



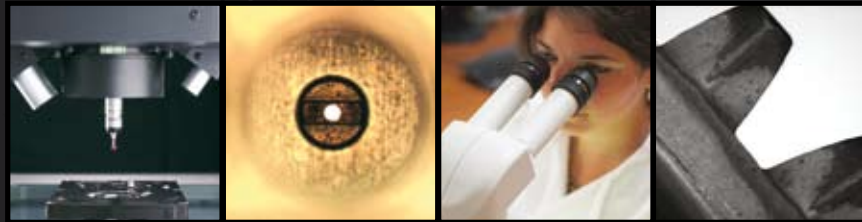
Video
Measuring
Systems

Measuring
Microscope

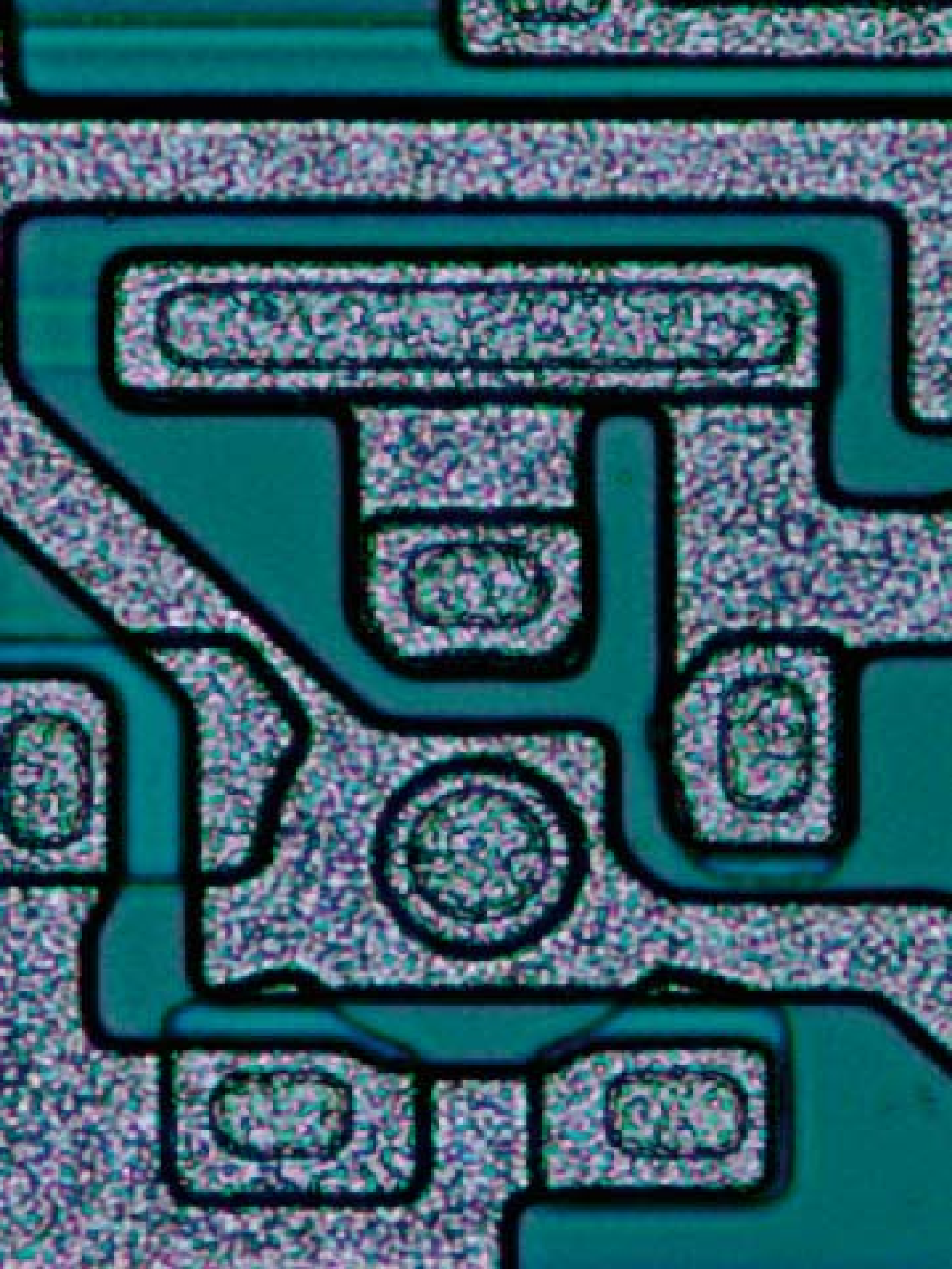
Manual
Metrology

Inspection
Systems

Industrial
Microscopes



Measuring success with Nikon



Nikon Metrology:

Founded on optical excellence

Established in 1917, mother company Nikon is a global company founded on the excellence of its optical technologies. Outstanding optical quality continues to be the core of its metrology, microscopy, semiconductor inspection and digital imaging equipment today.

With a pedigree in the manufacture of metrology instruments that dates back to the 1940s, Nikon has the experience to create metrology tools that meet, and often surpass, industry expectations. Recent innovations in vision measuring machines, for example, set new standards in speed and precision even for the smallest of work pieces.

Today, Nikon measuring instruments are promoted and distributed through Nikon Metrology. A short time after being acquired by the Nikon Group, Metris was renamed to Nikon Metrology. In addition to the instruments covered in this brochure, Nikon Metrology offers a wide range of innovative 3D measuring solutions that build on laser and x-ray technologies.

In this brochure, you will find some insights into Nikon's compelling and extended range of free-standing and bench-top automated vision measuring systems, new manual metrology microscopes, robust profile projectors, autocollimators and a variety of other metrology solutions. You will also hear from centres that have chosen Nikon metrology equipment to achieve an easier and more cost effective way of working.

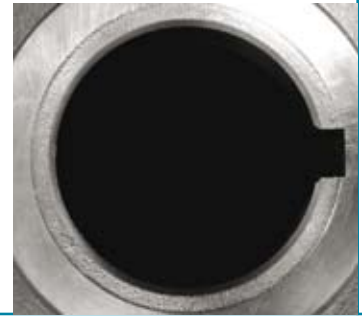
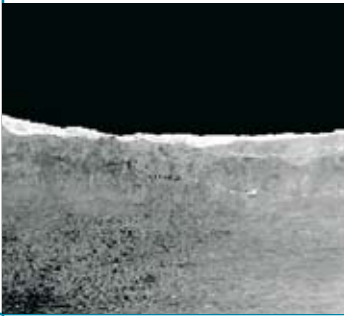
The importance of precision metrology

Metrology, or the science of measurement, is a universal tool in industry supporting the repeated manufacture of accurately made components for a wide range of devices from semiconductors to cars. Precision metrology ensures manufacture to appropriate tolerances, produces parts that fit and are fit for purpose, as well as making sure that manufacture complies with agreed specifications and internationally set process standards.

Essential in quality control, metrology allows supplied components and materials to be quality checked before, during and after incorporation into the final product. Metrology also provides an audit trail enabling a point of failure to be accurately pinpointed in time as well as providing a means of early detection and diagnosis of the problem. Early correction can save time, reduce waste and save money – and most importantly will safeguard your company's reputation for reliability and quality.

DID YOU KNOW?

Nikon manufactures its own precision lenses for all its measurement and microscopy instruments. Outstanding optical technologies combined with quality manufacturing ensure precision products.



Nexiv VMA/VMR

Video measuring Systems



MM-400/800 Series

Measuring Microscope Range



Profile Projectors
Optical comparitors

Manual metrology

Nikon measuring success

Whatever your metrology needs, from the simplest of manual measurement tools to automated, multi-sensor instruments, Nikon can tailor a solution to meet your specific needs from its high-performance range of metrology solutions.

Profile projectors: Ideal for the machine shop, QA department and assembly shop, profile projectors enable fast 'go / no go' decisions by magnifying surface features for sample checking, measuring one-off parts, or measuring intricate work pieces too difficult for a vernier calliper. Episcopic and diascope illumination and telecentric lenses, provide measurement flexibility and accurate, reproducible results.

Autocollimators: Used for assessing parallelism and ideal for machine builders and service engineers for the alignment or realignment of machine axes.

Digimicro: Highly accurate devices for measuring length, diameter or the thickness of objects in machine shops, assembly shop floor and in QA labs.

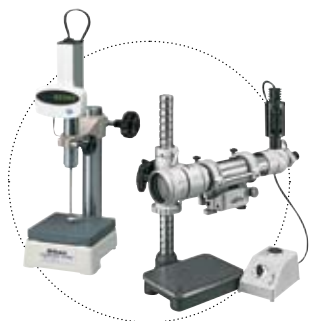
Measuring microscopes: Specifically designed for measurement and ideal for QA, these microscopes can measure objects greater than the field-of-view and can be fitted with a variety of options to assist in data interpretation.

Nexiv vision measuring machines: Fully automated and highly accurate, Nexiv systems are capable of measuring objects or features from less than 1µm up to 1m. Ideal for the assembly shop floor, QA department or specialised laboratory, Nexiv is the system of choice where accuracy is the paramount concern.

Support systems: With accessories such as the DS-L2 box, E-MAX, NIS-Elements software, and DP-E1 processor, metrology and data interpretation capabilities can be extended and enhanced to provide a truly versatile metrology environment for the whole spectrum of industrial measurement applications.

DID YOU KNOW?

Nikon has a long tradition in metrology. It began manufacturing profile projectors in the 1940s and coordinate measuring machines in the 1970s.



Autocollimators

Manual metrology



AZ100 and SMZ1500

Stereo Microscopes



Eclipse LV100/150

Inspection systems



DS Cameras
NIS-Elements Software

DS Cameras
NIS-Elements Software

Manual or automated measuring?

The metrology system most appropriate to your needs will depend on factors such as the work piece size, materials, sampling rate and inspection speed, repeatability, level of accuracy required, and ease of documentation. In most cases, throughput is the critical factor in deciding between manual or automated systems. For small volume work, manual metrology tools may suffice, while rapid throughput of large numbers of samples generally demands automation. Today's latest measuring microscopes, in addition, provide an intermediate solution – manual metrology with semi-automated functions.

The new MM400 and MM800 measuring microscopes

These new metrology microscopes enable complete digital control for maximum measuring accuracy and support a range of stages for work pieces up to 300 x 200mm in size. A variety of illumination options, in addition, provide flexibility in observations. In combination with powerful E-Max software, the measuring microscopes provide much of the automated functionality of vision measuring machines with automatic edge-detection to construct features beyond the field-of-view. These microscopes can also be fitted with a variety of other tools to assist in data interpretation.

DID YOU KNOW?

Nikon broke away from traditional microscope optical design to create the revolutionary CFI60 infinity optical system. The ability to incorporate multiple imaging modules into the light path without any compromise in optical quality, provides greater imaging capability and flexibility in metrology.



MM-400/800 series measuring microscope

CASE STUDY CARAGH MM-SERIES

Image quality counts at Caragh

As part of a drive to increase its capacity to develop precision engineering solutions for clients in the medical device, automotive and electronics sector, Caragh Tool and Die has invested in a new Nikon measuring microscope. This will be matched to the company's advanced manufacturing technologies and will play a key role in checking the tolerances of prototypes and production items made to solve a wide variety of complex engineering challenges.

According to John Eastwood, Caragh's

Quality Manager, "We work on a variety of materials to very demanding specifications and deadlines. We need a system with multiple illumination options and a wide magnification range that allows us to clearly see and measure the very finest details. The new microscope will be used across all of Caragh's speciality areas to examine ferrous, non-ferrous and plastic components."

Caragh has also invested in a Nikon V-12B profile projector. "Based on its superior image quality, the V-12B was the logical choice," says John.



Automation, speed and precision

Fully automated, and with outstanding accuracy, Nikon's range of Nexiv vision measuring machines provide measurement solutions for a wide range of sample sizes (< 1µm – 1m) and a variety of materials. Incorporating AutoMeasure modular software designed especially for metrology, Nexiv systems streamline and accelerate the measurement process. AutoMeasure, in addition, accepts company-specific programmes relevant to specialised applications and work pieces – saving time and ensuring continuity.

With measuring speeds ten times faster than manual operation, Nexiv systems eliminate operators' subjective errors, accelerate work flow and sample throughput for a more efficient manufacturing environment. Unlike most measuring microscopes, vision measuring is not confined to the field-of-view, but moves over the entire sample to measure all relevant areas. Machines can be incorporated into the production line between manufacturing processes to ensure that all parts passing onto the next stage of manufacturing are correct – reducing waste and saving money. You can rapidly realise a return on investment with a Nexiv!

There are a variety of Nexiv machines suited to a range of environments and metrology applications – bench top or stand alone, small to ultra wide with versatile optical head options.



Nexiv VMR-3020

CASE STUDY WESTWIND NEXIV VMR-3020

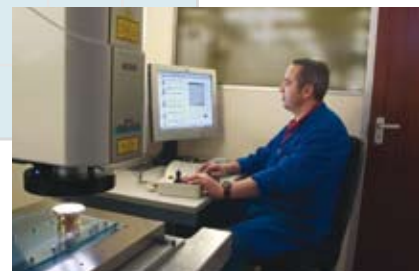
Accelerated throughput at Westwind

Vital QC tolerance checks of components destined for use in high performance air bearings used to take up to 25 minutes but are now completed in less than 30 seconds following Westwind Air Bearings investment in a Nikon Nexiv VMR-3020 vision measuring system.

"We can now take 'first-off' items from our production line, check their dimensions and give the green light for complete batch manufacturing within minutes. This has allowed us to cut out a previous bottleneck and push more production volume through our CNC drilling machines," says Malcolm

Thurlby who controls the quality of the company's PCB drilling spindles. On a typical component the Nexiv will automatically measure the position of about 20 separate apertures and check the diameter of each at 60 different points. It can also measure the depths and profiles. Any misalignment could cause a spindle to exceed its tightly defined run out tolerance.

The Nexiv has already been programmed to measure more than 100 different components at Westwind, but this should more than double as it is being used to check incoming goods and as a diagnostic tool to find out more about production methods.



A vision system matched to your needs

Exploiting Nikon's superior optical measurement technologies, image processing and automatic edge detection tools, Nexiv systems can measure an unbelievable variety of parts and enable multiple measurements of complicated profiles.

Multi-sensor capability

The latest instrument in the Nexiv series (the iNexiv VMA-2520) is a multi-sensor system designed to take advantage of the benefits of both non-contact measurement and contact measurement in one machine. Touch probe ready, this instrument is ideal for complex 3-D work-pieces. It enables accurate measurement on areas previously inaccessible to optical technologies and provides greater sample versatility.

Confocal for accurate Z-axis measurements

The confocal Nexiv is the machine of choice for complex IC packages. Addressing the demand for reliable semiconductor products, a confocal measuring head enables accurate micron-level Z-axis measurements of layers within a chip.

Ultra-high precision

When exceptional performance and accuracy are critical, Nikon's ultra-high precision Nexiv (VMR-H3030) achieves sub-micron level uncertainty. With a 300 x 300 x 150mm stage, laser height/profile scanning, intelligent pattern recognition and low contrast edge detection this system is ideal for dies, moulds and finely machined parts.

For FOUP and FOSB

Designed for 300mm Front Opening Unified Pod (FOUP) & Front Opening Shipping Box (FOSB) wafer carriers, this Nexiv provides all dimensional measurements for wafer carrier fabrication. With a laser AF that provides rapid, non-contact focusing, even on transparent surfaces, this system detects hard-to-see edges with excellent accuracy.

Big and wide

For ultra-wide metrology applications capable of handling large flat panels, shadow masks, etching sheets for lead frames, LCDs, mask patterns, and other large work pieces, the largest of the Nexiv range (Nexiv VMR-10080) features a 1000 x 800 x 150 mm stage stroke, bright diascope illumination, and pin-point laser auto focusing. An ultra-high magnification model is also available.

...and more

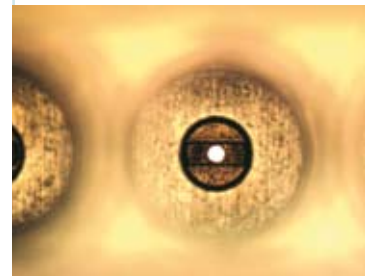
Whatever your choice of Nexiv, from the most affordable bench top system, standard and mid range models, to the most sophisticated ultra high precision and multi-sensor instruments, your Nikon industrial support team is on hand to ensure that you get the most from your investment.

DID YOU KNOW?

Nikon vision measuring systems can significantly accelerate workflow and increase productivity



iNexiv VMA-2520



iNexiv VMA-2520 with touch probe and high intensity white LED ring illumination

CASE STUDY BESPAC NEXIV VMR-3020

Metrology delivers a metered dose for Bepak

Thanks to its Nexiv measuring system, Bepak can now automatically check key tolerances of up to 400 critical incoming components every day. These are mainly pressed metal parts and rubber valves destined for use in its innovative range of metered dose inhalers (MDIs) for drug delivery. The Nexiv has already been used under FDA regulation 21 CFR80 and is playing a vital part in the company's commitment to quality and excellence.

Vincent Porter, Supply Quality Assurance at Bepak, "When we decided to scale-up production of our MDIs, we knew we would need a CNC system capable of automated sample processing to keep pace. We chose Nexiv because of its superior optical performance, flexibility, accuracy and ease of automation. We were impressed by the 8-segment LED illumination system and the through-the-lens auto-focus. This allowed us to detect our measurement points very accurately."



CASE STUDY DEK NEXIV VMR-6555

DEK has the edge!

DEK uses the Nexiv VMR-6555 to measure key tolerances, in up to nine directions, on screens comprising over 500 micro-circuits. These are destined for the screen printing of sensor strips used in hand-held blood glucose meters.

"We chose Nexiv because its unique 8-segment LED ring illumination system allows us to clearly detect the edge of our emulsion – even though they are coated on a mesh. This proved a problem with other vision measuring systems, but Nexiv

ignored the mesh and allowed us to focus clearly and consistently on the emulsion. Using AutoMeasure software it's simple to automate the entire measuring sequence," comments Roger Holding, Product Development Manager – Screen at DEK.

High measurement accuracy has allowed DEK to review its screen making process and improve the quality of the end product. "Armed with the data from Nexiv, we have optimised the process and materials to meet the increasingly tight demands of our customers."



Supporting metrology

Dedicated metrology equipment is not always necessary for many simple metrology tasks in industry. With the help of relatively inexpensive accessories, simple measurement tasks within the field-of-view of a microscope can be carried out.

The DS-L2 box, for example, is a stand-alone control unit with an LCD screen attached to a digital camera on a microscope. It allows users to capture an image of a sample, to draw and measure lines on the images, and share the images and annotations with remote parties via a network. This system is a simple and effective way of highlighting features on a sample to suppliers, colleagues or customers in remote locations.

NIS-Elements image analysis software brings measurement capability to AZ100 and SMZ1500 stereos and LV series inspection microscopes. NIS-Elements' special industrial measurement modules, such as the 'Metallo' module, incorporate a variety of measurement methodologies (planimetric, 'linear', 'circular' etc) to enable basic metrology, for example, in applications such as grain sizing.

NIS-Elements is also a powerful image management tool, which integrates microscopes, cameras, components and peripherals with image archiving, analysis and visualisation tools. Intuitive menus simplify workflow and image acquisition while providing many other features such as image stitching, object counting and volume views.

Other accessories provide additional function to dedicated metrology microscopes. These include, for example:

- A simple digital read-out (X, Y and Z) attached to a microscope.
- The DP-E1 data processor, to provide a suite of metrology functions and the ability to load previously used programs. Teaching files and measurement results can be easily transferred to a USB memory stick to be used anywhere.
- E-Max software, is a relatively simple to use metrology software package that brings many of the functions of a vision measuring system to a measuring microscope. It can also be used to combine a measuring microscope with profile projector functions to simplify advanced measuring and processing functions – from 2D processing and image measurement to data storage.

Digital imaging cameras

Nikon has a range of digital cameras that can be incorporated into Nikon's industrial microscope systems enabling immediate image capture, archiving, the creation of an audit trail and immediate image sharing via a network.

DID YOU KNOW?

NIS-Elements software provides a number of specialist metrology modules such as grain sizing.



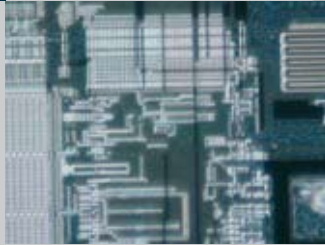
AZ100 Microscope with a DS-L2 box



NIS-Elements software



SMZ1500



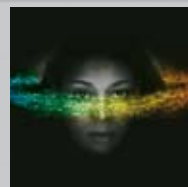
Video
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Industrial
Microscopes





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