

Zeta 3D Optical Profiler

Zeta-20



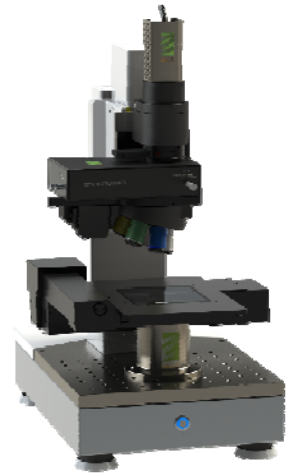
Exceptional 3D Imaging and Metrology

Based on *proprietary ZDot™ technology*, the Zeta-20 images and analyzes surface features on samples of all types: smooth to rough, low reflectivity to high reflectivity, transparent to opaque. Hardware and software options customize the Zeta-20 for specialized measurement needs. All hardware is easy to install and easy to use.

Key Features

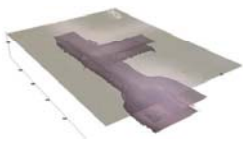
The **Zeta-20** is available with several advanced imaging techniques to match your requirements:

- **ZDot™** innovative 3D imaging is standard on all our optical profilers. The ZDot™ technology with our unique transmissive and dark field illumination schemes as well as a variety of objectives allows the tool to **handle the most ‘difficult’ of surfaces**.
- **ZIC** enhanced differential interference contrast imaging is great for **nanometer level surface roughness**
- **ZSI** shearing interferometer provides **Angstrom level vertical resolution**
- **ZX5** vertical scanning interferometry is ideal for measuring **nanometer heights over large field of view**
- **ZFT** reflectometry based **thin film thickness** measurement option

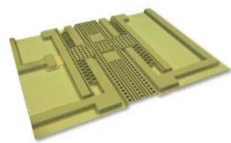


Zeta-20 with Motorized XY Stage

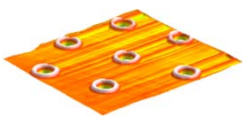
Micro-fluidic Device (mm)



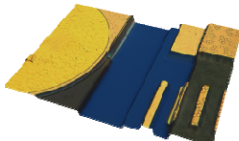
MEMS Device (µm)



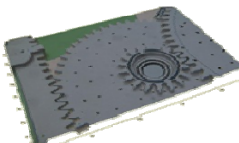
Laser Texture (Å)



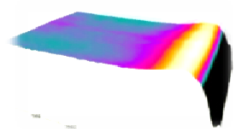
IC Wafer Surface (nm)



Micro Gear / MEMS (mm)



Disk Roll-Off (Å)



Measurement Channels and Sensitivity

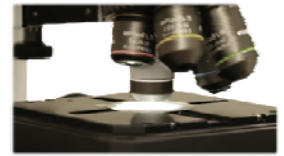
Measurement Required	Recommended Multi-Mode Technique				
	ZDOT	ZX5	ZIC	ZSi	ZFT
Roughness > 40 nm	✓				
10 nm to 25 mm step height	✓				
Film thickness > 10 µm	✓				
Large area feature with small Z height		✓			
5 nm to 100 µm step height		✓			
Roughness < 40 nm			✓	✓	
Defect: < 1 µm in size, < 75 nm in height			✓	✓	
< 10 nm step height				✓	
Defect: > 1 µm in size, < 75 nm in height				✓	
30 nm < film thickness < 15 µm					✓

Optical System Parameters

Specifications for standard objectives are shown below. Other options available: long working distance objectives, immersion objectives, and through transmission materials objectives; 0.63X and 1X couplers. *XY resolution is nominal.

	NA	Working distance (mm)	Z resolution for ZDot (µm)	XY resolution (µm)*	Optical resolution (µm)	FOV with 0.35X coupler		FOV with 0.5X coupler	
						1/3" camera	2/3" camera	1/3" camera	2/3" camera
2.5X	0.08	10.7	22	3.60	4.20	5364 × 4024	9394 × 7044	3788 × 2840	6614 × 4960
5X	0.15	20.0	5.9	1.80	2.20	2682 × 2012	4697 × 3522	1894 × 1420	3307 × 2480
10X	0.30	11.0	1.5	0.90	1.10	1335 × 1000	2327 × 1745	944 × 708	1644 × 1233
20X	0.45	3.1	0.5	0.45	0.75	668 × 500	1169 × 877	468 × 351	822 × 616
50X	0.8	1.0	0.1	0.18	0.42	267 × 200	466 × 349	189 × 142	328 × 246
100X	0.9	1.0	0.013	0.09	0.37	133 × 100	234 × 175	93 × 70	164 × 123
150X	0.9	1.0	0.013	0.06	0.37	88 × 66	156 × 116	62 × 46	109 × 82

	Standard Zeta-20 Zdot™ System	Hardware and Software Options
Measurement System	Infinite depth imaging microscope	Standard objectives: 2.5X, 5X, 10X, 20X, 50X, 100X, 150X
	Zdot(TM) based Optical Profiler	Special purpose objectives: LWD, TTM, immersion
	Dual high brightness white LED light source	Interferometer package (ZX5, ZX100): X5 and X100 objective, piezo stage, and leveling stage
	True color CCD camera (1/3"), 1024 x 768 pixels	Nomarski (ZIC) package: prism, polarizer, turret and analyzer
	30 frames/sec data acquisition	Spectrometer (ZFT) for film thickness measurements
	One coupler, choice of four options	Shearing Interferometer (ZSI) with 0.01nm resolution and 0.1nm RMS
	5-lens manual objective turret	Automatic objective detector (AOS)
	Auto focus	6-lens auto turret
	Up to 25mm vertical scan without stitching, using a 20X LWD objective	Back light LED for transmitted light applications
	Built-in vibration isolation	High resolution 2/3" CCD, 1280 x 1024 pixels
	High resolution 2/3" CCD 2.8MPix, 1920x1440 pixels	
	Couplers: 1X, 0.63X, 0.5X, 0.35X	
	Diamond Scribe for marking defects	
	Edge inspection fixtures	
Stages and Chucks	Manual XY stage (100mm x 100mm)	Manual 150 mm x 150 mm stage
	Motorized Z stage with high precision closed loop scanner	Motorized 100 mm x 100 mm stage
	Configurable stage platform (breadboard design)	Piezo Z stage (0.2 nm steps, 100 µm range)
		Extended Z range: > 100 mm
		Coarse tip/tilt stage (± 20 deg)
		Fine tip/tilt stage (± 6 deg)
		Manual R-theta stage
		Wafer chucks: 2 in to 8 in round, 5 in or 6 in square
		Hard disk chucks: 65 mm to 95 mm
		Back light compatible chucks
	Custom chucks for other applications, such as biotech	
Software	Noncontact measurements of step height, surface roughness, feature diameter, area, and volume	ZMORF™ advanced data analysis software powered by Digital Surf®
	Measurements on very low reflectivity (<0.5%) to very high reflectivity (>95%) materials within the same scan	Wafer shape measurement (bow) up to 4 in diameter
	Measurements on transparent materials	Film thickness spectrometer, visible light (film thickness from 30 nm to >10 µm)
	Analysis of layers within transparent structures	Stitching for large area images
	Analysis of high roughness and high aspect ratio structures	Automated Sequences
	Several leveling modes, including leveling-free measurement in ZDot™ mode	Off-line software
	Ra, Rq, Rz, Rsk, Rk and other ISO4287 parameters	Custom applications recipes:
	Sa, Sq, Sz, Ssk, Sk and other ISO25178 parameters	Patterned sapphire substrate measurements
	Color or height based region analysis	Diamond wire measurements for solar wafer slicer
	3D display software, with image processing filters, true and false color options, and annotation	Feature Detection
	Customizable reports	Multi-Surface for microfluidic devices
	Easy file management and data export in a variety of formats	Solar pyramid (wafer texture)
	Time to data: 30 sec typical	Solar contact finger metrology
		Solar cell bus bar metrology
		Solar wafer bow measurements



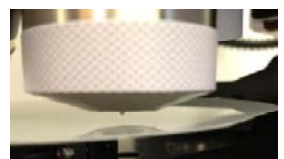
Transmissive Illumination



Edge Inspection Fixture



ZX5 Interferometer



Diamond Scribe to mark defects

Workstation

Processor: Intel Dual Core
 Operating system: Windows 7, 64-bit
 Memory: 4GB RAM (16GB available),
 ≥320 GB HDD
 Monitor: 24-inch LCD standard, 1920 x 1200 pixels

Support

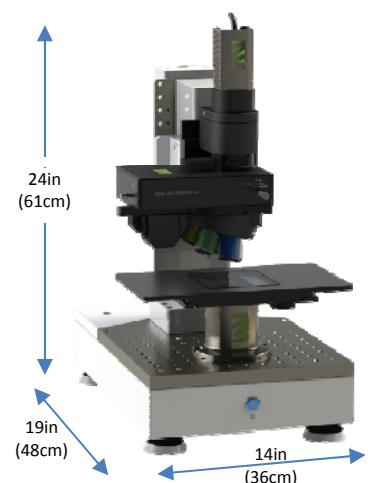
Warranty: One year parts and labor
 Software: Two years free upgrades
 User manual: Upon delivery
 Service manual: With optional service training
 Calibration: Step height and film thickness standards
 CE mark certification

Vibration Isolation

Built-in vibration isolation suitable for most applications
 Optional passive or active vibration isolation tables available for noisy environments
 Optional acoustic isolation case available

Facilities

Power: 100 – 230 VAC, 2 A
 Operating temp: 15° – 30° C, non-condensing
 Vacuum (optional): 600 mm Hg
 Tool dimensions (W x D x H): 36 x 48 x 61 cm
 Workstation dimensions: 52 x 66 x 51 cm
 Weight: 29.5 kg
 All cabling included with tool



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Actual features included will depend on configuration
 Specifications subject to change without notice

