



Surface Profiler



Alpha-Step  
500

PARAMETRIC



**THE ALPHA-STEP® 500** is a state-of-the-art, stylus-based surface profiler that combines high measurement precision with versatility and economy. The Alpha-Step 500 is ideal for applications such as semiconductor pilot lines and materials or process research. With guaranteed 10Å step height repeatability, the Alpha-Step 500 offers the best repeatability and performance to analyze and monitor processes. This system provides complete and detailed two-dimensional analysis of surface topography on a variety of surfaces including wafers, MEMS, ceramics, and SIMS craters. With many options available, the Alpha-Step 500 offers flexibility for high vertical ranges, powerful optics for sample positioning, and up to 39 statistical parameters for detailed surface analysis and characterization.

#### PRODUCT DESCRIPTION

**Advanced Features** Advanced system features include computer-controlled scanning and data collection, comprehensive data analysis software, and an intuitive user interface.

**Ease of Use** While designed for high performance, the Alpha-Step 500 is extremely easy to use, ensuring accurate and consistent measurements:

- Applications-specific recipes easily programmed to provide automatic leveling, scaling, and measurement analysis—eliminating errors due to operator interpretation and sample positioning.
- The high-resolution VGA monitor makes it easy to visually identify specific features of a test sample for measurement.
- Zoom optics provide magnification up to 210X (480X option) for precise micro-measurements.
- The intuitive user interface simplifies operator training.
- Stylus force—adjustable between 1 and 100 mg—can be tailored for specific surface conditions.

**Multi-Scan Average Mode** This mode automatically scans the same location up to 10 times and then averages the scans together for a final printout. When measuring a series of steps, the Alpha-Step 500 intelligently determines the number of steps and automatically calculates the average step height.

**Powerful Data Analysis** Two user-selectable bandpass filters separate the scan data into roughness and waviness components for simultaneous viewing. Up to 30 standard surface parameters can then be selected for display and further detailed analysis. Data can be saved and retrieved according to multiple, user-defined categories, such as production site, equipment, operator, process, time, and other factors. Individual scan data also can be exported in a standard ASCII format for customized analysis on commercial spreadsheet programs.

**Accurate Surface Characteristic Measurement** With resolution to 1Å and a guaranteed repeatability of 10Å, the Alpha-Step 500 accurately measures surface characteristics such as step height, roughness, and etch depth on a wide variety of substrates. These substrates include semiconductor wafers, ceramic hybrid circuits, disk media, and thin film heads; glass substrates for displays and optical storage devices; and polymer, resist, paper, and other materials used in a wide spectrum of industries.

**Environment Interference Protection** A removable isolation hood blocks out drafts as well as acoustic noise. Integrated isolation feet further protect the system from environmental interference.

**Application-Specific Options** A number of hardware and software options can be added to the Alpha-Step 500 to meet the needs of specific applications:

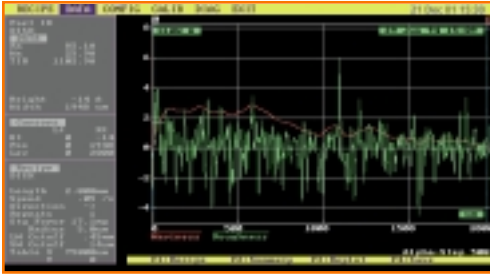
- The extended vertical range option increases vertical range from the standard 300 microns (12 mil) to 2 mm (80 mil), stretching the profiler's use to such applications as hybrid packages and micro-machined parts.
- Additional surface roughness parameters add powerful analysis capabilities that increase the total number of surface parameters to 39.
- High magnification optics increase the optical range to 160-480X from the standard 70-210X, ideal for applications requiring larger view magnification.
- A color camera is available for viewing color features.

#### COMPREHENSIVE FILMS METROLOGY SOLUTION

The Alpha-Step 500 (high-precision surface profiling), HRP Series (CMP and etch profiling), RS-100 (resistivity mapping), ASET-F5x (advanced thin film measurement), and Quantox XP (advanced gate process monitoring) provide comprehensive films metrology control using optical, electrical, and surface topography measurements.

Surface Profiler

# Alpha-Step 500



Roughness and waviness components can be separated and displayed simultaneously with other key measurement data.

## BENEFITS

- Excellent repeatability and performance.
- Ease of use for accurate, consistent measurement.
- Advanced two-dimensional stylus-based surface analysis.
- Flexibility for high vertical ranges.
- Powerful optics enable sample positioning and viewing of stylus.
- Handles high-sensitivity measurements with ease.
- Customized analysis on commercial spreadsheet programs.

## APPLICATIONS

### ➤ Semiconductor

Two-dimensional surface topography characterization and etch depth monitoring of open geometries for process control.

### ➤ MEMS / Opto-Electronics

MEMS and opto-electronic device step height monitoring. Analyzes micro-lenses and curvature, also the etch depth of Dense Wavelength Division Multiplexers (DWDMs).

### ➤ Other Applications

Characterizes the surfaces of hybrid circuits, glass, ceramics, papers, films, and coatings, and any other machined or polished surfaces.

## KLA-TENCOR: ACCELERATING YIELD

KLA-Tencor's portfolio of solutions includes the industry's broadest fleet of advanced inspection and metrology systems, which enables customers to capture yield-critical defect and metrology data. It also includes the sophisticated software to turn that data into quick corrective action. Finally, it includes the expertise to help customers rapidly understand and resolve complex manufacturing problems so they can reap the financial and market rewards associated with faster time to market and increased product yields.

## KLA-TENCOR SERVICE/SUPPORT

Customer service and support are an integral part of KLA-Tencor's yield optimization solution. Our vast customer support organization services our worldwide installed base and is responsible for customer support following shipment of equipment and software. Services include system installation, secure online monitoring, on-site repair, telephone support, relocation services, and selected post-sales applications.

© 2002 KLA-Tencor Corporation. All brands or product names may be trademarks of their respective companies. KLA-Tencor reserves the right to change the hardware and/or software specifications without notice.

Printed in the USA  
PO-ALS500-01/02



KLA-TENCOR CORPORATION  
WWW.KLA-TENCOR.COM

160 RIO ROBLES  
SAN JOSE, CA 95134

PHONE 408.875.3000  
FAX 408.875.4144