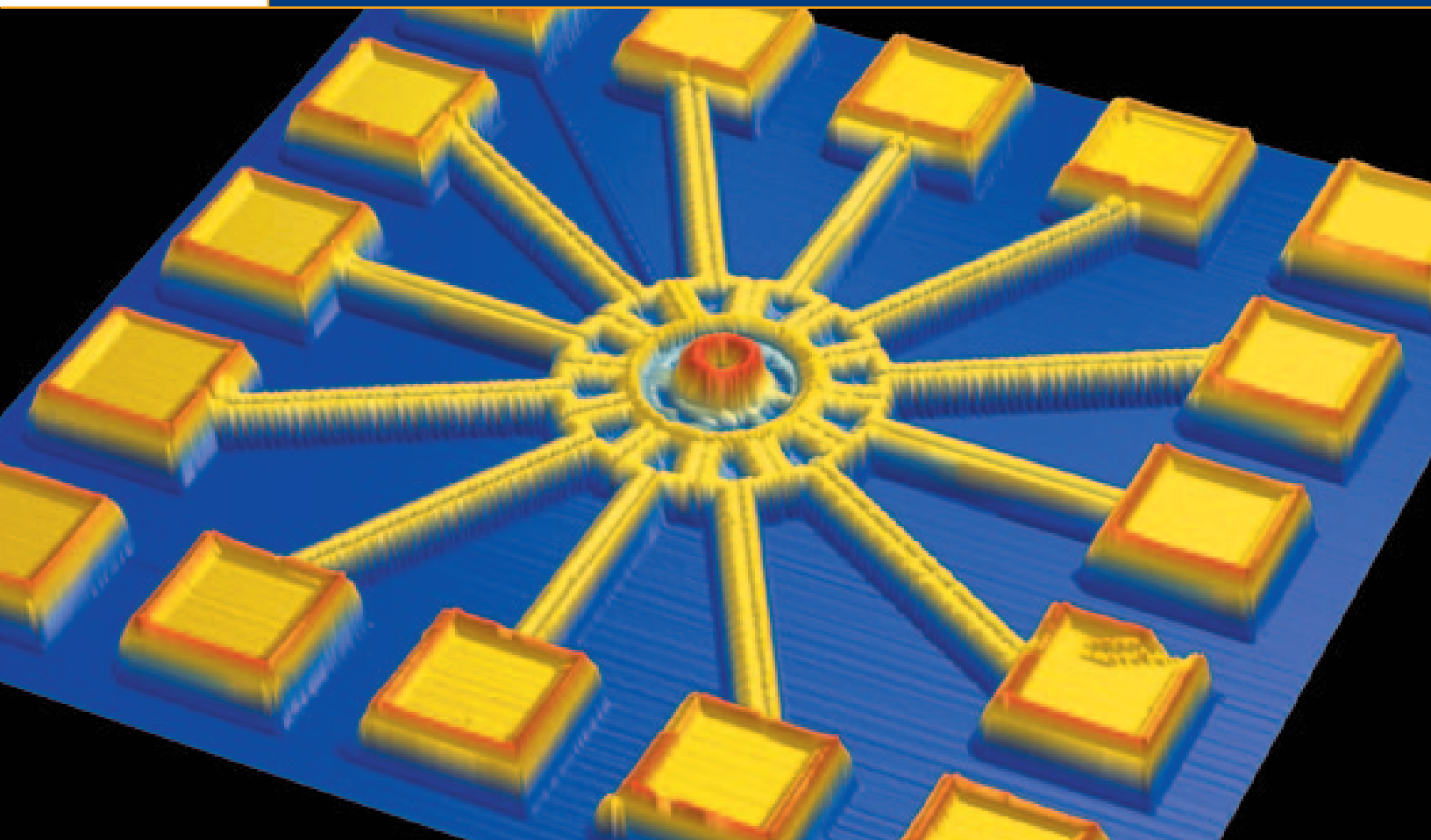




# **Dektak 8 Advanced Development Profiler**

## **Programmable, Repeatable Surface Profiling**

- **Automated 3D Topography Measurement**
- **Advanced Tip Technology**
- **Powerful 3D Data Analysis and Visualization**



# Dektak 8 Advanced Development Profiler

## High Performance 200 mm Surface Profiling



### Introducing the Dektak® 8 Advanced Development Profiler

Dektak stylus profilers have led the industry with innovative products and technologies for over 35 years. The new Dektak 8 accurately characterizes film thickness, roughness, stress and defects on samples up to 200 mm (8 inches). Featuring low-force tip technology, long-scanning capability, and industry-leading data analysis software, the Dektak 8 offers superior performance in a bench top configuration.

- Industry leading precision  
**7.5 angstrom  $1\sigma$  repeatability,**  
**1 angstrom resolution**
- 3D surface profiling with Vision®32 analysis package  
**Characterize film roughness, shape and stress in true 3D\***
- Low force sensor technology  
**Scan soft materials accurately, without damage**
- Super-sharp and high aspect ratio tips\*  
**Advanced tip geometries for deep trenches and soft materials**

\*Optional capabilities

### Industry-Leading Step Height Repeatability

The Dektak 8 Advanced Development Profiler delivers 7.5 angstrom, 1 sigma repeatability for precise step height measurement of films from 100 angstroms to 1 millimeter thick.<sup>1</sup> The low-noise, low-inertia sensor delivers unprecedented sensitivity and versatility for MEMS, V-grooves, thick film hybrid circuits and PCB vias.

### Low Force and High Aspect Ratio Styli for Challenging Measurements

The N-Lite Low Inertia Sensor 3 outperforms all other stylus sensors, with an extremely low noise floor and industry-leading low stylus force. Servo control suspends the stylus in a free floating state, maintaining constant force, even over large steps.

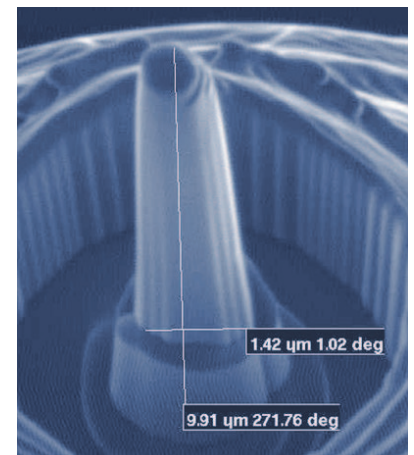
The N-Lite option provides dynamic stylus forces down to 0.03 mg. N-Lite enables the use of super-sharp, 50 nm styli, which can measure sub-micron lines and spaces while also providing scratch-free measurement of resists, polymers and soft metals such as gold. High aspect ratio styli reach into 10  $\mu\text{m}$  deep by 1.5  $\mu\text{m}$  wide trenches, accurately measure Shallow Trench Isolation (STI) etch depth, and characterize deep structures for MEMS research.

With safe, easy stylus replacement, the Dektak 8 offers the most flexible and comprehensive stylus technology available.

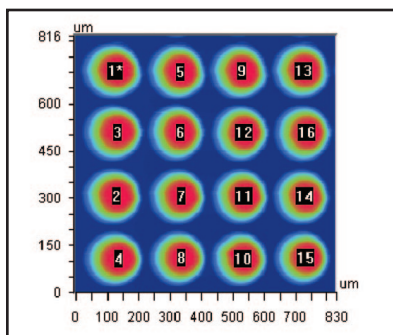
### Long Scan Planarity and Stress Measurement

Long scan capability sets the Dektak 8 apart from other stylus systems. Its overhead X/Y gantry provides a large measurable area, including the entire area of a 200 mm (8 inch) wafer, in a compact footprint. A programmable sample stage enables 50 mm (100 mm optional) scans for measuring planarity and stress on thin films.

The Dektak 8 includes thoughtful features for accurate, automated measurement. Programmable stage positioning recalls up to 200 sites. A 3-point suspension and guide pins provide repeatable wafer positioning, so you can measure the same trace before and after deposition. All measurements are referenced to an optical flat for an extremely stable baseline.



**Exclusive stylus technology such as high aspect ratio and super sharp tips extend the capabilities of the Dektak 8.**



**3D Large Area Analysis: Vision32 multi-region analysis of flip-chip bumps.**

## Powerful 3D Data Analysis

Dektak software leads the industry in advanced data analysis and automation capabilities. Innovative features include easy-to-use export macros and a flattening algorithm that dramatically reduces scanning artifacts.

Optional Vision<sup>®</sup>32, the industry's leading data analysis software, provides true 3D mapping, with over 200 analysis tools, powerful filtering and a comprehensive parameter set. Visualize data with 2D and 3D plots, or choose from Fourier, histogram, bearing ratio and dozens of other analyses.

## Innovative Optics

Advanced optics provide high-resolution illumination and imaging, even on highly reflective parts. Real-time sample viewing lets you see exactly what you scan. The dual-optics configuration lets you switch quickly between top-down imaging for coarse positioning, and high-mag for fine alignment. The image can be saved as a bitmap file for correlation to scan data.

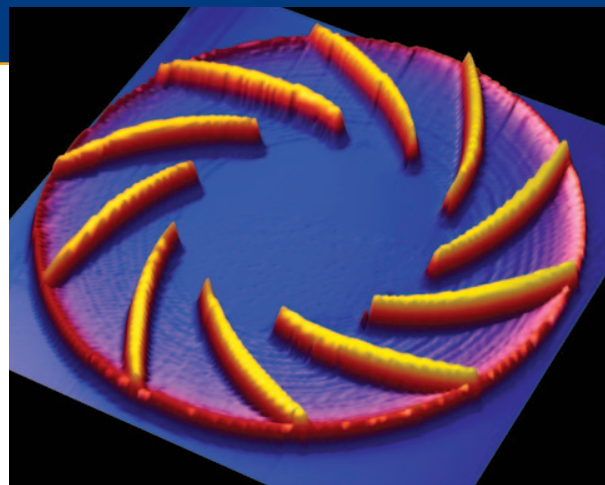
## High Resolution Roughness Measurement

With 3D surface characterization you can measure roughness with unprecedented accuracy, from very smooth (less than 10 Å Ra) to very rough (several hundred microns roughness) surfaces. Digital filtering, wide cursor analysis, and the most advanced 3D surface analysis available help make the most of your data.

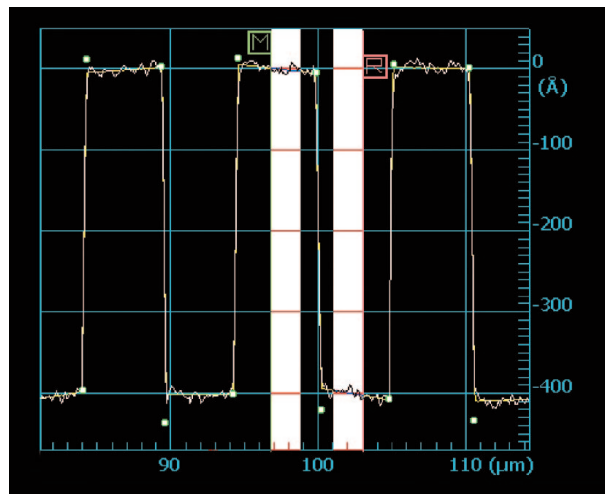
## Applications

The Dektak 8 Advanced Development Profiler is the tool of choice for a wide variety of measurements:

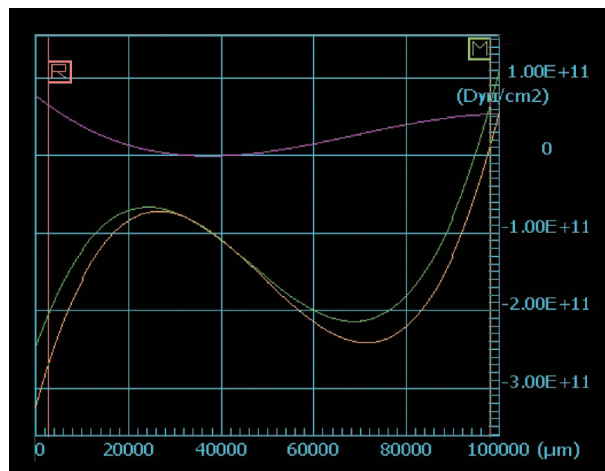
- MEMS characterization**
- Thin- and thick-film coatings**
- Thin-film stress calculations**
- Roughness on wafers and machined parts**
- Transparent films and photo resist thickness**
- Metal etch uniformity**
- Compound semiconductor devices on GaAs wafers**
- Microlens height/curvature**
- V-groove depth**
- Surface quality and defect review**



**MEMS Metrology: 3D map of MEMS impeller, 850 sq. µm scan.**



**Automatic Step Detection: 400 Å steps, 10 µm pitch lines with exclusive 50nm radius stylus.**



**Film Stress: automatically calculate compressive and tensile stress on thin films.**

# Specifications

## Worldwide Customer Support from the Industry Leader

Veeco Instruments Inc. provides solutions for nanoscale applications in the worldwide semiconductor, data storage, telecommunications/wireless and scientific research markets. Our Metrology products are used to measure at the nanoscale and our Process Equipment tools help create nanoscale devices. Veeco's manufacturing and engineering facilities are located in New York, California, Colorado, Arizona and Minnesota. Global sales and service offices are located throughout the United States, Europe, Japan and Asia Pacific.

**Front Cover:**  
MEMS Micro-motor (courtesy CNRI MEMS Exchange)



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<sup>1</sup>Measured repeatability on a 1 micron step height standard, 6.55  $\mu\text{m}$  vertical range.

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## SYSTEM

<b>Measurement Technique</b>	stylus profilometry
<b>Measurement Capability</b>	three-dimensional surface profile measurements
<b>Sample Viewing</b>	dual magnification objectives (70X and 280X)
<b>Stylus Sensor</b>	Low-Inertia Sensor (LIS) 3; optional N-Lite LIS 3 sensor
<b>Stylus Force</b>	1 to 15 mg with standard LIS 3; 0.03 to 15 mg with N-Lite sensor option
<b>Stylus Options</b>	– stylus radius options from 0.2 to 25 $\mu\text{m}$ – Super Sharp 50 nm stylus for use with N-Lite LIS 3 sensor – High Aspect Ratio (HAR) tips for 10 $\mu\text{m}$ D x 2 $\mu\text{m}$ W trenches or 200 $\mu\text{m}$ D x 20 $\mu\text{m}$ W trenches
<b>Sample Stage</b>	– programmable 200 mm (8 in.) X/Y, 360° manual rotation, manual leveling standard – programmable 200 mm (8 in.) X/Y, 200 mm X/Y translation, 360° programmable rotation (0.1° resolution) and auto-leveling optional
<b>Computer System</b>	PC with latest Pentium® processor, 381 mm (15 in.) flat panel display; optional printer
<b>Software</b>	Dektak software running under Microsoft® Windows XP®; optional Vision®32 3D analysis software; optional Stress Measurement software
<b>Vibration Isolation</b>	– vibration isolation table optional – table-top vibration isolation system optional

## PERFORMANCE

<b>Scan Length Range</b>	50 mm (2 in.) standard; 100 mm (4 in.) optional
<b>Data Points Per Scan</b>	60,000 maximum
<b>Max. Sample Thickness</b>	25.4 mm (1 in.)
<b>Max. Wafer Size</b>	200 mm (8 in.)
<b>Step Height Repeatability<sup>1</sup></b>	7.5 Å, 1 sigma on 1 $\mu\text{m}$ step
<b>Vertical Range</b>	262 $\mu\text{m}$ (0.010 in.) standard; 1 mm (0.039 in.) optional
<b>Vertical Resolution</b>	1 Å max. (@ 6.55 $\mu\text{m}$ range)
<b>X/Y Repeatability</b>	$\pm 5 \mu\text{m}$

## ENVIRONMENT

<b>Temperature Range</b>	between 15 and 30 °C (59 to 86 °F)
<b>Humidity Range</b>	$\leq 80\%$ , non-condensing

## DIMENSIONS

457 mm W x 610 mm D x 483 mm H  
(18 in. W x 24 in. D x 19 in. H)

## POWER REQUIREMENTS

<b>Input Voltage</b>	100-120 VAC/200-240VAC, 50-60 Hz
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