Common Applications

Materials Science

Materials characterization of metals, ceramics, polymers, composites, coatings, metallurgy, metallography, fracture analysis, degradation processes, morphological analysis, steel cleanliness analysis, microanalysis, texture analysis, ferromagnetic materials, etc.

Research

Mineralogy, geology, paleontology, archeology, chemistry, environmental studies, particle analysis, applied physics, nanotechnology, nanoprototyping, etc.

Life Sciences

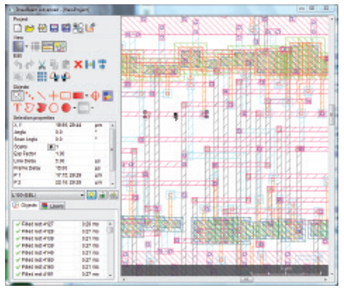
Botany, parasitology, pharmaceutics, STEM histology, dental implants, etc.

Forensic Investigations

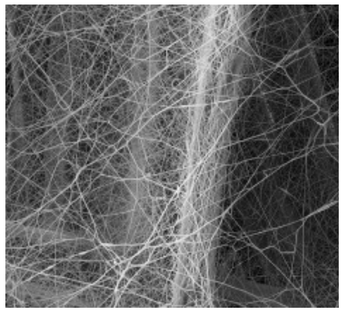
Bullets and cartridge investigation, tool mark comparison, analysis of hairs, fibers, textiles and papers, paint, ink and print characterization, investigation of counterfeit banknotes, etc.

Electrotechnical Engineering

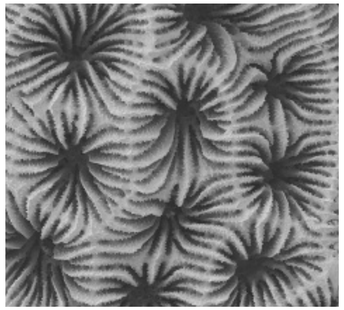
Solar cell inspection, PN junction visualization, lithography, etc.



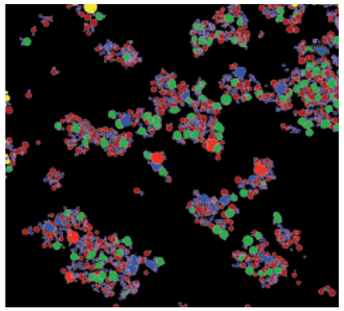
DrawBeam interface - Layout of D/A Convertor



Quality control of nano-fiber textiles



Colonial coral skeleton, high depth of focus in Field Mode



Automatic morphological analysis of semi-sintered iron balls for powder metallurgy.

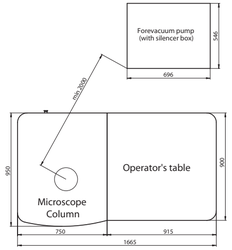
www.tescan.com

VEGA3

	SBH	SBU		
Resolution In high-vacuum mode (SE) In medium-low-vacuum mode (BSE)	3.0 nm at 30 kV –	3.0 nm at 30 kV 3.5 nm at 30 kV		
Working vacuum High-vacuum mode Medium-vacuum mode Low-vacuum mode * – with optional gauge	< 9x 10^{-3} / < 9x 10^{-4} * – –	< 9x 10^{-3} / < 9x 10^{-4} * 3 – 150 Pa 3 – 500 Pa		
Electron optics working modes	Resolution, Depth, Field, Wide Field, Channelling	**High Vacuum** Resolution, Depth, Field, Wide Field, Channelling	**Medium Vacuum** Resolution, Depth, Field, Wide Field, Channelling	**Low Vacuum** Resolution Depth
Magnification	Continuous from 4.5x to 1,000,000x			21x - 1,000,000x
Maximum field of view	34.7 mm			8.1 mm
Accelerating voltage	200 V to 30 kV			
Electron gun	Tungsten heated cathode			
Probe current	1 pA to 2 µA			
Scanning speed	From 20 ns to 10 ms per pixel adjustable in steps or continuously			
Focus window	Shape, size and position continuously adjustable			
Scanning features	Dynamic focus, Point & Line scan, Tilt correction, 3D Beam, other shapes accessible using optional DrawBeam Software Tool			
Image size	Up to 8,192 x 8,192 pixels in 16-bit quality, size is adjustable separately for live images (in 3 steps) and for saved images (in 10 steps), for square and rectangular 4:3 or 2:1 aspect ratios.			
Microscope control	All microscope functions are PC-controlled using the trackball, mouse and keyboard via the program VegaTC using Windows™ platforms. Control panel and touchscreen optionally available.			
Automatic procedures	In-Flight Beam Tracing™ beam optimization, BI OptiMag (Spot Size optimization for Magnification), WD (Focus) & Stigmator, Contrast & Brightness, Scanning Speed (according to Signal - Noise Ratio), Gun Heating, Gun Centering, Column Centering, Vacuum Control, Compensation for kV, Look Up Table, Auto-diagnostics			
Remote control	Via TCP / IP			

Requirements

Installation requirements	Power 230 V/50 Hz or 120 V/60 Hz, 1300 VA No water cooling Compressed dry nitrogen is recommended: 150 – 500 kPa
Environmental requirements	Temperature of environment: 17 – 28 °C Relative humidity: < 80 % Vibrations: mechanical suspension (option): < 4 µm/s below 30 Hz < 8 µm/s above 30 Hz Background magnetic field: synchronous < 3 x 10^{-7} T asynchronous < 1 x 10^{-7} T System dimensions: 1665 x 950 mm Room for installation: min. 2.5 m x 2.5 m



TESCAN
PERFORMANCE IN NANOSPACE

TESCAN, a.s.
Libušina třída 21, 623 00 Brno, Czech Republic, EU
tel. +420 547 130 414, fax +420 547 130 415
e-mail: info@tescan.cz

www.tescan.com

Distributor

VEGA3 SB

3rd Generation of VEGA SEMs

The VEGA series was designed for a wide range of SEM applications and needs in today's research and industry. After 10 years of continuous development VEGA has matured into its 3rd generation. This new generation provides users with the advantages of the latest technology, such as new improved high-performance electronics for faster image acquisition or an ultra-fast scanning system with compensation of static and dynamic image aberrations, all while maintaining the best price to performance ratio.

TESCAN
PERFORMANCE IN NANOSPACE

Modern Optics

- A unique four-lens **Wide Field Optics™** design offering a variety of working and displaying modes
- The proprietary Intermediate Lens (IML) that works as an 'aperture changer' changes the effective final aperture electromagnetically.
- The use of premium materials for the lenses and coils enables an ultra-fast imaging rate down to 20 ns/pixel with minimized dynamic distortion effects.
- Newly implemented **In-Flight Beam Tracing™** for high precision real-time computation of optical parameters
- The column construction, being without any mechanical centering elements, enables fully automated column set-up and alignment.
- Unique live stereoscopic imaging, using advanced **3D Beam Technology**, opens up the micro and nano-world for amazing 3D experience and 3D navigation.

Analytical Potential

- The SB chamber is equipped with a 3-axis motorized stage
- First-class YAG scintillator-based detectors
- 10 chamber interface ports with optimized analytical geometry for e.g. EDX, EBSD, EBIC
- Selection of optional detectors and accessories
- Full operating vacuum can be reached within a few minutes with powerful turbomolecular and rotary fore vacuum pumps.
- Investigation of non-conductive samples in the variable pressure mode (SBU) version
- 3D measurements on a reconstructed surface utilizing 3D metrology software

Rapid Maintenance

Keeping the microscope in peak conditions is now easy and requires a minimum of microscope downtime. Every detail has been carefully designed to maximize the microscope performance and minimize operator effort.

Automated Procedures

Filament heating and alignment of the gun for optimal beam performance is done automatically with just one click. There are many others which reduce the operator´s tune-up time significantly.

User-Friendly Software

- Multi-user environment is localized in many languages.
- Three levels of user expertise/rights, including an EasySEM™ mode for routine applications
- Image management and report creation
- Built-in self-diagnostics for system readiness checks
- Network operations and remote access/diagnostics

Software Tools

- Modular software architecture enables several extensions to be attached.
- Basic set of plug-ins, such as Measurement, Image Processing, Object Area available as standard
- Several optional modules or dedicated applications optimized for automatic sample examination procedures, such as automatic morphology and particle analysis or 3D surface reconstruction, etc.

EasySEM™

Fast and Easy Way to Results

Intuitive EasySEM touch screen control interface enables rapid sample examination within minutes.

High level of system automation and self-diagnostics, running in the background, ensure valuable results even for inexperienced users.

Optional fully integrated EasyEDX microanalysis brings quantitative elemental analysis results directly into the live SEM image with only one touch. Point and area analysis as well as quantitative line profile and area distribution mapping functions are available.

Software Tools	SB	SB – EasyProbe
Image Processing and Operations	●	●
Measurement	●	●
Object Area	●	●
Hardness	●	●
Tolerance	●	●
Multi Image Calibrator	●	●
Switch-Off Timer	●	●
3D Scanning	●	●
Positioner *	●	●
EasySEM™	●	●
Scriptor	●	●
Live Video	●	●
Morphology	○	○
Particle Analysis*	○	○
Image Snapper*	○	○
DrawBeam	○	-
Sample Observer	○	○
EasyEDX Integration Software	○	●
3D Metrology (MeX) **	○	○

● standard, ○ option, * requires optional specimen stage with position readout, ** third party dedicated software by Alicona Imaging GmbH.

Selected EasyEDX Specifications	
Energy resolution	133 eV (Mn Kα) at 100 kcps
Detector type	XFlash Detector 410M. SDD
Detector cooling	Peltier couple, LN_2 free
Max. input count rate	150 kcps
Detector range	from B(5) to Am(95)

VEGA3 SB Configurations

VEGA3 SBH

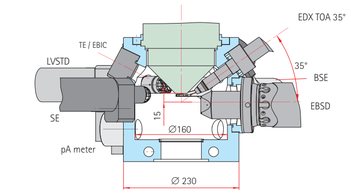
A high vacuum model of SEM with 3-axis motorized stage for investigation of small conductive samples.

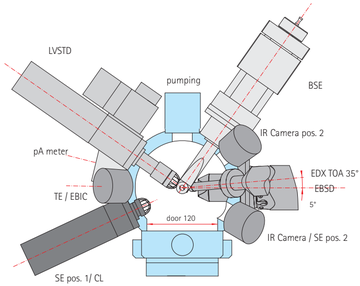
VEGA3 SBU

A variable pressure SEM that supplements all the advantages of the high vacuum model with the extended facility for low-vacuum operations, enabling the investigation of non-conductive specimens in their natural uncoated state.

VEGA3 SB – EasyProbe

The EasyProbe is a favorable package of a scanning electron microscope fully integrated with a selected EDX microanalyser. EasyProbe is available in both high vacuum and variable pressure variant. The system is delivered with a touch screen.





SB Chamber

Internal size	∅ 160 mm
Door width	120 mm
Number of ports	10
Chamber suspension	mechanical

Specimen Stage

Type	Eucentric, 3-axis motorized
Movements	Standard: Specimen stage without position readout X = 45 mm – motorized Y = 45 mm – motorized Rotation = 360° - motorized Z = 27 mm – manual Tilt = -90° to +90° eucentrically – manual Option: Specimen stage with position readout X = 35 mm – motorized Y = 35 mm – motorized Rotation = 360° - motorized Z = 27 mm – manual Tilt = -90° to +90° eucentrically – manual
Specimen height	maximum 36 mm – standard stage maximum 34 mm – optional stage

Detectors	SBH	SBU	SBH – EasyProbe	SBU – EasyProbe
SE – ET type detector	●	●	●	●
BSE detector	○	●	○	●
LVSTD	-	○	-	-
EasyEDX	○	○	●	●
TE detector	○	○	-	-
CL detector	○	○	-	-
EBIC	○	○	-	-
EDX*	○	○	-	-
EBSD*	○	○	-	-

● standard, ○ option, * third party products

Accessories	SBH	SBU	SBH – EasyProbe	SBU – EasyProbe
pA meter	●	●	●	●
Touch alarm	●	●	●	●
Chamber view camera	○	○	○	○
Beam blanker	○	○	-	-
Touch screen LCD	○	○	●	●
Control panel	○	○	○	○

● standard, ○ option, * third party products