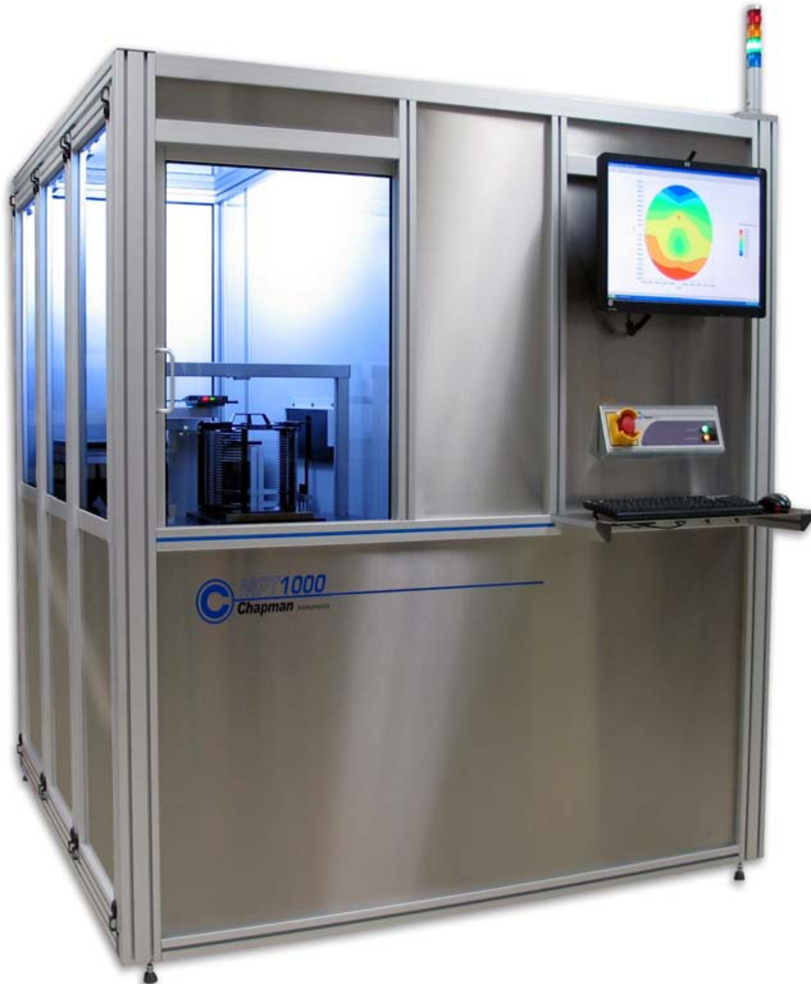
Wafer Thickness

MPT1000 Non-Contact Thickness Measurement System



The Complete Solution for Advanced Wafer Metrology

The Chapman MPT1000 utilizes a sophisticated dual non-contact measurement technology to measure such wafer geometry parameters as thickness, shape and flatness. The system is available in a fully automated, semi-automated and manual configuration. When equipped with the optional edge chip and crack module and the surface roughness module the MPT1000 is the most complete solution for advanced wafer metrology.

Measurements

- Wafer Thickness
- Total Thickness Variation (TTV)
- Bow
- Warp
- Tape Thickness
- Surface Roughness (Optional)
- Edge Chip and Edge Crack (Optional)

Features

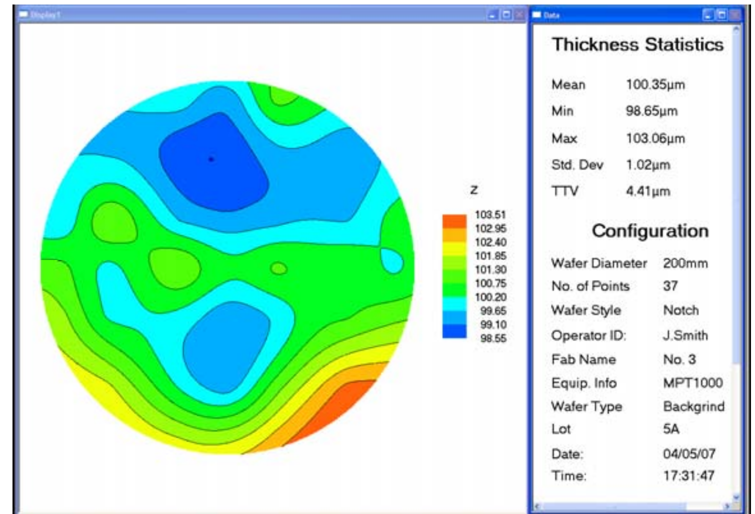
- 3D mapping of thickness and shape
- Surface roughness module optional
- Edge inspection module optional
- Measures Si, Ge, InP, GaAs, Glass
- Bare, patterned and bumped wafers
- Wafers in Film Frame
- Available manual or automated

Advantages

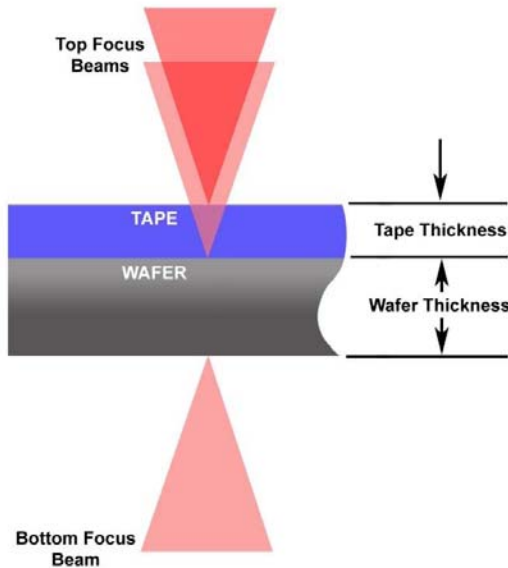
- Non-contact full wafer scanning
- Measures independent of material
- Small laser spot size
- "All in one" system measurements
- Measures all tape configurations (clear or opaque)
- Superior accuracy and repeatability
- High Throughput
- Ability to measure different wafer thicknesses including wafers less than 100 um

Chapman Instruments

Chapman Instruments non contact measurement system utilizes two focused laser beams, on the top and the bottom of the sample. The focus position of each beam is measured independently by using a confocal optical principle and an accurate positional response system. Both wafer surface and tape, or other material structures can be measured from the focused beam position at each surface interface.



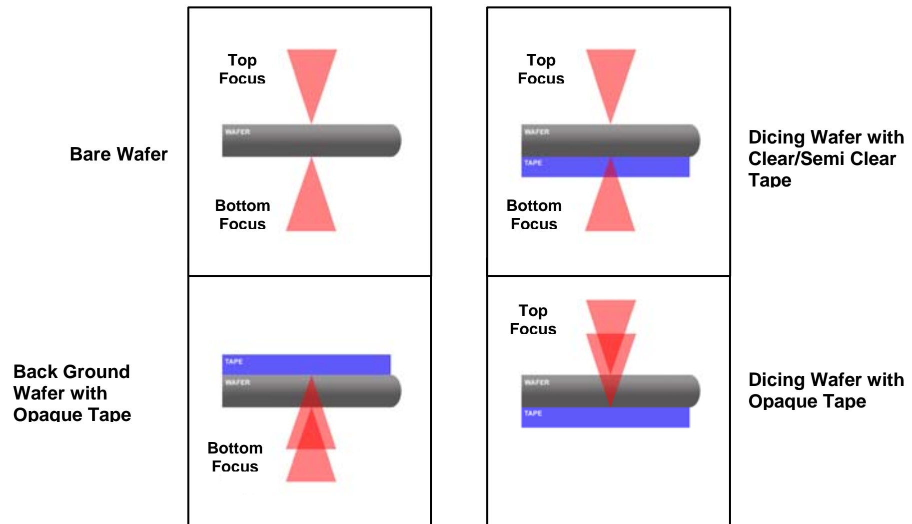
Thickness Measurement Report
100 um Wafer



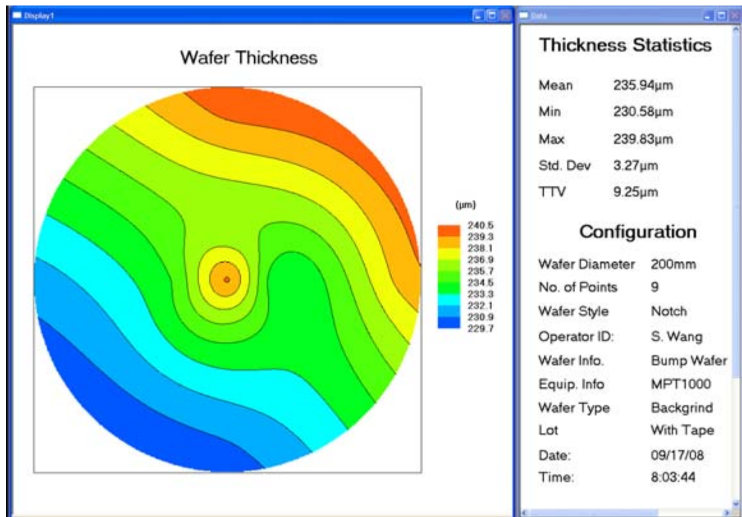
The diagram on the left demonstrates the measurement system principal. The figure displays two beams, one focused on the top and the other on the bottom of the sample. The top beam is shown at two positions, one on the top of the tape and the other at the top of the wafer surface. The measurement is made by moving the focus position form the top of the tape to top of the wafer.

The dual optical measurement system provides accurate wafer thickness measurements independent of material properties, especially useful for patterned wafers, bumped wafers, GaAs and other wafer types, after back grinding and dicing.

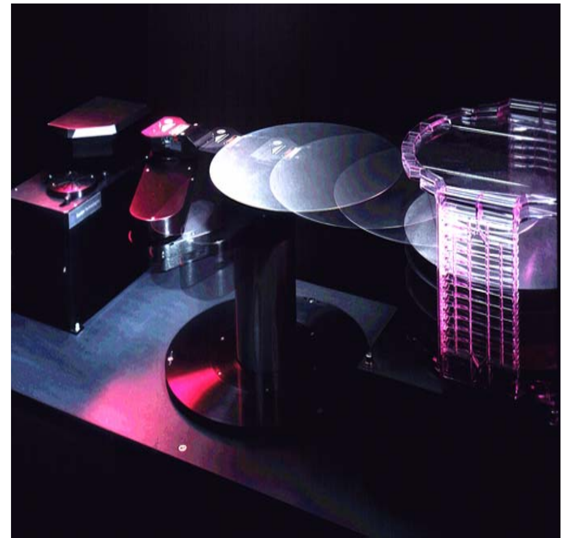
The patented dual laser configuration allows the system to measure any wafer configuration - bare, patterned or bumped – or wafer on tape (film frame) configuration – clear or opaque tape.



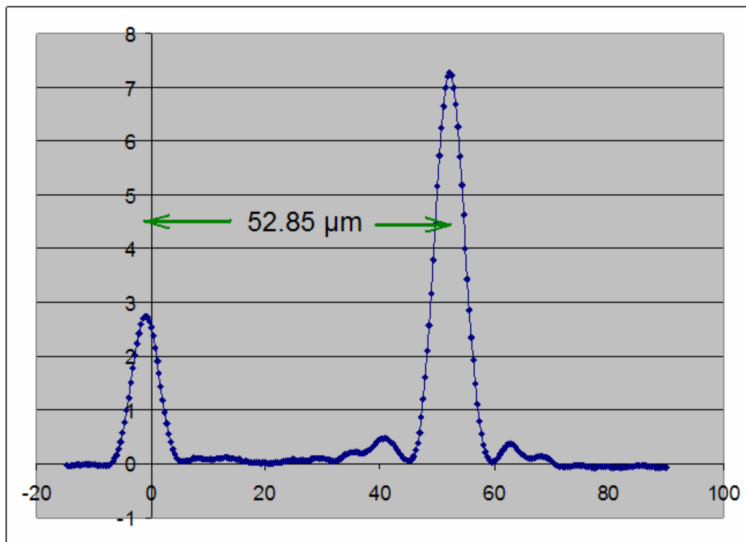
Sample Wafer Configurations for
Wafer Thickness Measurements



Thickness Measurement Report
235 um Bumped Wafer

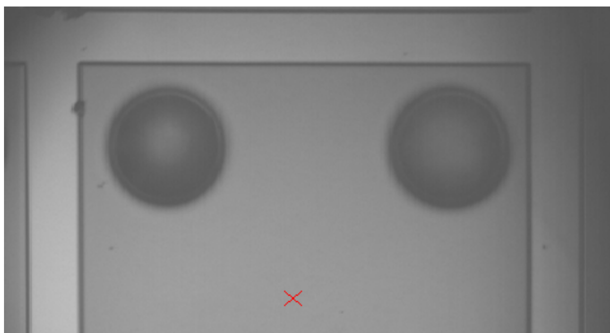


Robotic Handling System
Available in Automated, Semi-automated and Manual Configurations



Glass in Focus

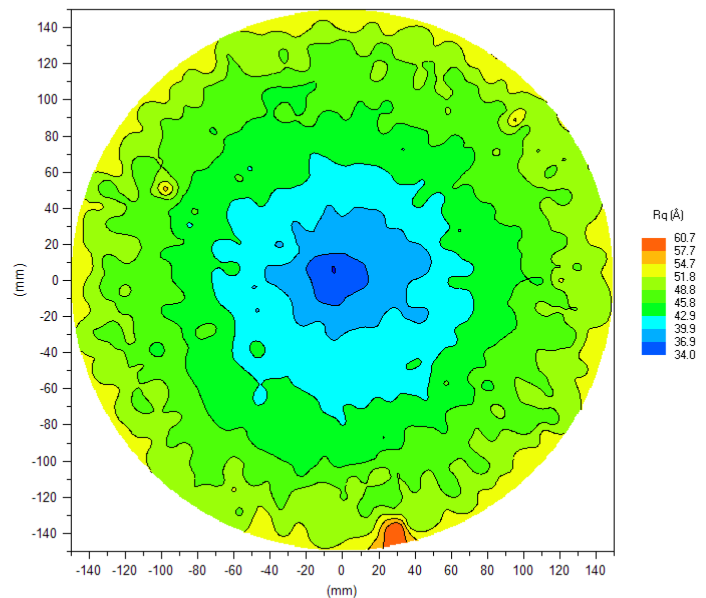
Wafer in Focus



Wafer Bumps as Viewed by System Microscope

The diagram on the left graphs the laser focused on a glass surface and the wafer surface. The difference in the "in-focus" locations equals the thickness of the glass.

With the available edge chip and crack module and the surface roughness module the MPT1000 becomes the complete solution for advanced wafer metrology.



Surface Roughness Report (Ra)

Measurement Specifications

Thickness	Accuracy[2]	0.15µm
(ASTM F533)	Repeatability[1,3]	0.10µm
	Range	30µm-10mm

System Specifications

Configuration	Manual, Semi or Auto
Sensor	Dual Confocal
Resolution	0.1µm
Spatial Resolution	1.0µm
Safety	SEMI S2/S8
Laser System	CDRH Class 1

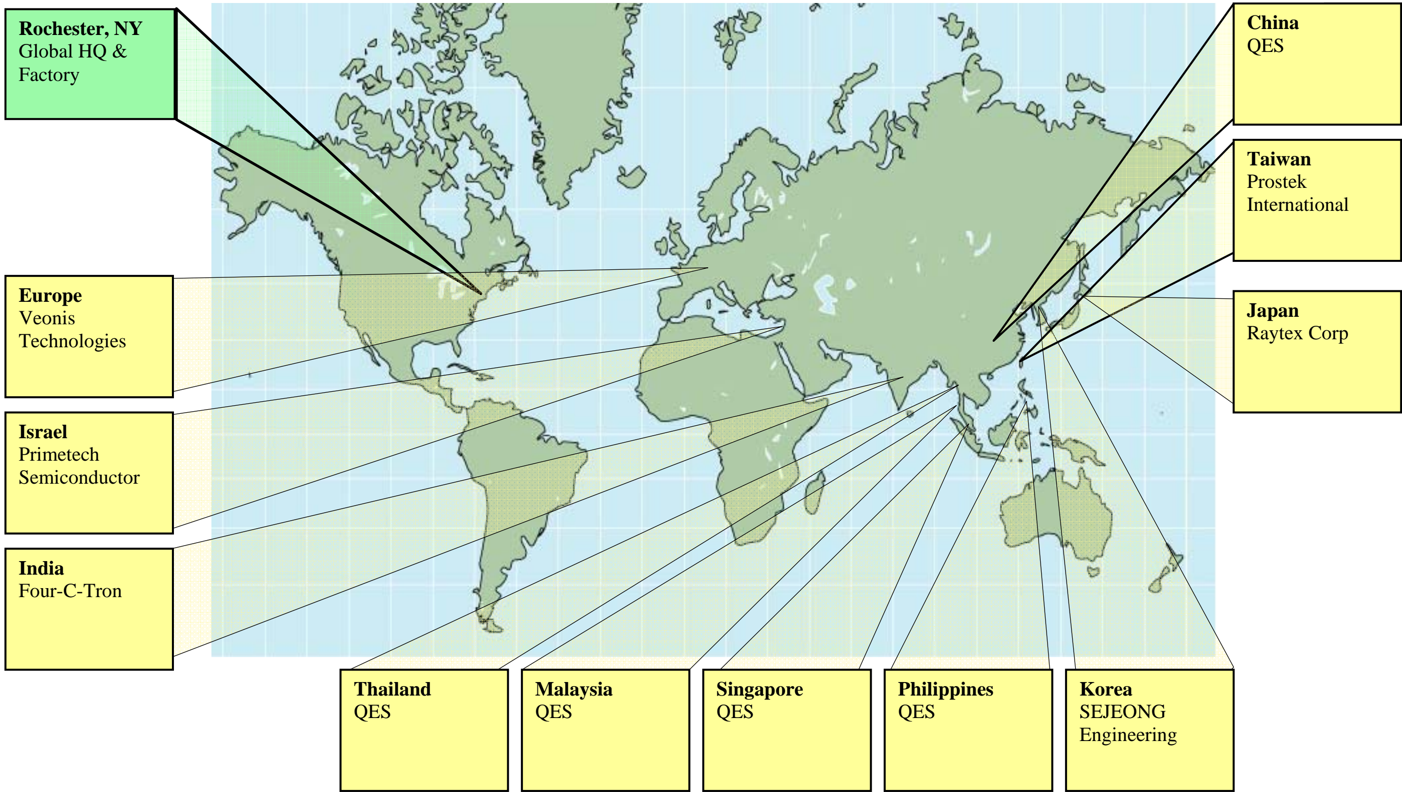
Wafer Specifications

Wafer Size	50mm to 300mm
Wafer Mounting	Bare Wafer or Film Frame
Materials	Silicon, Sapphire, Gallium Arsenide, Glass
Surfaces	As cut, Lapped, Polished, Patterned, Bumped
Flat/Notch	All Semi Standard
Conductivity	P or N Type

1 - Bare wafer 100 um 2 – Utilizing a NIST traceable device 3 – 1 sigma for 10 wafer runs

All technical specifications are subject to change without notification. In the event of a conflict, specification contained in the Chapman Instruments Technical Specification document will supersede those contained herein.

World Wide Sales, Service and Support



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