

Wafer Measurement Systems
for Semiconducting, Semi-insulating
and PV (Solar) Wafers

Proforma™ SERIES

Affordable Wafer
Characterization Tools
for Process Development,
Production and
Quality Control



Proforma™ 300 – Manual Measurement Tool

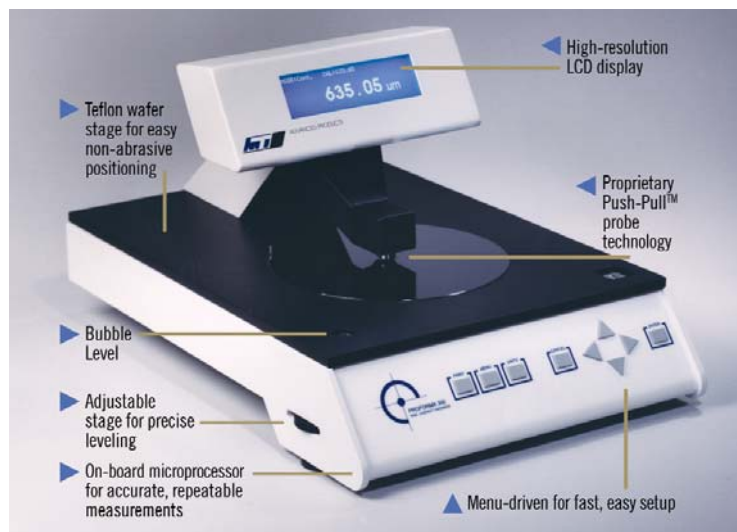
Fast, accurate, and reliable, the Proforma™ 300 measures wafers up to 300 mm in diameter for thickness, total thickness variation (TTV) and bow. Thickness, TTV and bow values are obtained by placing the wafer between MTII's proprietary non-contact capacitance probes. The Teflon coated wafer stage allows for easy, non-abrasive positioning of the wafer, while removable locating pins can be utilized for precise centering of the wafer.

Measurement results are shown on the high resolution LCD display. An RS-232 port is provided for output to a personal computer for complete monitoring and control.

Portable and easy to set up, the Proforma™ 300 provides the user precise non-contact measurements at critical points throughout the wafer manufacturing process.

The Proforma™ 300 is completely menu-driven. The on-board intelligence provides fast, accurate, repeatable measurements for all types of wafer materials. Maximum measurement range or maximum probe/wafer stand-off distance can also be adjusted to meet your specific requirements.

Optional wafer rings can be provided to elevate 3", 4", 5", 6" and 8" wafer off the Teflon table. This not only allows for measurement of bow but also eliminates contact between the wafer and table, providing additional wafer protection. Wafers mounted to back grind tape or a variety of other carriers can be measured using MTII's exclusive calibration routine, a process that takes less than 15 seconds.



Features

- 50-300 mm wafer diameters
- High-resolution LCD display
- Menu-driven for fast, easy setup
- 5-point, TTV and bow measurements
- RS-232 computer interface
- English and metric units
- Remote operation and monitoring
- Teflon wafer stage
- On-board microprocessor
- Up to 1700um measurement range

Proforma™ 200SA/300SA – Semi-automated Measurement Tools

The Proforma™ 200SA and 300SA deliver fast, full surface scanning of both semiconducting and semi-insulating wafers. Wafers are manually loaded onto the automated wafer stage and measured at the click of a button. Capable of measuring thickness, TTV, bow, warp and site and global flatness, the Proforma™

200/300 SA series is ideal for process development and process monitoring during wafer thinning applications. The quick and easy to use Windows®-based control

system performs complex data analysis and provides output in tabular and 3-D graphical formats which can be exported to spreadsheet and word processing programs.

Able to measure as-cut, lapped, etched, polished or patterned wafers, the Proforma™ 200SA and Proforma™ 300SA provide fast, accurate information about your process.

Customized data reporting, multi-format data export and full network capability allows easy access to your process information from anywhere on your network.



The systems come preset for SEMI standard wafer diameters, with the ability to add custom wafer diameters if required. Each measurement and system parameter is selected from the user-friendly software interface. Parameters can be modified and data recalculated without the need to rescan the wafer, allowing “what-if” engineering analysis.

In addition to the powerful measurement capabilities of the standard system, an optional software package can be added for determination of wafer stress. Based on Stoney's equation, the system can calculate the stress induced on the wafer after

deposition or processing.

For offline, remote data analysis and machine set-up, MTII offers the powerful DataTools software package.



This Windows®-based program adds the ability to view data at any computer across your network, upload measurement recipes to the system, and recalculate data based on changed measurement parameters.

Features

- Non-contact full wafer scanning
- 75 mm to 300 mm wafer compatible
- 3-D mapping of thickness and shape
- Measures semiconducting and semi-insulating wafers
- Standard Windows® based user interface
- Powerful software and graphics package
- Customized data reporting
- Upgradeable to fully automated system
- Up to 1700 um measurement range
- Remote data analysis and recipe creation

PV-1000 Measurement Module

Outstanding accuracy, repeatability and stability are the hallmarks of MTI Instruments' non-contact measurement systems. The new PV-1000 series brings our 40+ years of precision measurement experience to a line of products specifically for the photovoltaic industry. Ideal for both process development and production environments, the PV-1000 solar wafer measurement system fits anywhere on the production line. Its modular design offers expandability to meet your current and future measurement requirements.

The PV-1000 Advantage

Using MTI's exclusive Push/Pull™ capacitance probe technology, each PV-1000 module provides up to three pairs of probes for measurement of maximum, minimum and average thickness, as well as total thickness variation (TTV) and wafer bow. For applications requiring additional thickness channels, multiple PV-1000 modules can be chained together for unlimited line scans on the wafer.

Integrated data acquisition and control electronics analyze and transmit wafer data via the on-board

Ethernet port at speeds of up to seven wafers per second. The digital I/O port allows communication with wafer handling equipment for up to 64 classes of wafer sorting and binning. Remote monitoring capabilities allow you to see your production line data across your network or directly at the module.

Complete System Integration

Each PV-1000 module comes with a software package for easy integration into your existing production line. Our Windows® based interface package allows for quick set-up, calibration and data monitoring at the module or across your Ethernet network. Multiple PV-1000 modules can be monitored from a single location using standard TCP/IP protocols.

For users who want to integrate the PV-1000 into an existing control computer, MTI also supplies a Windows® DLL software package standard with each system. The DLL allows access to every function and measurement performed by the PV-1000.



Features

- Up to three thickness channels per rack
- Exclusive MTI Push/Pull™ probes work with all wafer types
- Min, max, avg and total thickness variation measurements
- Bow measurements (3 probe pairs required)
- Optional sensors for measuring wafer resistivity
- Integrated data acquisition and control electronics
- Fast Ethernet com port - production rates up to 7 wafer per/sec
- Digital I/O for interface with wafer handling equipment
- Windows® based control program - local or remote monitoring
- Windows® based DLL package for integration with control PC's

Performance Specifications

		Proforma™ Series						
		Proforma 300	Extended Range	Proforma 200SA	Extended Range	Proforma 300SA	Extended Range	
Wafer Sizes		50-300mm	50-300mm	75-200mm	75-200mm	150-300mm	150-300mm	
Measurement Range		1mm	1.7mm	1mm	1.7mm	1mm	1.7mm	
Thickness	Accuracy	+/-0.25um	+/-0.5um	+/-0.25um	+/-0.5um	+/-0.25um	+/-0.5um	
	ASTM F533 Repeatability*	0.050um	0.075um	0.050um	0.075um	0.050um	0.075um	
TTV	Accuracy	+/-0.25um	+/-0.50um	+/-0.25um	+/-0.50um	+/-0.25um	+/-0.50um	
	ASTM F533 Repeatability*	0.050um	0.075um	0.050um	0.075um	0.050um	0.075um	
Bow	Range	+/-500um	+/-800um	+/-500um	+/-800um	+/-500um	+/-800um	
	ASTM F534	Accuracy	+/-2.0um	+/-5.0um	+/-2.0um	+/-5.0um	+/-2.0um	+/-5.0um
		Repeatability*	0.750um	0.750um	0.750um	0.750um	0.750um	0.750um
Warp	Range			500um	1500um	500um	1500um	
	ASTM F1390	Accuracy		+/-2.0um	+/-5.0um	+/-2.0um	+/-5.0um	
		Repeatability*			0.750um	0.750um	0.750um	0.750um
Flatness (Global)	Accuracy			+/-0.05um	+/-0.15um	+/-0.05um	+/-0.15um	
	ASTM F1530 Repeatability*			0.030um	0.050um	0.030um	0.050um	
Flatness (Site)**	Accuracy			+/-0.05um	+/-0.15um	+/-0.05um	+/-0.15um	
	ASTM F1530 Repeatability*			0.030um	0.050um	0.030um	0.050um	

		PV 1000 Series	
		Probe 70-ILA	Probe 100-ILA
Measurement Range		1.7mm	2.5mm
Thickness	Accuracy	+/-0.25um	+/-0.25um
	ASTM F533 Repeatability*	0.050um	0.10um
Distance Between Sensors		3.4mm	5.0mm
Measurement Spot Size		8.0mm	12.0mm
Probe Length		10cm	10cm

*Repeatability = 1 Sigma for 10 wafer runs

**Minimum Site Size X, Y = 8mm

Wafer Specifications

Materials	All semiconducting and semi-insulating materials
Surfaces	As-cut, Lapped, Etched, Polished, Patterned
Flat/Notch	All SEMI Standard Flat(s) and Notches
Conductivity	P or N Type
Wafer Mounting	Bare Wafer, Sapphire/Tape Base

MTI also offers custom designed solutions for your semiconductor and photovoltaic process applications

For information on other non-contact products or custom solutions from MTI Instruments, contact us at 1-800-342-2203 or +1-518-218-2550.

MTI Instruments, Inc.
325 Washington Avenue Extension
Albany, NY 12205
PH: +1-518-218-2550
OR USA TOLL FREE: 1-800-342-2203
FX: +1-518-218-2506
EMAIL: sales@mtiinstruments.com
www.mtiinstruments.com

mtiinstruments

A Subsidiary of Mechanical Technology, Inc.

2500/03.11 SCH MT135049 03.11