## **Dynamic Surface Roughness Profiler**

### Portable, Placeable Roughness Metrology

The NanoCam Sq<sup>™</sup> dynamic profiler measures surface roughness on small to very large coated and uncoated optics. With impressive portability, now you can bring accurate metrology anywhere you need it, including at production stations for small optics, directly on large optics, on gantries or robots, or on polishing equipment.

The unique NanoCam Sq does away with slow, messy replication methods required by traditional workstation interferometers. Its portability and on-machine capability reduce handling and transportation of optics, increasing throughput and dramatically reducing the risk of damage to expensive, mission-critical optics.

#### **Vibration Insensitive Performance**

The NanoCam Sq utilizes Dynamic Interferometry®, incorporating a single camera, high-speed optical sensor that measures in less than 100 microseconds—thousands of times faster than a conventional optical profiler. Because acquisition time is so short, the NanoCam Sq can measure despite vibration, making it possible to mount the instrument in polishing equipment, on gantries or on robots. This flexibility enables the NanoCam Sq to be used in a wide range of configurations.



### **Industry Leading Analysis, Standard**

4Sight analysis software features a user-friendly interface for acquiring and analyzing data and reporting ISO 25178 surface roughness parameters, PV and Ra. 2D and 3D displays, filtering and masking make it easy to highlight surface roughness and structure. The unique Measurement Stack enables complex data transformations. Comprehensive data sharing lets you read, write, save and print from most file types, including Zygo MetroPro®, Bruker Vision®, ADE-PhaseShift MAP, and HDF5®.

#### **Accessories**

Interference objectives are available with 2.0X, 5X, 10X, and 20X magnifications, with an optional 2X magnification multiplier. Each objective can measure samples with reflectivity from 1% to 100%. Multiple mounting options are available, including a motorized, joystick controlled tripod, mobile workstation, and interfaces to polishing equipment, gantries or robots.

### **FEATURES**

- Vibration Insensitive Dynamic Operation
- 1.4 MP, 12-bit, Low-Noise Camera
- 460 nm Pulsed LED Source
- Integrated Alignment System
- ISO 25178 Surface Roughness Parameters
- Motorized, Joystick Controlled Tip/Tilt/Z Tripod
- Workstation, Gantry, Robot Mountable Interfaces

## **APPLICATIONS**

- Portable Roughness Measurement for Small Optics
- 3D Surface Roughness on Large Optics
- On-Machine Polishing Metrology



# **Specifications**

Configuration	NanoCam So	9										
Description	Vibration inser	nsitive dyna	amic surfa	ce profiler		,						
Acquisition Mode	Instantaneous	phase shift	fting with	pixelated phase sensor					e	200 200	400 500 µm	000
Light Source	Pulsed LED at	sed LED at 460 nm							1 6	200 300	Shelle Scales	1-65
Sample Reflectivity	1%-100%	-100%					ISO 25178			Water and	100	-6
Camera	1.4 MP, 12-bit	MP, 12-bit					Height Parameters					5.5
Computer System	High performa	nce PC wit	th 22 in L(	CD monitor		Sq	1.09	nm	200 - 200		A 17.50	45
Operating System	Windows® 7					Ssk	0.0899		250 -			-4
System Software	4Sight™ Analysis Software					Sku	2.90		350 - 73 7	- 5 86		3.5
	Instantaneous phase shifting data acquisition					Sp	3.96	nm	400 -			-2.5
	ISO 25178 surface roughness parameters, PV, Ra					Sv	2.91	nm	490	The second	( - W ) . W	-2
	2D profiles and 3D surface maps					Sz	6.87	nm	500 -	16 10 10		-1
	Reference generation, subtraction, data averaging						0.867	nm	550		280	-0.5
	HDF5 data format standard, others supported						- Filming		jett.	The second second	1	O MA
	including .opd, .map, .dat, .hdf, .int, .csv and .txt											986
	Upgrades free during warranty period								and the			140
Physical Envelope	< 24 x 24 x 8	24 x 24 x 8 cm (9.6 x 9.6 x 3.3 in)						and the	A	The state of the s		120
Weight	< 4.6 kg (10.0	) lbs)					-		<b>美国新</b>	100	Con-	110
Power Consumption	< 45 Watts ins	45 Watts instrument; <750 Watts complete system							Just 1	- MARCH 1	of Park	- 90 - 60
Temperature Range	Operational: 16–27° C (60–80° F), non-condensing										77	
	Storage: -1-38° C (30-100° F), non-condensing						N. T. F.		34 A	Show Which	100	10
Options							4	100	28.00	712	The state of the s	- 30 - 21
Objectives	Long working distance, interferometric objectives									10		
	See table below; other magnifications available						Reg	16 3	Act The	1		- w
Magnification Multiplier	Optional 2X	. •						-	The second	igh.	X = 597 µm Y = 597 µm	
Configurations	Optional joystick-controlled tripod with $\pm$ 7° tip/tilt, $\pm$ 19 mm (0.75 in)											
Comigurations	z travel; mobile workstation; dovetail or Schunk mount for gantries,											,
	z travel; mobile workstation; dovetall or Schunk mount for gantnes, robots, or on-machine interfaces											
Calibration Mirror	Super-smooth											
Extended Cables	5 m standard,					22						
	o ili standard,	TO III Opti	onai			1 0			(90)	PYENILMOUND LOCA (OPTIONAL)	TON PT	
System Performance								_				
Minimum Exposure	< 100 µsec					23		Î		f	0.0	
Vertical Range	115 nm step max										2.0	
RMS Repeatability 1	< 0.005 nm					1	1)		•	-	0	17 3
RMS Precision <sup>2</sup>	< 0.1 nm						[sart]					
Long Working Distance Inte	rference Obie	ctives			1	AMPLE EFIECTIVITY OW - HIGH]	DA TA		-4 2106		TYPICAL APPLICATE	OH!
Magnification	2.0X	5X	10X	20X		\	177.7 + 4.8	P. P. San St. Land St. Berry B.	-X110#			
Numerical Aperture	0.055	0.15	0.30	0.45	7	1 \/	57.5					6-1
Working Distance (mm)	22.7	23.5	17.3	4.5		×82 (	, H H					:
Optical Resolution at 460 nm (µm		1.5	0.8	0.5		41			POME	1		-
Spatial Sampling (µm) 4	3.7	1.5	0.7	0.4	2	2 1 0	0		CAMPRA	18		
Field of View (mm)	4.4	1.8	0.9	0.4		-	7	7		1		i.
Depth of Field @ 460 nm (µm)	190.1	22.5	5.4	2.3					-CONTROL	*	TPMARE	ř
Warranty		One-year, limited, on-site system installation and operator training										
	22 ,00	,				9						

- 1 One sigma for RMS of 10 data sets of calibration mirror, each data set being an average of 64 measurements.
- 2 Average RMS of the difference of 10 data sets between measured surface and the calibrated surface. Each data set is an average of 64 measurements. Calibrated surface is the pixel by pixel average of 10 measurements of calibration mirror.
- 3 Optical resolution is based on Sparrow criteria =  $0.5\lambda/NA$
- ${\bf 4} \quad {\bf Spatial \ Sampling \ is \ the \ camera \ pixel \ size \ divided \ by \ objective \ magnification.}$

Specifications subject to change without prior notice.

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