PennState College of Engineering

CENTER FOR NANOTECHNOLOGY EDUCATION AND UTILIZATION

Profilometer

How It Works:

The stylus on the profilometer scans across the sample surface in the x-direction. As it moves across the surface the stylus moves up and down tracking surface features. This vertical displacement is recorded by the tool for measurement purposes.

Tool Operation:

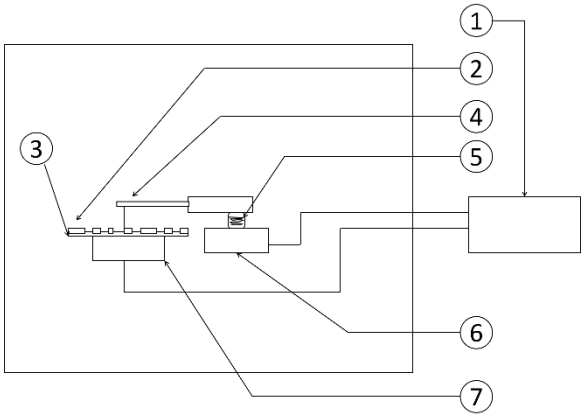
Surface Roughness: Using software, the tool is capable of measuring the average roughness of the surface of the sample.

Feature Height: One common mode of operation involves using the stylus to measure the height of features in patterned thin films.

Film Stress: Based off sample curvature, the profilometer can be used to measure the stress (tensile of compressive) in solid thin films

Material / Applications:

Profilometers can be used to measure features on the scale of 10's of nm to the µm level. They are particularly useful for measuring film roughness, film thickness, and thin film stresses. Since the stylus is in contact with the sample, it is important that the profilometer only be used to measure relatively rigid films. The stylus will damage soft films and cause a distorted image.



1 Analyzing computer
2 Patterned film
3 Sample substrate
4 Probe tip
5 Measure spring
6 Probe manipulator
7 Stage

Tool Model #

Specification	Standard	Option
Vertical	50 Å to 2,520 kÅ	1 mm maximum
Vertical Resolution	1 Å/65 k, 10 Å/655 kÅ, 40 Å/2, 620 kÅ	160 Å 1 mm
Scan Length Range	50 µm to 30 µm (2 mils to 1,18 in)	
Scan Speed Range	3 seconds to 100 seconds	
Software Leveling	Two-point programmable or cursor leveling	
Stage Leveling	Manual	
Styles (standard)	Diamond, 12.5 µm radius	0.2 µm, 0.7 µm, 2.5 µm, 5 µm
Stylus Tracking Force	Programmable, 1-15 mg	
Maximum Sample Thickness	31.75 mm (1.25")	
Sample Stage Diameter	6" for 150 mm and smaller samples	
Manual Stage Position Translation	X Axis, 20 mm. Y Axis, 77 mm	
Sample Stage Rotation	Manual Theta, 360°	
Power Requirements Current Phase	120 V, 60 Hz, 5 A @ 120 (+/-10%) Single Phases	
Cameral Field of View	2.6 mm horizontal field of view	1.1-4.6 mm zoom
Color Cameral	45° side view	