Product Specifications



Tencor™ P-17 Profiler

Production Series Stylus Profiler



The KLA Instruments[™] Tencor[™] P-17 and P-17 Open Frame (OF) benchtop profilers provide leading edge surface measurement and analysis capabilities for addressing production and R&D applications where a wafer handler is not a requirement. Applications include step height, roughness, and stress metrology for use in semiconductors, power devices, 5G, LED, automotive and data storage.

The P-17 features industry leading step height repeatability due to superior sensor and scanning stage design. Specifications are based on the standard deviation of 15 trials using best known methods on a typical step height.

	Steps ≤ 1µm	Steps > 1µm		
Repeatability	4Å	0.10%		
Reproducibility	15Å	0.25%		

The UltraLite[®] low noise probe sensor technology utilizes a linear variable differential capacitive (LVDC) sensor that maintains constant stylus-sample forces and excellent vertical linearity over the entire range for high resolution and precise measurements. Vertical linearity is measured by the maximum non-linearity component divided by the vertical range.

	Standard Range	Low Force	Extended Range
Total Dynamic Range	327µm	131µm	1000µm
Vertical Resolution (low / mid / high range)	0.01 / 0.04 / 0.20Å	0.01 / 0.02 / 0.10Å	0.01 / 0.08 / 0.60Å
Stylus Force	0.5 – 50mg	0.03 – 50mg	0.5 – 50mg
Force Control	Constant	Constant	Constant
Vertical Linearity	± 0.5% > 2000Å 10 Å ≤ 2000Å	± 0.5% > 2000Å 10 Å ≤ 2000Å	± 0.5% > 2000Å 10 Å ≤ 2000Å
Sampling Rate	5 to 2000Hz	5 to 2000Hz	5 to 2000Hz

The P-17 has superior scan flatness over the entire scan length for excellent short scan, long scan, and stress measurements. Contact KLA Instruments for best known recipe conditions.

	Specifications	Test Sample and Conditions		
	200Å flatness on a 0.5mm scan			
	300Å flatness on a 2mm scan			
Scan Flatness	400Å flatness on a 30mm scan	1/20λ, 150mm optical flat		
	750Å flatness on a 60mm scan			
	1700Å flatness on a 130mm scan			
Bow Repeatability	0.1%	20m radius mirror		
Stress Repeatability	2.5%	with polynomial fit enabled		

Product Specifications



The 2D and 3D scanning stage support measurements up to the full diameter of the substrate with millions of data points per scan.

	2D Measurements	3D Measurements		
Maximum Scan Length	200mm – no stitching required	Any rectangle within a 200mm circle		
Lateral Resolution	0.025µm	0.5µm		
Maximum Points per Scan	1 million	4 million		
Scanning Speed	2 to 25,000µm/sec	-		

P-17 specifications include optics, camera, computer, software, standards compliance, plus tool dimensions and weight.

	Specification
Optics Field of View	Top View: 1400 by 1400µm and Side View: 1200 by 850µm
Camera	5MP color camera w/ 3.5X optical zoom
Dimensions (P-17/P-170F)	Height: 45cm/45cm; Width: 57cm/74cm; Depth: 77cm/96cm; Weight: 100kg/100kg
Computer	6 core 4.1GHz i5 processor with 8GB RAM and 1TB HDD with DVD RW, USB and Ethernet
Monitor	23-inch monitor
Software	Windows 10, 64-bit with Microsoft Office
Standards Compliance	SEMI standards S2-0715, S8-0715, S14-0309; European CE

The P-17 should be installed with facilities and environmental specifications as stated below.

	Specification
Facilities	Electrical: 90 to 260V at 50 to 60Hz, Power: 430VA; Vacuum: 500mmHG at 27L/min
Environment Vibration	Floor Vibration $\leq 250\mu$ -inch/s from 1 - 100Hz; Audio Noise: ≤ 80 dB on C-weighting scale
Environment	Temperature: 16 to 25° C; rate of change $\leq 2^{\circ}$ C/hr;
Temperature	Relative Humidity: 30 to 40%, non-condensing
Environment Airflow	≤ 100ft/min, down blowing

The P-17 offers a full range of styli, plus custom designs:	
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- Standard: 2-50µm radius, 60° angle
- Submicron: 0.2µm radius, > 90° angle
- . DuraSharp[®]: 0.04µm radius, 40° angle
- Knife Edge: 2µm radius x 50µm, 60° angle ÷.

 High Aspect Ratio: 0.2-2µm radius, 20-45° angle	

The P-17 includes the following motorized stages standard:					
	200mm XY Stage, 2µm repeatability	•	Theta Stage: ± 360°, 0.1° resolution		
	Z Stage: soft touch stylus null, optical sensor	•	Level: ± 3°		
The	The P-17 chucks are designed for a range of sample sizes:				
	50 to 200mm universal vacuum chuck with adjustable	•	156mm solar chuck	•	240 x 240mm chuck (P-17 OF)
	alignment pins and optional stress posts		HDD disk chuck	•	200/300mm chuck (P-17 OF)
•	200mm standard chuck with drop-on precision locators				

Measure the topography of any surface with our range of benchtop and automated wafer handling optical and stylus profilers.









HRP®-260



Tencor™ P-7,

P-17, P-170F



Alpha-Step® D-500 Alpha-Step® D-600

Find out more at kla-instruments.com/stylus-profilers and kla-instruments.com/optical-profilers.

KLA SUPPORT

Maintaining system productivity is an integral part of KLA's yield optimization solution.

Efforts in this area include system maintenance, global supply chain management, cost reduction and obsolescence mitigation, system relocation, performance and productivity enhancements, and certified tool resale.

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