

Dynamic Surface Roughness Profiler

Portable, Placeable Roughness Metrology

The NanoCam Sq[™] dynamic profiler measures surface roughness on small to very large coated and uncoated optics, as well as precision metals, plastics and polished surfaces. With impressive portability, the NanoCam Sq puts accurate metrology anywhere you need it—at production stations, 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 S (surface roughness) parameters, as well as 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 from 0.9X through 50X magnifications, with an optional 2X magnification multiplier. Each objective can measure samples with reflectivity from 1% to 100% without changing reference optics. 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
- 1.6 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

NanoCam[™]

Specifications

Configuration	NanoCam Se	q											
Description	Vibration inser	nsitive dynar	nic surfa	ce profiler			1						
Acquisition Mode	Instantaneous	phase shift	ing with p	ixelated ph	ase sensor					0	100 200 300	400 500 µm	
Light Source	Pulsed LED at 460 nm						150 25	178		50	1. 1. 1 M	Contraction of the	- 6.5
Sample Reflectivity	1%-100%						Height Parameters			100 -		11 124	-6
Camera	1.6 MP, 12-bit	t					Fieight	1 00	5 nm	150 -	Mr. Annales		- 5
Computer System	High performa	nce PC with	22 in LC	D monitor			Sol	0.0900	nm	200 -	a started	Star Charles	- 4.5
Operating System	Windows® 7						SSK	0.0899		300	100 AD 1		- 3.9
System Software 4	4Sight [™] Analysis Software						Sku	2.90	1	350	12200	F States & Lou-	-3
	Instantaneous phase shifting data acquisition							3.96	nm	400 -	121912	the second	-2.5
	ISO 25178 surface roughness parameters, PV, Ra							2.91	nm	450 -	C. C. S. Mar	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- 1.5
	2D profiles and 3D surface maps							6.87	nm	550	A Carlos		- 1
	Reference generation, subtraction, data averaging							0.867	nm		a series and the		-0.5
	HDF5 data format standard, others supported									μm			I NM
	including .opd, .map, .dat, .hdf, .int, .csv and .txt												
	Upgrades free	during warr	anty peri	bc					13	C.C.	-		- 1
Physical Envelope	< 24 x 24 x 8	cm (9.6 x	9.6 x 3.3	in)				100	-	2.87-1	the section of		1
Weight	< 4.6 kg (10.0) lbs)						ALC: NOT	State Fr	A State	Sec. Car	and the second second	- 11
Power Consumption	< 45 Watts ins	strument; <	750 Watt	s complete	system		6.8	a second the second	Ser Mart	States.	the second	Rentrad	- 81
Temperature Range	Operational: 16–27° C (60–80° F), non-condensing						0050	Sec. all	\$		A second	50 0	-64
	Storage: -1-3	8° C (30–10	00° F), no	n-condens	ing		100	50	100	e de	a barn and	50 500	-4
Options								200 250	1985	1 -	1. S. S. 1	Tro 250 20	- 21
Objectives	Long working distance, interferometric objectives							4m 300 33	50 000	2341.10	150	Jun	
	See table below; other magnifications available							4	400 450	the set	100 A00	X - 507	
Magnification Multiplier	Optional 2X	,	5						5	6	Fr 500	Y = 597 µm	
Configurations	Optional joystick-controlled tripod with $\pm 7^{\circ}$ tin/tilt ± 10 mm (0.75 in)									-50 . X.	2	Z = 6.87 nm	
	z travel: mobile workstation: dovetail or Schunk mount for centries												
	robots or on-machine interfaces												
Calibration Mirror	Super-smooth	reference n	nirror										
Extended Cables	5 m standard	10 m ontio	nal				00 P						
Exterided Cables	o in Stanuaru,	το πι ομιοι	Idi				- <u>+</u> -					NULOCATION	
System Performance							•	Carrow	71		(OPTIO	NAL)	7
Minimum Exposure	< 100 µsec						+	<i>6 11</i>	Ц	F-1			Bes -
Vertical Range	115 nm step max											2.	••
RMS Repeatability 1	< 0.005 nm						00 (7)					•	*•
RMS Precision ²	< 0.1 nm												
							SAMPLE	[:	244.5] 9.6	ESTO	P		
Long Working Distance Inter	ference Obje	ectives ³					(LOW - HIGH)	OA [122.2]	- /		P	TYPICAL APP	UCATION
Magnification	0.9X	2.0X	5X	10X	20X	50X		4.8		0		9	1
Configuration	Michelson	Michelson	Linnik	Linnik	Linnik	Linnik		1					L FI
Numerical Aperture	0.026	0.055	0.15	0.30	0.45	0.80	OA 222.2 4.8		10	POV	VEP	+	
Working Distance (mm)	15.0	23.0	23.0	17.0	4.5	1.0	5.0		<u>کم</u> ک	- FOV			ă 👘
Optical Resolution at 460 nm (um) 4 8.8	4.2	1.5	0.77	0.51	0.29	24	¢[<u> </u>	CAM	ERA		2
Spatial Sampling (um) 5	8.2	3.7	1.5	0.74	0.37	0.15					mou	+	1

1 One sigma for RMS of 10 data sets of calibration mirror, each data set being an average of 64 measurements.

4.4

190.0

4400

19

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.

9.9

1100

9900

41

3 Specifications based on 1200 x 1200 array size.

Field of View (mm)

Warranty

Depth of Field @ 460 nm (µm)

Max. Spatial Wavelength (µm) 6

Min. Spatial wavelength (µm) 7

4 Optical resolution is based on Sparrow criteria = $0.5\lambda/NA$

5 Spatial Sampling is the camera pixel size divided by objective magnification.

6 (Number of pixels * pixel size) / magnification (IAW ASME B46.1)

7 (5 * pixel size) / magnification (IAW ASME B46.1)

Specifications subject to change without prior notice.

Dynamic Interferometry is a registered trademark, and NanoCam and 4Sight are trademarks, of 4D Technology Corporation

Schunk, HDF5, Windows, Zygo, MetroPro, Bruker, Vision and ADE-PhaseShift are registered trademarks of their respective owners. All specifications subject to change without notice.

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0.90

54

890

3.7

One-year, limited, on-site system installation and operator training

1.8

22.0

1800

7.4

0.44

2.3

440

2.6

0.18

0.73

180

1.40