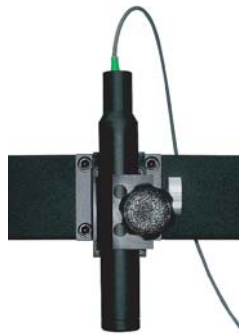


Nanovea Profilometers are designed with leading edge Chromatic Confocal optical technology (axial chromatism) both ISO and ASTM compliant. The technique measures a physical wavelength directly related to a specific height without using any complex algorithms. This ensures accurate results for all surface conditions. There is no influence on accuracy from sample's reflectivity, no need for frequent calibrations and no effects due to changes in measurement parameters. Utilizing a raster scan, the Profilometer can measure in 2D and 3D at standard speeds with an Point Sensor (single point) or 200 times faster with a Line Sensor (multi point), allowing a flexible measurement solution for all applications. The platforms can be integrated with wide area video imaging which extends the Profilometers with user friendly automation. Several automation options are available including: programmable recipes, pattern recognition, machine vision, automatic pass/fail results and database communication. Many standard Profilometer models are available including a first fully portable Profilometer, the Jr25. Profilometers can also be custom built with various platform sizes, motorization configuration (rotational, high speed and Class 1 Clean Room). The Profilometers durability and low cost of use are ideal for quality control environments.

The Jr25 is the first truly portable high performance Profilometer of its kind. With an optional battery pack and carrying case, the Jr25 provides measurement capability during field studies. The Jr25 is designed to utilize the superior Chromatic Confocal technique with complete portability. With a total weight less than 5.5 Kg, the operator can safely place the Jr25 onto the surface under inspection. The Jr25 has the ability to measure an area up to 25mm x 25mm and focusing on the surface is easy with an adjustment range of 30mm. With a fully rotational scanning head, the Jr25 has the ability to measure surfaces at difficult angles. Along with quick and ease of use, the Jr25 has been designed specifically for production environments where samples cannot be moved or in open field studies. The scanning head of the Jr25 can also be integrated onto automated robotic arms and other equipments.

OPTICAL OPTIONS

Point Sensor

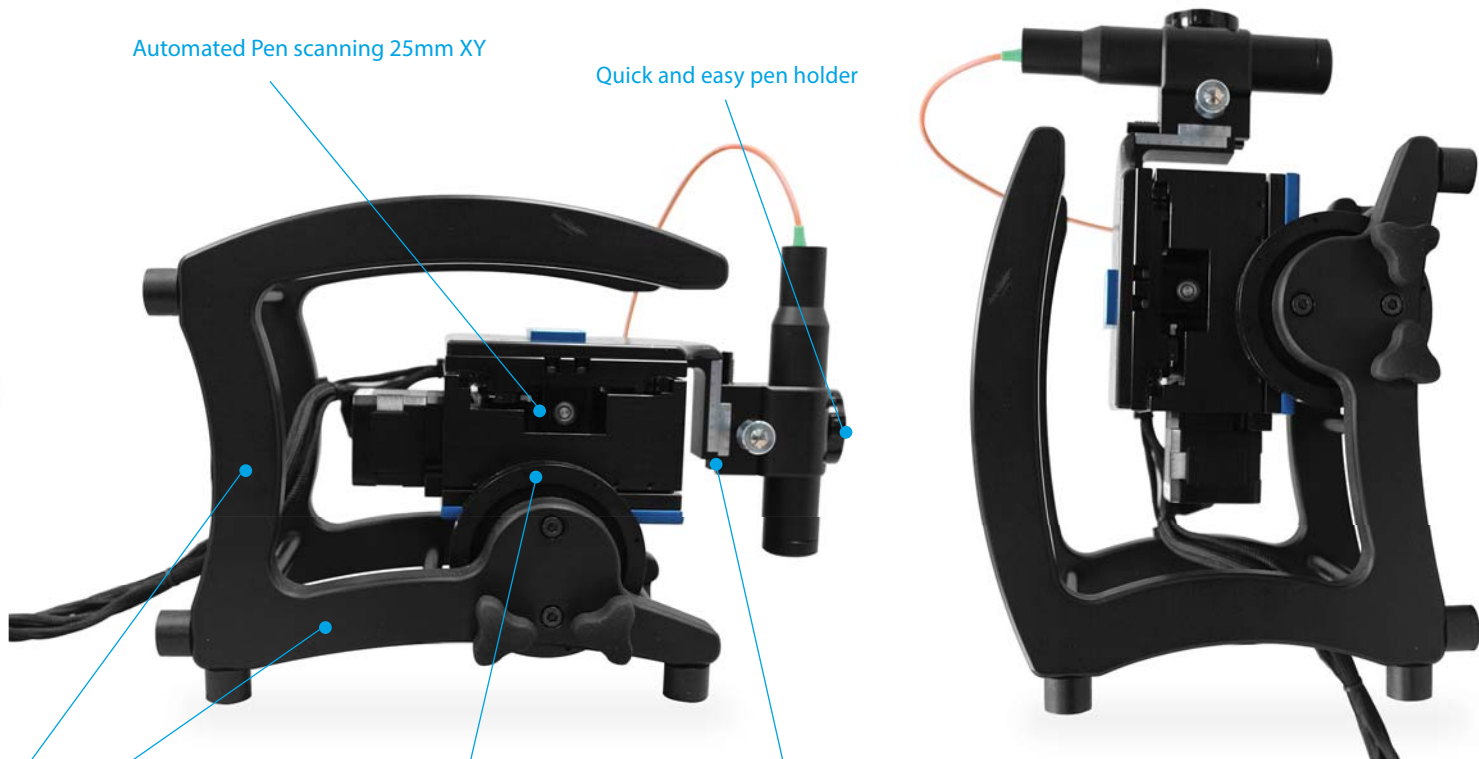


20 x 30 x 17 cm

* Fully portable or integrated on automated arms

Automated Pen scanning 25mm XY

Quick and easy pen holder



Vertical or horizontal standing positions

Rotational head

Manual 30mm Z control

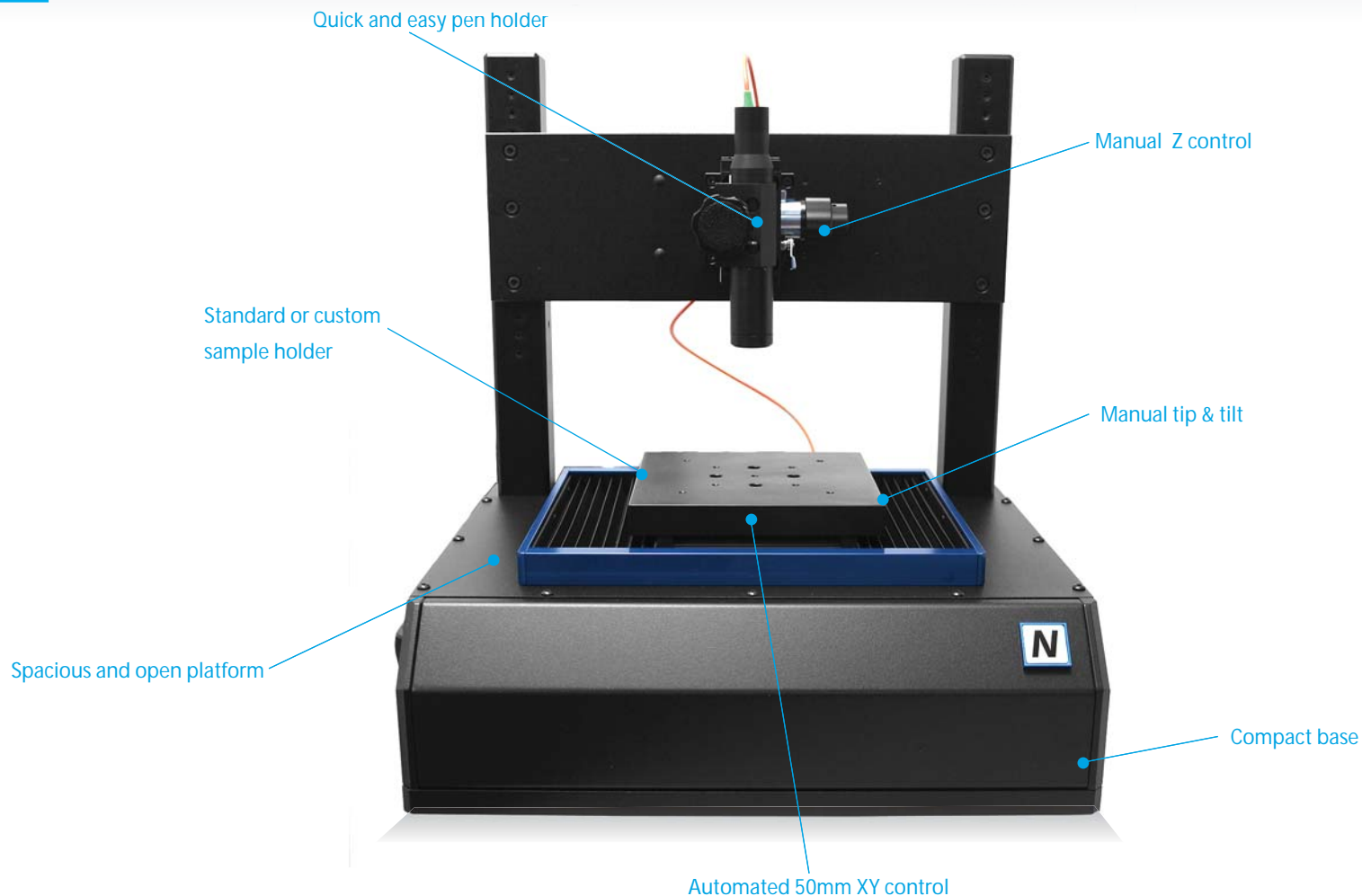
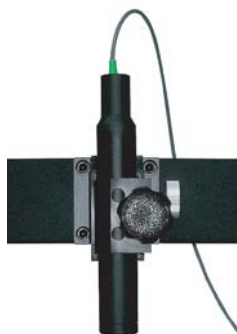
With a small and simple footprint, the PS50 is the most advanced compact Profilometer available. The high-performance PS50, with 50mm X-Y stages, is the ideal choice for upgrade and replacing stylus and laser profilers. The PS50 has the option of running by laptop which makes for an easy moving and installation where space is critical. Comes standard with 150mm x 150mm sample stage area to accommodate multiple and or larger samples. Quality Control options with macros for automatic testing and analysis recipes.

PS50

OPTICAL OPTIONS

38 x 33 x 43 cm

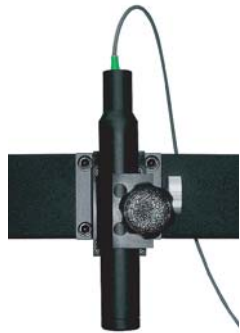
Point Sensor



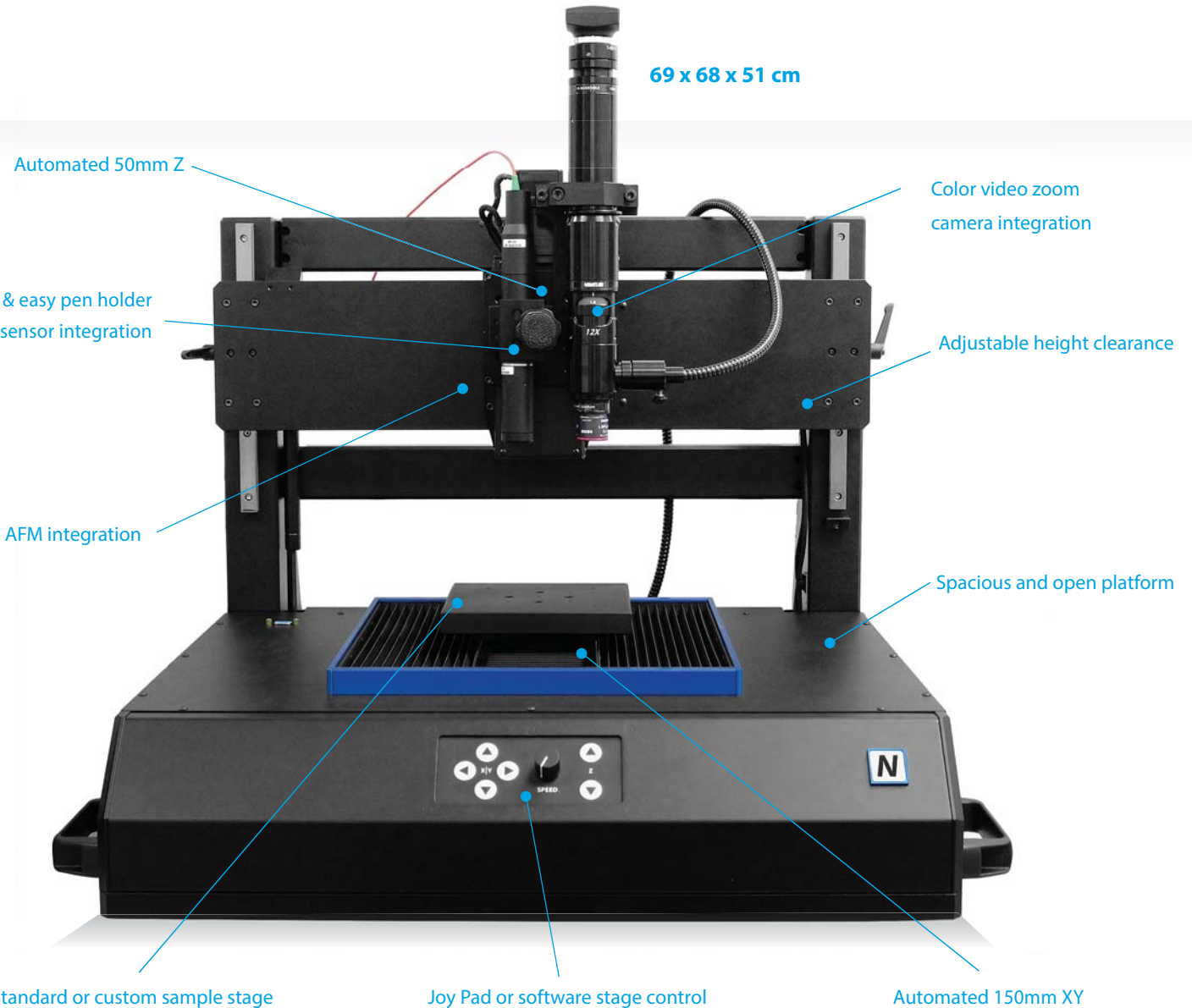
With 150mm X-Y stages and an adjustable height clearance of up to 200mm, the ST400 is ideal for a wide range of samples with varied geometries. With the optical video zoom or optical microscope, high magnification microscopy work can be done in combination with measuring roughness and other properties at precisely selected locations. The advanced software makes it easy to select zones on the video to be scanned automatically by Profilometer. Quality control options are available to automate various aspects of testing including image pattern recognition, database communications, macros for automatic testing and analysis recipes. Chromatic Confocal line sensors are also available on this system to allow speed of up to 200 times faster than the single point sensor. Custom ST400's are available for more open configurations that allow for larger X-Y stages, 360° rotational stages and many other custom configurations.

OPTICAL OPTIONS

Point Sensor



Line Sensor



The ST500 Profilometer provides fast large area measurement (without stitching) using a 400 mm X-Y axis travel with a maximum speed up to 200 mm/s. With a 50 mm Z axis the system can be equipped with either an optical pen or line sensor for ultra fast measurement (382,000 points per second). Unlike other technologies, each point is a direct, full depth of field during large area measurement without the need of refocusing. A video zoom camera can also be used to provide automated functions to large area measurement complete on a user friendly desktop platform.

ST500

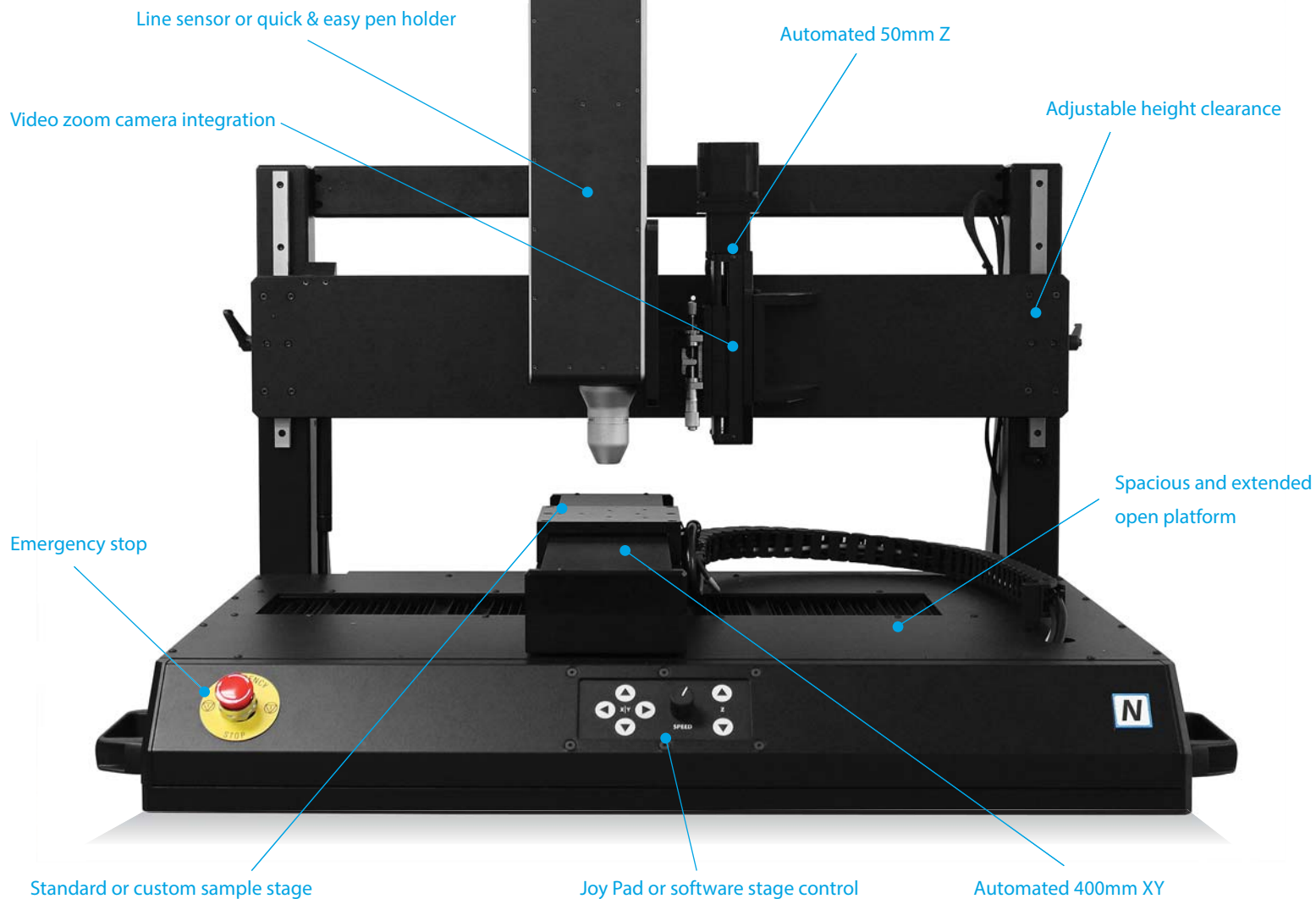
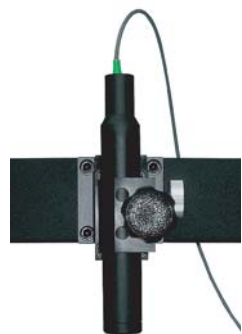
OPTICAL OPTIONS

86 x 73 x 88 cm

Line Sensor



Point Sensor



The HS2000 with its granite base and air bearing stages provides superior stability at high speeds for flatness measurement. Specifications for flatness are the best in the industry with less than 1micron over the entire measurement area. The HS2000 provides automated inspection for quality control applications where speed (1m/s) and large areas or multiple measurements are critical. It comes with an enclosure and workstation to create a fully contained stand-alone instrument. The HS2000 equipped with a line sensor can inspect at speed of up to 200 times faster. Designed for high speeds, large area's and flatness but also excellent for roughness measurements, combined with advanced automation features.

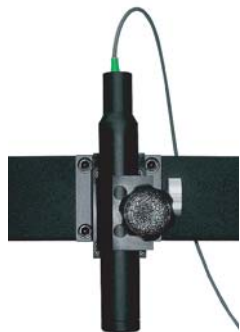
HS2000

OPTICAL OPTIONS

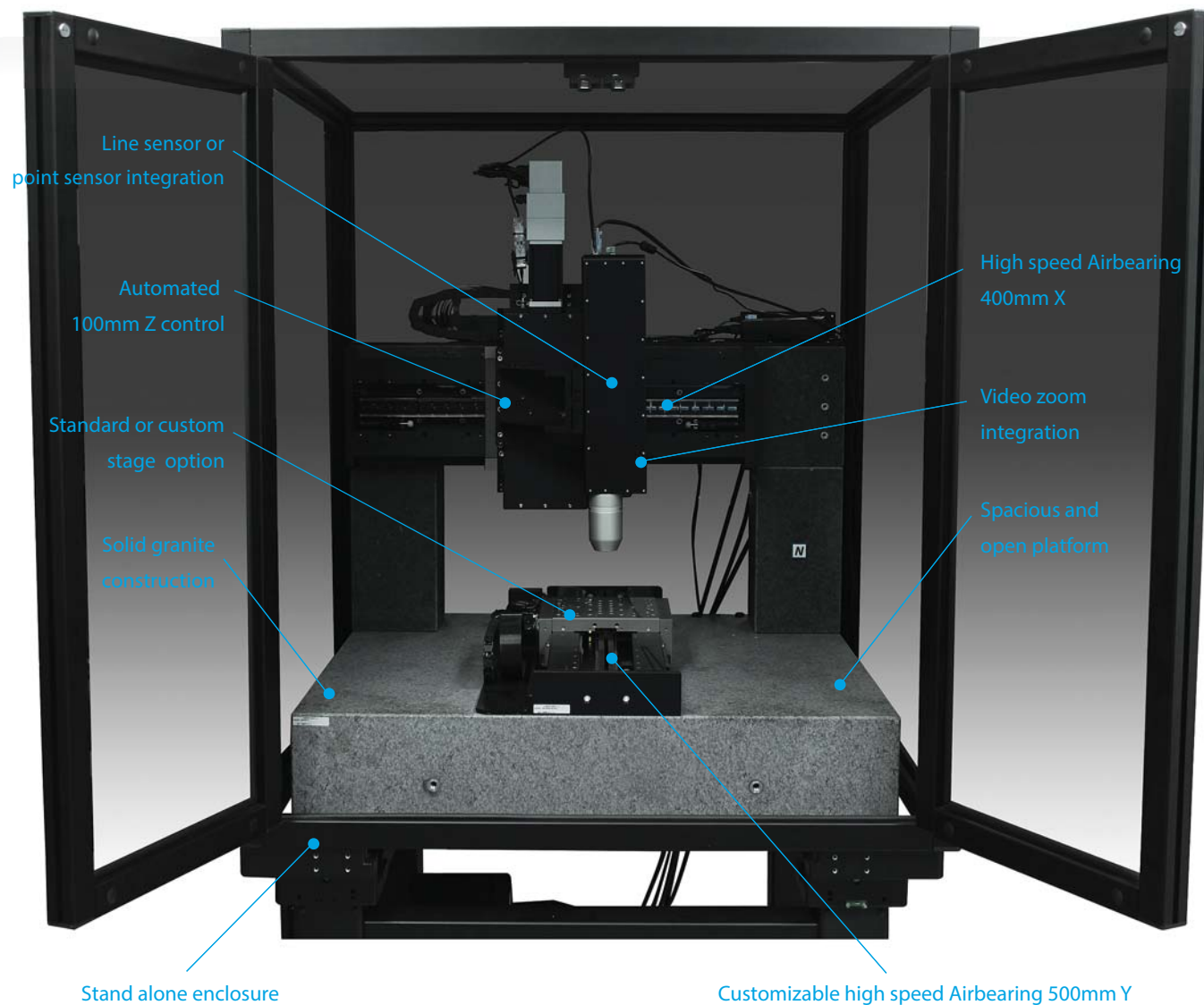
Line Sensor



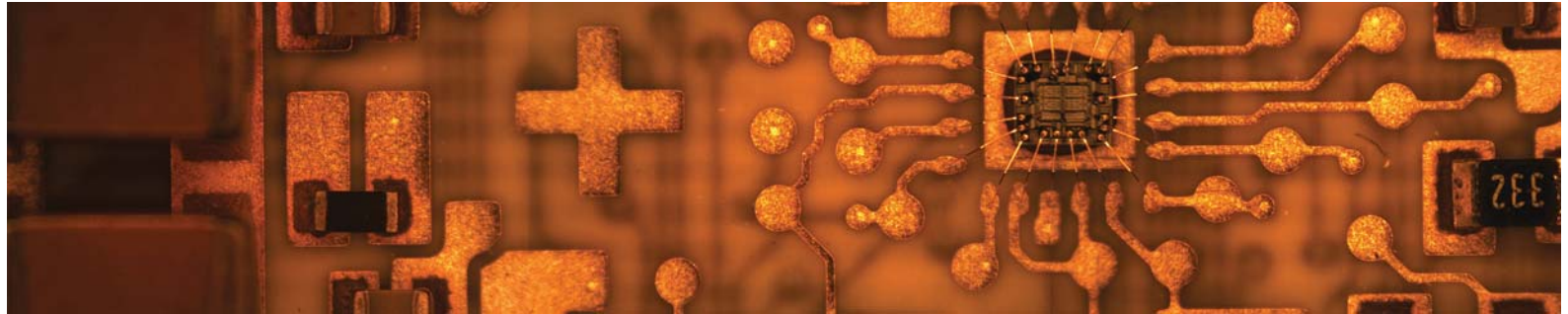
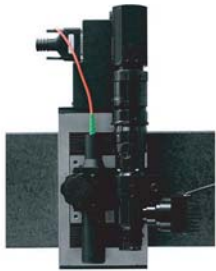
Point Sensor



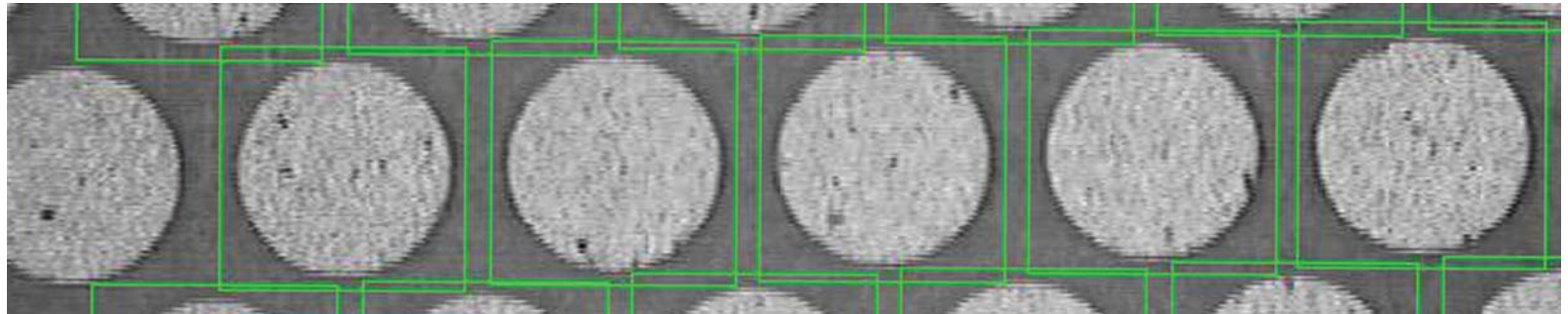
101 x 106 x 195cm



The wide area video imaging option provides user ability to select areas to be measured through live camera view. The camera is offset to the Optical Pen with a calibrated distance through the Nanovea 3D software. Complete with manual or motorized zoom capabilities with a diagonal field of view ranging from 11.42mm to 1.77mm. Broadview Map Selection is available in the software that allows user to take a picture of the surface and stitch multiple images together for Broadview Map Selection. (PRVision) Pattern recognition Software can also be included when imaging option is added. Microscope Video Imaging is also an option for higher magnification microscope applications. 12X Ultra zoom Lens with coax lighting & detent. Color Video Camera (PAL 1200x1600). 5X objective for total video magnification of 1X to 100X. Objectives up to 100x available for maximum magnification of 2000X.



Broadview Map Selection Tool



PRVision for machine vision capability

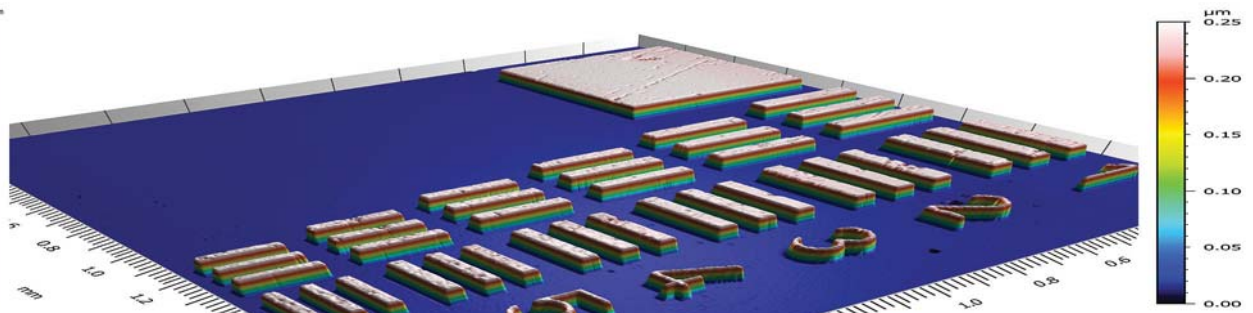
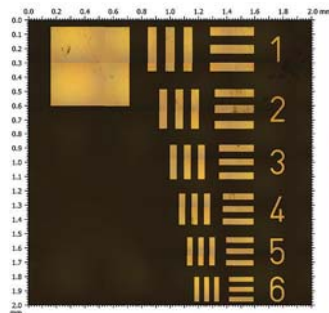
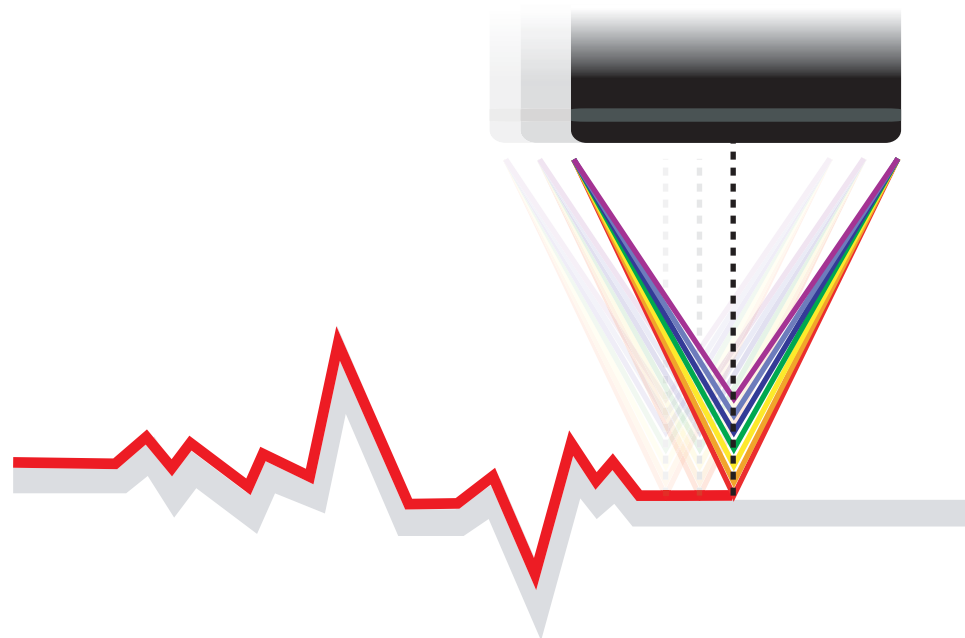


Image area selection measurement and image overlay

TECHNIQUE

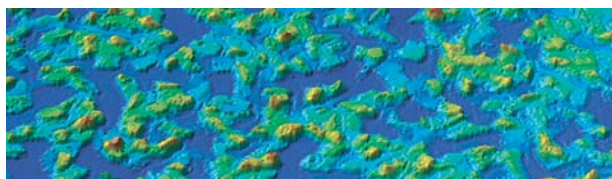
The Chromatic Confocal technique uses a white light source (LED) that passes through a series of lenses, called an optical pen, which has a high degree of chromatic aberration. The refractive index of the lenses will vary the focal distance of each wavelength of the white light. In effect, each separate wavelength of the white light will focus at a different distance from the optical pen, creating the measurement range. When a surface of interest is within the measurement range a single wavelength of the white light will be in focus while all others will be out of focus. The white light is then reflected back through the optical pen, then through a pin hole filter that allows only the focused wavelength to pass through to a CCD spectrometer. The CCD will indicate the wavelength in focus, which corresponds to a specific distance for a single point. The physical wavelength measured uses no algorithms providing the highest accuracy independent of form, roughness level, illumination and measurement speed. There is no special leveling procedure required. And while others make claims of resolutions Nanovea provides high accuracy.

Chromatic Confocal by design ensures the highest accuracy of all optical techniques. Specifically when measuring surfaces that are geometrically complex (randomly rough surfaces). Other techniques are subject to many error sources that are simultaneously present and it is not possible to remove or compensate for them or even to estimate their combined influences. The Profilometers offer high accuracy across the widest range of materials and surfaces conditions including tissues, biomaterials, polymers, plastics, metals, composites and ceramics. Examples of particularly demanding applications where Chromatic Confocal performs better than any other technique includes: corrosion, scratches & wear tracks, non-reflective/reflective surfaces and shapes or surfaces with steep angles.

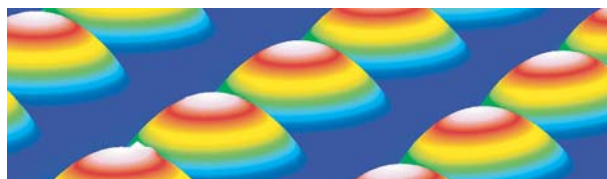


3D - 2D NON CONTACT PROFILOMETRY

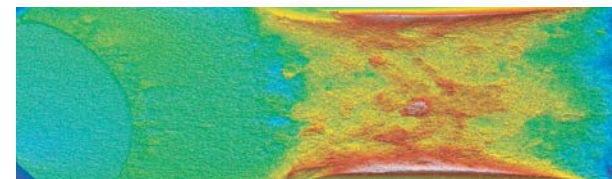
Roughness | Texture | Finish



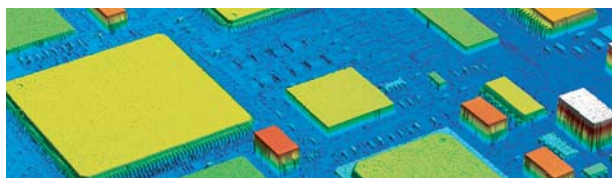
Profile | Dimensional



Topography | Shape | Form



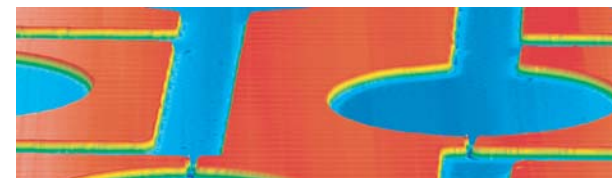
Flatness | Warpage | Planarity



Volume | Area



Step-Height | Depth | Thickness



Chromatic confocal provides the best level of accuracy for the measurement of surface roughness, texture or finish above 100nm Ra. This is because the technique measures a direct physical wavelength linked to a specific height which ensures the accuracy of data. In addition to the technique working on any material, it allows the highest surface angles to be measured with no need of algorithms. Since testing parameters have no effect on results, the repeatable data is easily comparable from sample to sample and from one instrument to another.

Standards:

• ISO 25178 • ISO 4287 • ISO 13565 • ASME B46.1 • Includes: GB/T, DIN, JIS, NF, BSI, UNI, UNE ISO equivalents

Standard Measurement Analysis:

• 3D and 2D mean roughness (Ra, Sa), root mean square roughness (Rq, Sq), maximum height (Rz, Sz), maximum pit height (Rv, Sv), skewness (Rsk, Ssk), kurtosis (Rku, Sku), and many more • 2D & 3D surface waviness • Peak distribution • Grain analysis • Texture alignment and analysis including: aspect ratio, direction, auto correlation, length, fourier transform, isotropy, power spectrum, root mean square gradients and many more.

Advanced Measurement Analysis:

• Motifs (locates highest peaks and lowest valleys) • Spectral (periodicity and orientation) • Vectorisation of micro-valleys and furrows • Fractal dimension

Specialized Measurement Analysis:

• Automotive: bearing ratio parameters • Lead-tightness (Mercedes Benz MBN31007-7) • Depth of gain and finish amplitude of granular plastic materials (Renault D45-1856)

Software Features:

• Easily defined line or area scans • Recipes • Lateral resolution • Export raw data and images • Real time display • Automatic reporting • Multi-language support • Mapping

Analysis Software Features:

• Filtering • Leveling • Thresholding • Zooming • Area selection and form removal tools • Subtract and compare functions and many others

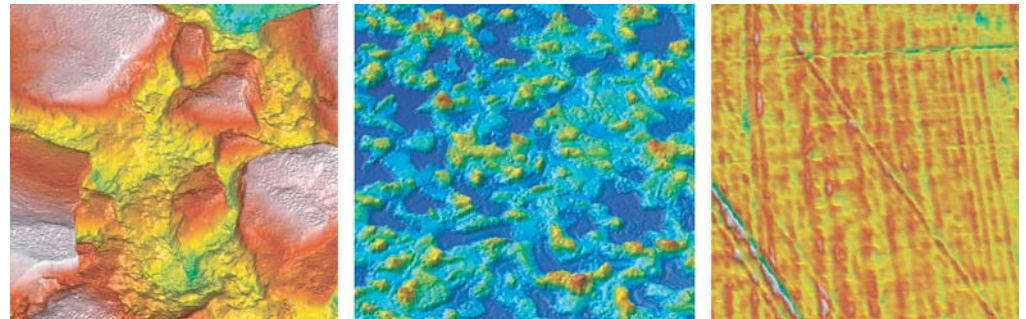
Advanced Automation:

• Focus • Analysis template • Multi sample handling macros • Microscope to profiling or AFM • Dual frequency for surfaces with varying reflectivities • Rotational staging • Pattern recognition • Database communications • Pass/Fail limits • Line sensors for up to 200 times faster measurements

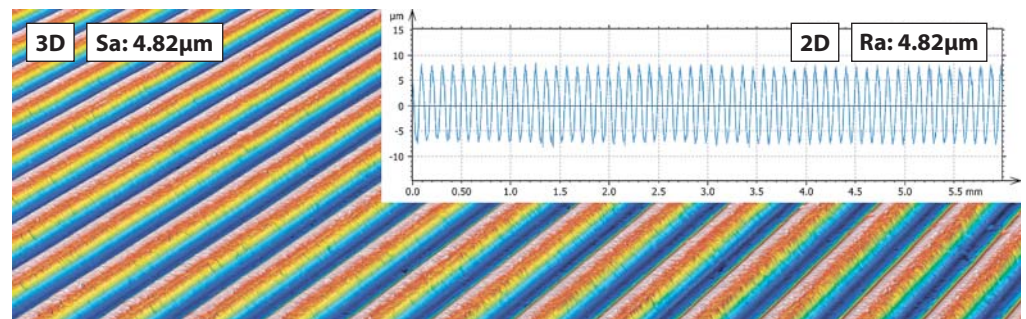
Sample(s) Holders and Environmental Conditions:

• Custom and standard sample holders • Heating stage

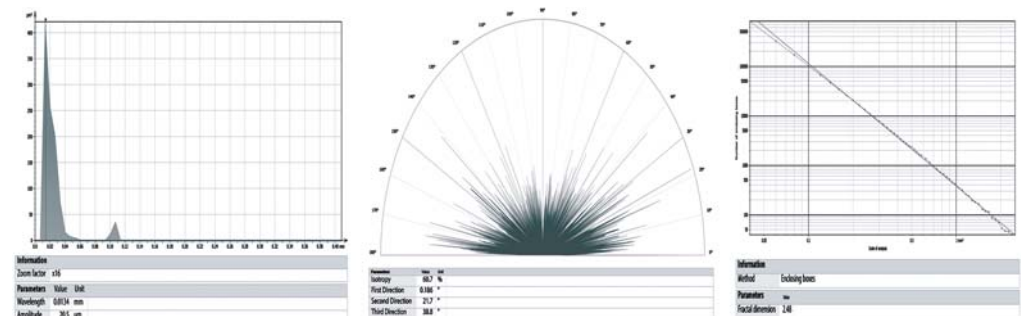
ROUGHNESS | TEXTURE | FINISH



Precise roughness, texture and finish measurement of any surface



Highly accurate & repeatable direct measurement with no software minipulation



Advanced surface analysis including: pattern, direction, fractal and many others

With a wide height range up to 25mm and the capability to measure steep angles, the chromatic confocal technique is ideal for many surface profile dimensional measurements including applications such as micro lenses and precision tooling. Because no stitching is needed for large surfaces, the chromatic confocal technique can be used to measure dimensions in seconds with a single profile. With pattern recognition and automation in addition to pass fail conditions and database communication, the instrument can be used as an advanced quality control tool.

Standards:

- ISO 5436-1

Standard Measurement Analysis:

- Maximum, minimum and mean heights
- Width
- Distance
- Radius
- Slope
- Center point and quantity of a specific feature
- Point to point
- Plane to point
- Plane to plane.

Software Features:

- Easily defined line or area scans
- Recipes
- Lateral resolution
- Export raw data and images
- Real time display
- Automatic Reporting
- Multi-language support
- Mapping

Analysis Software Features:

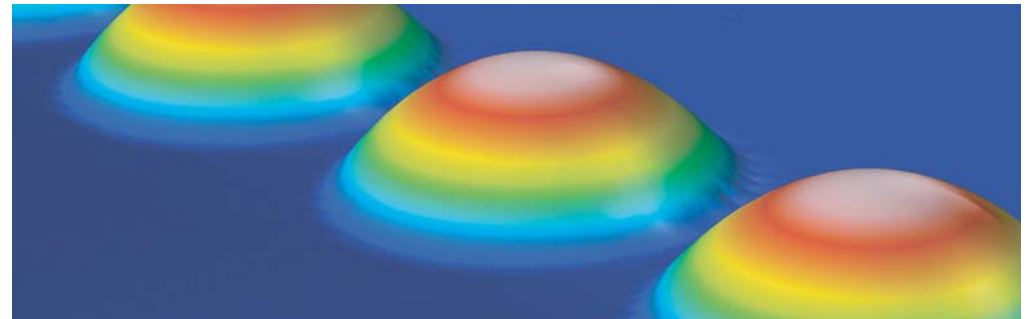
- Filtering
- Leveling
- Thresholding
- Zooming
- Area selection and form removal tools
- Subtract and compare functions and many others

Advanced Automation:

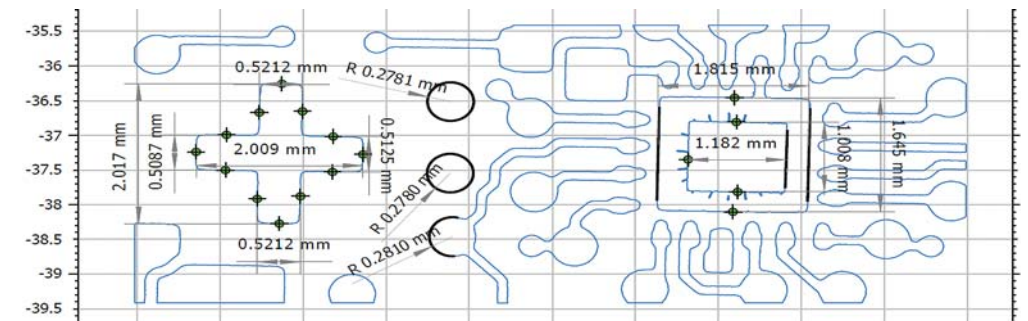
- Automatic focus (optical and microscope), automatic analysis template
- Multi sample handling macros
- Easy selection of area under the microscope for profiling or AFM testing
- Automatic dual frequency for surfaces with varying reflectivities
- Rotational staging
- Pattern recognition
- Database communications
- Pass/Fail limits
- Line sensors for up to 200 times faster measurements

Sample(s) Holders and Environmental Conditions:

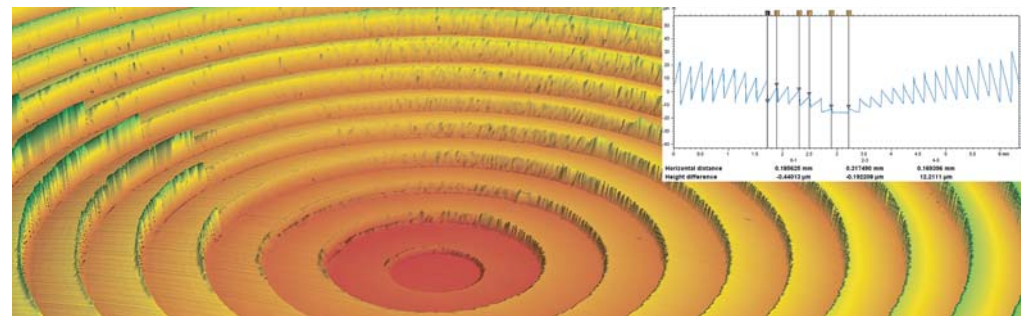
- Custom and standard sample holders
- Heating stage



Superior ability to precisely measure steep angled features



Reflection intensity data or video zoom imaging can also be used for lateral dimension measurements.



Superior ability to accurately measure challenging profile dimensions

FLATNESS | WARPAGE | PLANARITY

The chromatic confocal technique is ideal for measuring flatness, warpage and planarity on applications where it is often critical such as for micro parts, glass, seals and many others. Because no stitching is needed for large surfaces, the chromatic confocal technique can accurately measure in seconds these in addition to detecting local defects. With the HS2000, flatness can be measured on the full 400x500mm area with less than 1micron of deviation in a very short time. It is also possible to obtain the best match polynomial of the shape that causes deviation in flatness. With pattern recognitions and automation, in addition to pass fail conditions and database communication, the instrument can be used as an advanced quality control tool.

Standards:

• ISO 25178 • ISO 4287 • ISO 13565-2 • ISO 12085 • ISO 12780 • ISO 12181

Standard Measurement Analysis:

• 3D and 2D surface waviness and flatness • Best polynomial match • Material and bearing ratios

Software Features:

• Easily defined line or area scans • Recipes • Lateral resolution • Export raw data and images • Real time display • Automatic reporting • Multi-language support • Mapping

Analysis Software Features:

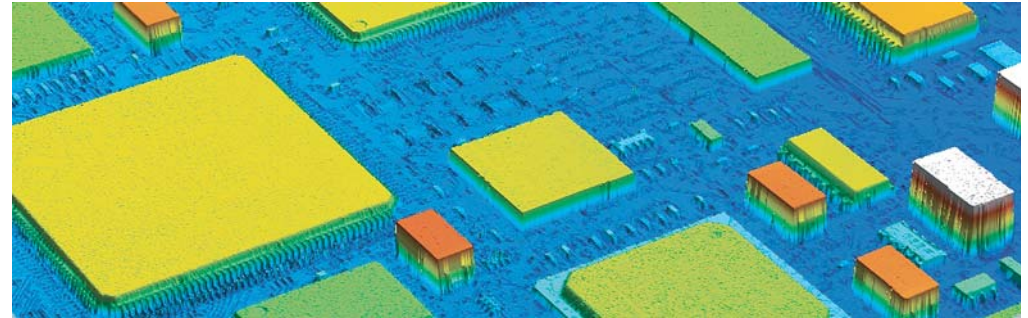
• Filtering • Leveling • Thresholding • Zooming • Area selection and form removal tools • Subtract and compare functions and many others

Advanced Automation:

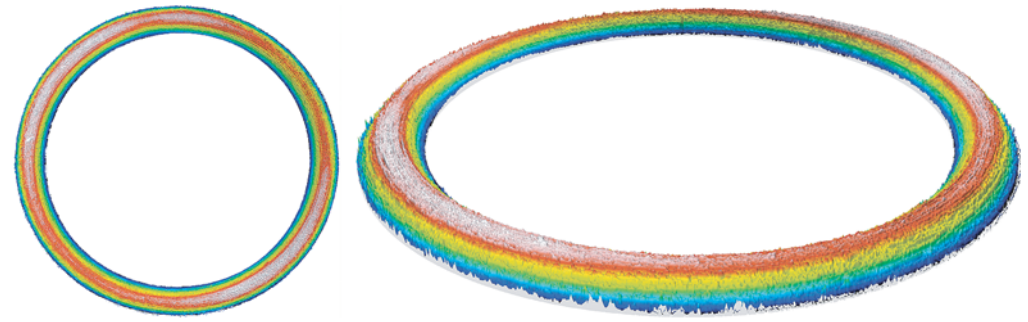
• Automatic focus (optical and microscope), automatic analysis template • Multi sample handling macros • Easy selection of area under the microscope for profiling or AFM testing • Automatic dual frequency for surfaces with varying reflectivities • Rotational staging • Pattern recognition • Database communications • Pass/Fail limits • Line sensors for up to 200 times faster measurements

Sample(s) Holders and Environmental Conditions:

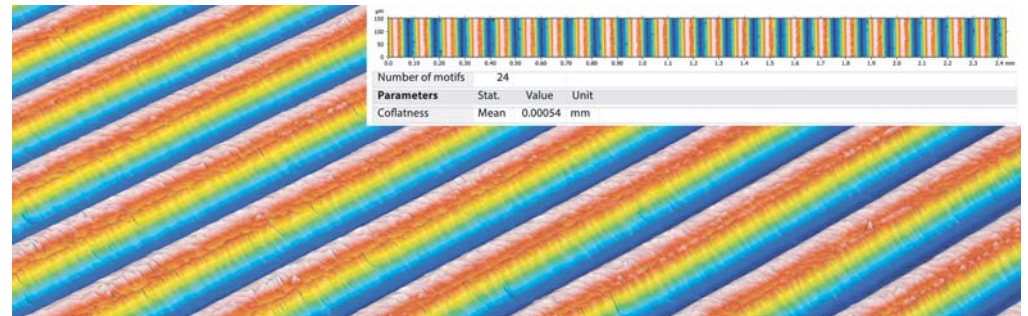
• Custom and standard sample holders • Heating stage



Precise measurement of flatness, warpage and planarity with a single 2D profile or 3D area



Accurately measure flatness across large areas and rotational capability



Superior ability to accurately measure co-planarity

With a wide height range up to 25mm and the capability to measure steep angles, the chromatic confocal technique is ideal for measurements of topography, shape and form on unknown and complex surfaces such as soft tissue, plants & rock, small parts and many others. Since no stitching is needed for large surfaces, the the chromatic confocal technique can measurerequired shape and form data in a few seconds. The resulting data is the best polynomial match for the shape under test. With pattern recognition and automation in addition to pass fail conditions and database communication, the instrument can be used as an advanced quality control tool for shape and form measurements.

Standards:

• ISO 25178 • ISO 4287 • ISO 13565-2 • ISO 12085 • ISO 12780 • ISO 12181

Standard Measurement Analysis:

• Waviness and lay parameters • Skewness and kurtosis • Surface comparison or subtraction • Abbott-Firestone Curve • Best polynomial match

Software Features:

Easily defined line or area scans • Recipes • Lateral resolution • Export raw data and images • Real time display • Automatic reporting • Multi-language support • Mapping

Analysis Software Features:

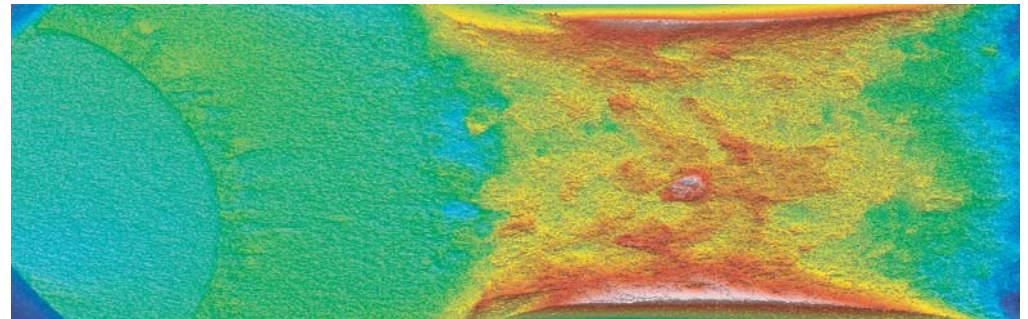
• Filtering • Leveling • Thresholding • Zooming • Area selection and form removal tools • Subtract and compare functions and many others

Advanced Automation:

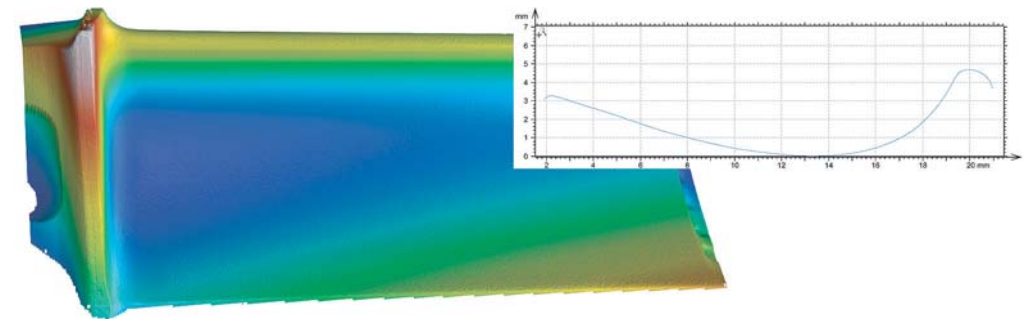
• Automatic focus (optical and microscope), automatic analysis template • Multi sample handling macros • Easy selection of area under the microscope for profiling or AFM testing • Automatic dual frequency for surfaces with varying reflectivities • Rotational staging • Pattern recognition • Database communications • Pass/Fail limits • Line sensors for up to 200 times faster measurements

Sample(s) Holders and Environmental Conditions:

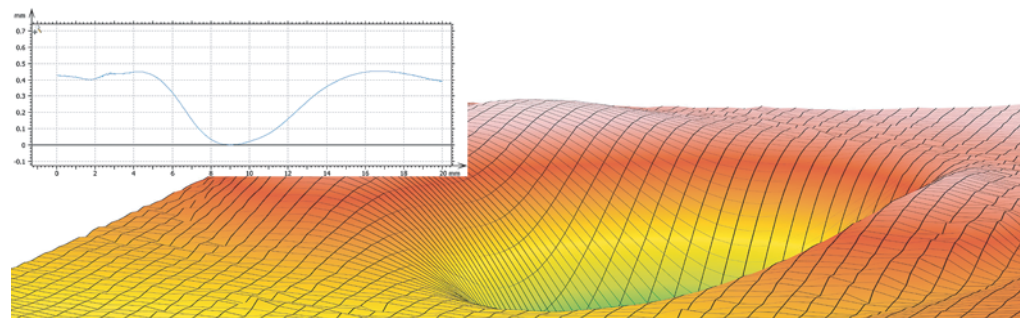
• Custom and standard sample holders • Heating stage



Precise surface topography measurement on any surface



Accurate shape measurement of small parts and features



Superior ability to accurately measure and analyze surface form

The chromatic confocal technique provides the highest level of accuracy for volume and area measurement on the widest range of materials. This is because the technique measures a direct physical wavelength linked to a specific height which ensures accuracy of the data. Nearly any material surface can be measured, including textile and highly corroded surfaces, and the highest surface angles can be measured with no need of algorithms. Because testing parameters has no effect on results, the repeatable data is easy to compare from sample to sample and from one instrument to another. With pattern recognition and automation in addition to pass fail conditions and database communication, the instrument can be used as an advanced quality control tool.

Standards:

• ISO 25178 • ISO 4287 • ISO 13565 • ISO 12085 • ISO 12780 • ISO 12181

Standard Measurement Analysis:

• Volume of void • Volume of hill or valley • Peak or pit • Surface area • Maximum and minimum depths • Highest peak

Software Features:

• Easily defined line or area scans • Recipes • Lateral resolution • Export raw data and images • Real time display • Automatic reporting • Multi-language support • Mapping

Analysis Software Features:

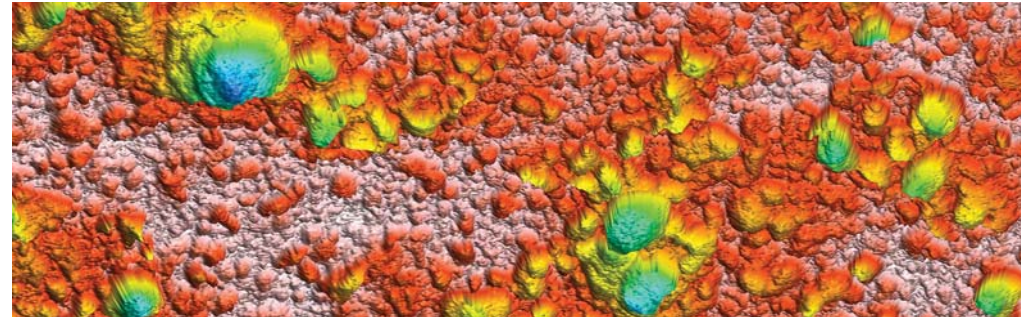
• Filtering • Leveling • Thresholding • Zooming • Area selection and form removal tools • Subtract and compare functions and many others

Advanced Automation:

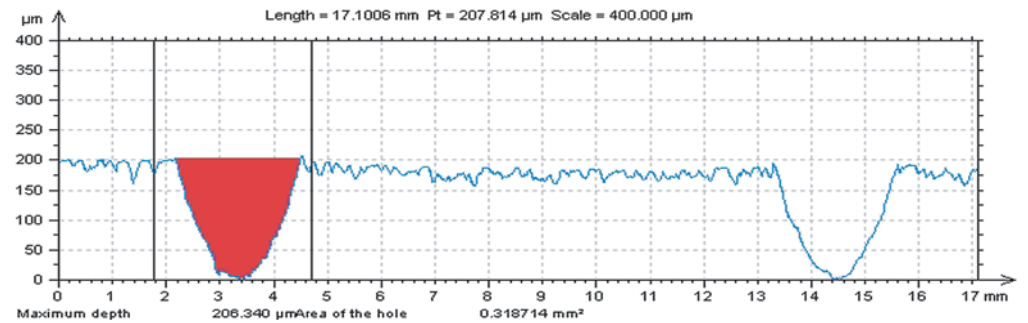
• Automatic focus (optical and microscope), automatic analysis template • Multi sample handling macros • Easy selection of area under the microscope for profiling or AFM testing • Automatic dual frequency for surfaces with varying reflectivities • Rotational staging • Pattern recognition • Database communications • Pass/Fail limits • Line sensors for up to 200 times faster measurements

Sample(s) Holders and Environmental Conditions:

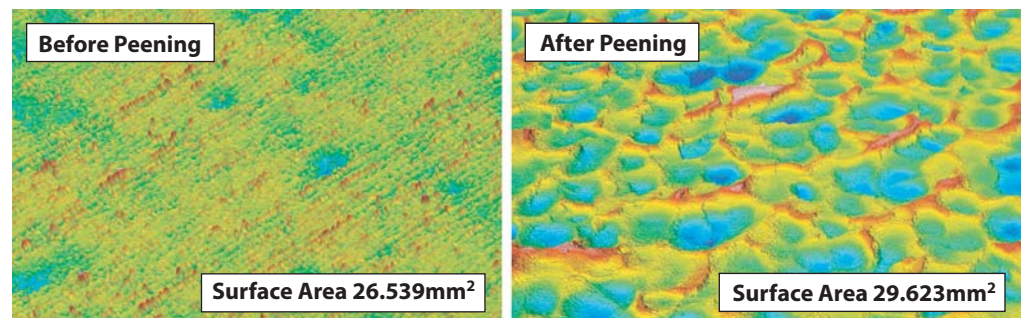
• Custom and standard sample holders • Heating stage



Precise measurement of volume and area with a single 2D profile or 3D area



Accurately measure volume and depth across large and rough areas



Superior ability to compare and evaluate surface area

The chromatic confocal technique offers the best accurately measures step heights from 60nm to 20mm. The advantage of the technique to accurately measure thickness lies on the fact that chromatic confocal is not influence by large change in reflectivity or texture as sometime seen when going from a coating to its substrate. Thickness of an optical transparent layer can also be measured with similar resolution and range ($> 7\mu\text{m}$).

Standards:

- ISO 5436-1

Standard Measurement Analysis:

- Point to point • Plane to plane • Maximum, minimum and mean heights • 3D or 2D map of thickness • Thickness distribution curve

Software Features:

- Easily defined line or area scans • Recipes • Lateral resolution • Export raw data and images
- Real time display • Automatic reporting • Multi-language support • Mapping

Analysis Software Features:

- Filtering • Leveling • Thresholding • Zooming • Area selection and form removal tools
- Subtract and compare functions and many others

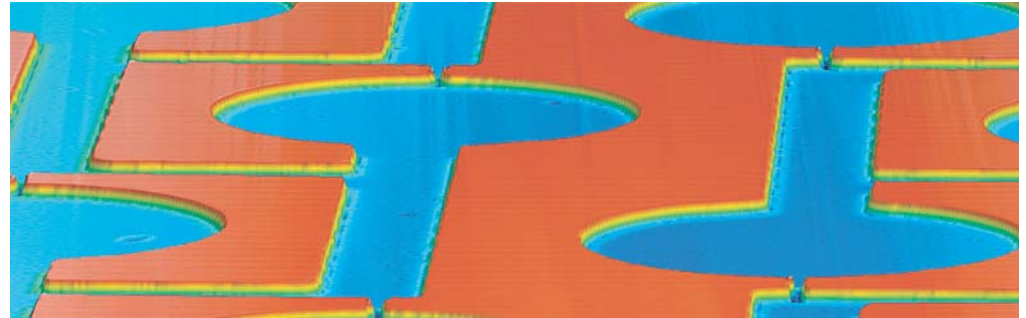
Advanced Automation:

- Automatic focus (optical and microscope), automatic analysis template
- Multi sample handling macros • Easy selection of area under the microscope for profiling or AFM testing • Automatic dual frequency for surfaces with varying reflectivities
- Rotational staging • Pattern recognition • Database communications • Pass/Fail limits
- Line sensors for up to 200 times faster measurements

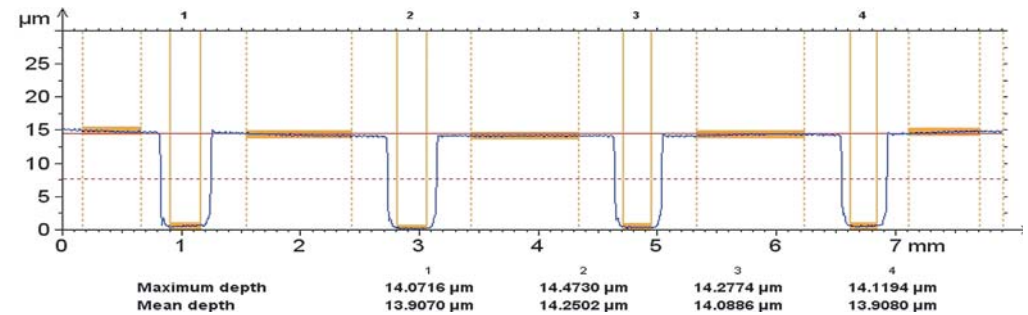
Sample(s) Holders and Environmental Conditions:

- Custom and standard sample holders • Heating stage

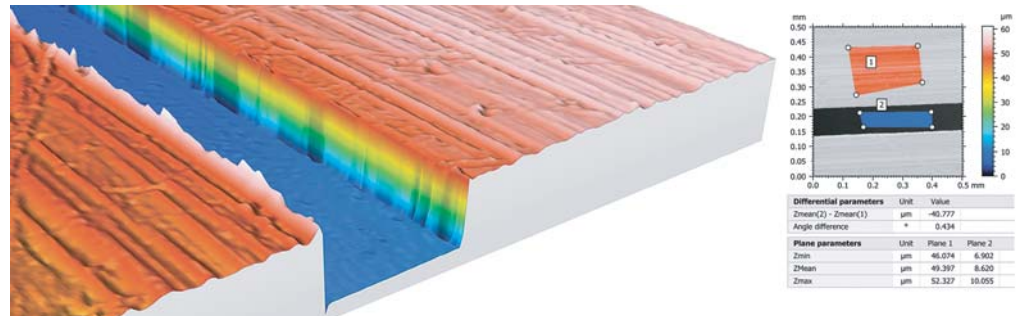
STEP HEIGHT | DEPTH | THICKNESS



Precise measurement of step height, depth and thickness with a single 2D profile or 3D area



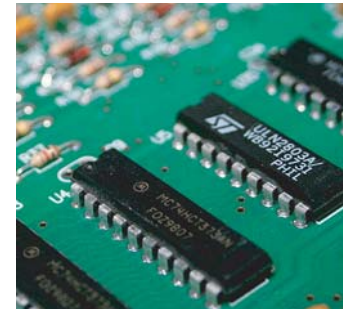
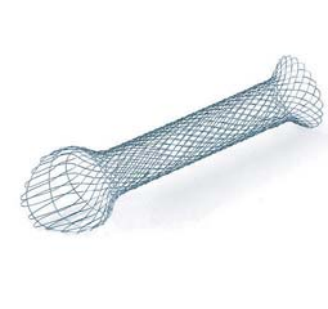
Accurately measure height and depth across large areas



Superior ability to accurately measure step height on challenging surfaces

Nanovea Profilometers measure nearly any material with a wider range of measurement than any other Profilometer. And because so, virtually any surface can be an application in fields including: Bio & Biotechnology, Building Materials, Consumer Products, Medical, Metals, Oil & Mines, Optics, Paint & Coating, Pharmaceutical, Semiconductor/Electronic/Solar, Textiles/Leather/Paper, Tooling & Machinery and Transportation.

APPLICATIONS



BASE	PS50	JR25	ST400	ST500	HS2000
Type	Compact BenchTop	Portable	Standard BenchTop	Large Area BenchTop	Precision Flatness Stand Alone
X-Y Axis Stage Travel	50x50mm	25x25mm	150x150mm	400x400mm	400x500mm (Air Bearing)
Z Axis Travel for Focusing	30mm Manual	30mm Manual	50mm Motorized	50mm Motorized	100mm Motorized
Maximum X-Y Speed	20mm/s	20mm/s	50mm/s	200mm/s	500mm/s
Dual Direction Scanning	N/A	N/A	Available	Available	Available
Base Dimensions	38x33x43mm	20x30x17mm	69 x68x81mm	97x72x92mm	101x106x195mm
Rotational Stage (X-Y Plane)	N/A	N/A	Available	Available	Software Based Rotation
Rotational Cylinder (90° to X-Y Plane)	N/A	N/A	Available	Available	N/A
2D Video Imaging	N/A	N/A	Up to 2000X Mag	Up to 2000X Mag	Up to 2000X Mag
Max Sample Weight	8Kg	No Limit	8Kg	4Kg-23Kg	7Kg-23Kg
Additional Options	N/A	Larger X-Y	AFM Module	N/A	Larger X-Y, 5-Axis Control
High-Speed Configuration (200x Std)	N/A	N/A	Available	Available	Available
Auto Focus	N/A	N/A	Available	Available	Available
Automated Scanning Programs	X-Y Only	X-Y Only	Available	Available	Available

SENSOR TECHNOLOGY

Technique — Non Contact • White Light • Chromatic Confocal

Data Stitching — Not Required within X-Y Stage Travel

Materials Types — ALL - Including Dark, Transparent & Reflective

Max Surface Angle — Up To 87°

Vertical Static Noise¹ — 1.7nm

POINT SENSOR (Standard)	PS1	PS2	PS3	PS4	PS5	PS6
Sensor Height Range	110µm	300µm	1.1mm	3.5mm	10mm	20mm
Working Distance	3.35mm	1.8mm	12.0mm	16.2mm	25.9mm	20mm
Lateral Accuracy (X-Y)	0.9µm	1.2µm	2.0µm	3.0µm	7.0µm	8.0µm

LINE SENSOR (High Speed)	LS1	LS2	LS3
Sensor Height Range	200µm	1mm	4mm
Working Distance	5.3mm	18.5mm	41.0mm
Line Length	0.96mm	1.91mm	4.78mm
Lateral Accuracy (X-Y)	1µm	2µm	5µm
Number of Simultaneous Points	192	192	192
Acquisition Rate	Up To 384,000 Points/Sec	Up To 384,000 Points/Sec	Up To 384,000 Points/Sec

¹ Static Noise for PS1 is the RMS of noise level measured on a static sample (average of 10) *See brochure pages for application specific details *Specifications continuously improving, please contact Nanovea for latest.

Today's Standard For Tomorrow's Materials.

Firmly aligned with our vision, Nanovea aims to simplify advanced measurement technologies to stimulate materials engineering for the common good. Ease of use, advanced automation and the dedication to superior accuracy are the driving forces behind its full range of precision instruments. As a Trusted Quality Manufacturer, our Profilometers, Mechanical Testers & Tribometers can be found internationally in distinguished educational and industrial organizations ranging from automotive to cosmetic, biotechnology to medical devices and from microelectronics to space applications. Thousands of clients rely on our accurate & honest solutions, superior instruments and experienced laboratory and consulting services.

The Profilometers are designed with leading edge Chromatic Confocal optical technology (axial chromatism) both ISO and ASTM compliant. Only Nanovea's Nano and Micro module on the Mechanical Testers have all modes of testing including indentation, scratch and wear; no interchange of modules needed. In order to give accurate and repeatable data, the Nanovea modules are designed with high quality leading edge technologies. This ensures durability with low cost of use. While the Tribometer provides highly accurate and repeatable wear and friction testing compliant to ISO and ASTM standards. Designed, at the core, with a self-tuned high quality motor with a 20bit internal speed and a 16bit external position ($>0.006^\circ$) encoder, the Tribometer provides an unmatched range of rotational speeds from 0.01 to 5000rpm.