

Wafer Measurement Systems  
for Semiconducting and  
Semi-insulating Wafers

# Proforma™ SERIES

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

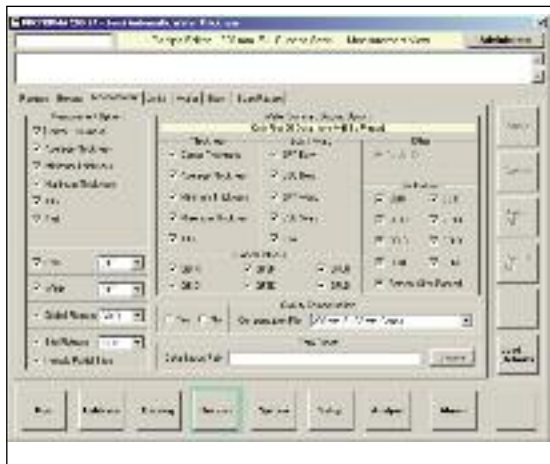


## The Proforma™ Advantage:

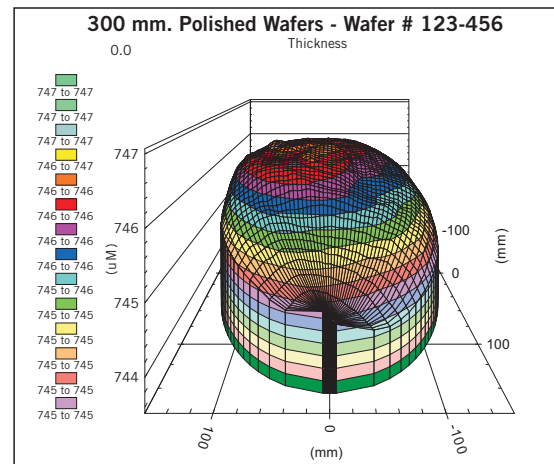
A Complete Suite of Wafer Measurement Tools for All Wafer Sizes and Materials

MTII's Proforma series of wafer metrology tools includes manual, semi-automated and fully automated solutions for your production, process development and quality control measurement applications. Based on MTII's exclusive Push/Pull™ capacitance technology, the Proforma family measures virtually all wafer materials including Si, GaAs, InP and Ge, without recalibrating or electrically grounding the wafer.

Powerful software algorithms determine values such as thickness, TTV, bow, warp and flatness in seconds. In addition, an optional software module is available that calculates stress by determining changes in wafer shape before and after processing. All calculations comply with the latest requirements of ASTM and Semi standards, assuring correlation with other compliant tools.



Windows®-based control software for quick, easy set-up of measurement parameters



3-Dimensional Representation of Wafer Thickness and Shape

## Advantages

- Measures Si, Ge, InP, GaAs without calibration
- MTII's exclusive Push/Pull™ sensing technology
- Outstanding accuracy and repeatability
- SEMI & ASTM compliant measurements
- MS Windows® based software
- Recipe driven software
- Remote monitoring and data analysis
- Systems for 75-300 mm diameters

# 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, while a parallel port provides direct output to a printer.

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.



## 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
- Parallel printer port
- English and metric units
- Remote operation and monitoring
- Teflon wafer stage
- On-board microprocessor

# 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



# AutoScan™ 200/300 – Fully-automated Measurement Tools

The AutoScan 200 and AutoScan 300 are fully automated measurement systems for use in high volume, production environments. Capable of determining thickness, TTV, bow, warp, site and global flatness and resistivity, the AutoScan series utilizes user-defined and ASTM/SEMI scan patterns to generate full 3-dimensional images of 75 to 300 mm diameter wafers.

The AutoScan comes standard with two cassette stands that can be defined as input and/or output stations and is capable of wafer throughputs up to 100 wafers per hour. An additional cassette stand is also available for greater capacity and wafer sorting. The class 10 compatible pick-and-place robotic handling system is equipped with laser cassette scanning for non-contact detection of empty slots, crossovers and broken wafers. The integrated wafer pre-aligner is capable of detecting all SEMI standard notches and flats.



To simplify system service and upgradeability the AutoScan series is designed and manufactured in modules that are quickly and easily installed or replaced, maximizing system uptime.

In addition to the standard equipment, the AutoScan is available with an optional optical character recognition (OCR) module capable of reading all SEMI standard alphanumeric and bar code characters.

An optional wafer resistivity station provides the added capability of non-contact measurement of bulk resistivity. An additional wafer cassette stand is available in place of the resistivity module.

For cleanroom applications, the AutoScan is available with and integrated Ultra-Low Penetration Air (ULPA) filtration module.

Featuring a class 10,000 pre-filter, a Class 10 ULPA filter and a variable-speed blower motor, the filtration module offers 99.999% efficiency for 0.12  $\mu\text{m}$  particles.”

## Features

- Auto calibrates in less than 30 seconds
- Modular design for future upgrades
- Up to 100 wafers/hour throughput
- Integrated PC control
- Enclosed environment for Class 10 compatibility
- SEMI S2 health and safety compliant design
- SEMI S8 ergonomic compliant design
- Optional OCR and resistivity modules
- Integrated wafer pre-aligner
- Casters and leveling feet for portability

## Performance Specifications

		Proforma™ 300	Proforma™ 200SA	Proforma™ 300SA	AutoScan™ 200	AutoScan™ 300
Wafer Sizes		50-300mm	75-200mm	150-300mm	75-200mm	150-300mm
Measurement Range		1mm standard [1.7 mm Extended]	1mm standard [1.7 mm Extended]	1mm standard [1.7 mm Extended]	1mm standard [1.7 mm Extended]	1mm standard [1.7 mm Extended]
Thickness ASTM F533	Accuracy	+/-0.25um	+/-0.25um	+/-0.25um	+/-0.25um	+/-0.25um
	Repeatability*	0.050um	0.050um	0.050um	0.050um	0.050um
TTV ASTM F533	Accuracy	+/-0.05um	+/-0.05um	+/-0.05um	+/-0.05um	+/-0.05um
	Repeatability*	0.050um	0.050um	0.050um	0.050um	0.050um
Bow ASTM F534	Range	+/-500um [+/-850um]	+/-500um [+/-850um]	+/-500um [+/-850um]	+/-500um [+/-850um]	+/-500um [+/-850um]
	Accuracy	+/-2.0um	+/-2.0um	+/-2.0um	+/-2.0um	+/-2.0um
	Repeatability*	0.750um	0.750um	0.750um	0.750um	0.750um
Warp ASTM F1390	Range		500um [1500um]	500um [1500um]	500um [1500um]	500um [1500um]
	Accuracy		+/-2.0um	+/-2.0um	+/-2.0um	+/-2.0um
	Repeatability*		0.750um	0.750um	0.750um	0.750um
Flatness (Global) ASTM F1530	Accuracy		+/-0.05um	+/-0.05um	+/-0.05um	+/-0.05um
	Repeatability*		0.030um	0.030um	0.030um	0.030um
Flatness (Site)** ASTM F1530	Accuracy		+/-0.05um	+/-0.05um	+/-0.05um	+/-0.05um
	Repeatability*		0.030um	0.030um	0.030um	0.030um

\*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

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