Software

Computer Specifications

Win 7 OS, Intel Core i3 2.66 GHz, 2GB RAM, 500 GB HD, USB port, DVD-RW optical drive

Specifications subject to change.

KLA-Tencor *The Toho FLX Series incorporates the original KLA-Tencor design and patents.*