

# Electron microscopy for professionals



**PHENOM™** 

**PHENOMWORLD**



'The perfect combination'

## Outperform by image quality

How do you stay competitive in a world where critical dimensions are continuously getting smaller? With the Phenom™, because it offers you direct access to the high resolution and high quality imaging you need in a growing number of industrial, educational and R&D applications. The Phenom has proven to be the new standard in desktop electron microscopy. It is an advanced professional solution that enables engineers, technicians and researchers to solve their imaging problems.



### Bringing optical and electron microscopy together

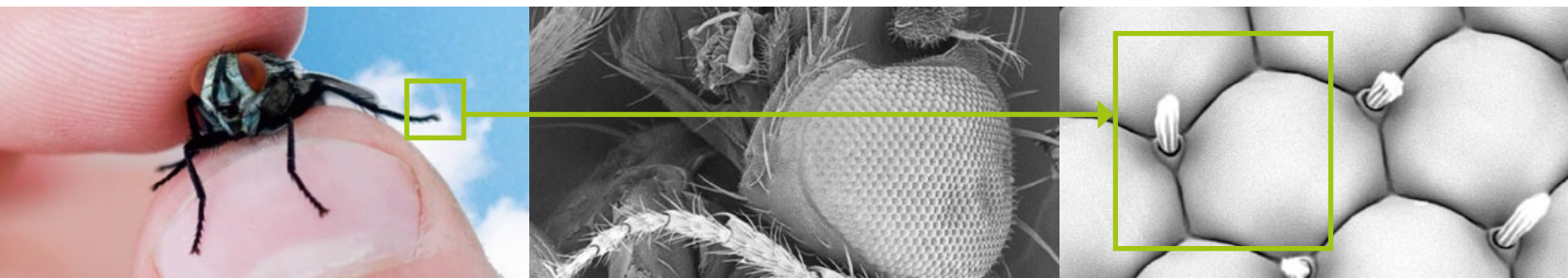
Electron microscopy enables you to see details at a sub-micron level beyond the wavelength of light. The Phenom combines all the advantages of an optical microscope without compromising on ease of use or time to result. The Phenom closes this gap and offers you the best of both worlds by combining light optical and electron optical technologies in one integrated system.

### Phenom: world's fastest scanning electron microscope

The Phenom takes you through your world in seconds – from millimeters to the sub-micron scale, while its award winning user interface makes it easy to operate for everyone. The Phenom will do for microscopy what personal computers did for office efficiency. The superb image quality of the Phenom will help create new ways to ramp up production and reduce the time required for root cause analysis. It is the ideal tool for researchers in their quest for next-generation products or to help teachers

present scientific concepts more easily. The Phenom provides an exciting leap in teaching methods with an engaging and interactive design that creates a truly effective learning experience.

**'Imagine the possibilities.  
See them with the Phenom.'**



### Phenomenal results

- 24x to 24,000x magnification
- Millimeter to nano scale imaging
- Easy to operate
- High throughput
- Low operating and imaging costs

## The perfect combination for your application

### Materials and metallurgy

The composition and morphology of many engineering materials are typically observed with light microscopes, but when higher magnification and 3D detail is required, a scanning electron microscope (SEM) is needed. The Phenom takes metallurgical imaging to a new level of clarity. It can be used to perform micro-structural analysis of metals to identify variances that occur after treatment, as well as to determine composition and stress distribution. For failure analysis of 3D objects, the large depth of focus can show the fracture origins and fatigue features.

### Particles & Pharmaceutical industry

As important as size distribution is, the shape and agglomeration of sub-micron particles is only visible with an electron microscope. The Phenom is the professional solution to expand your lab capabilities. With an ultimate resolution of 30nm, the Phenom will clearly identify and compare the morphology of fine particles or deposits for new formulations.

### Fibres and filters

Non-woven micro and nano fibres are developed and manufactured for filtration, textiles, and other products. The Fibremetric™ system is a solution that allows you fast analysis and reporting of statistical data on your production sample. Monitoring the production process by means of this semi-online quality control keeps production within tolerances without waste. Product development can benefit from the Fibremetric™ system as a consistent tool for fibre analysis or pore size measurement. The Fibremetric™ system powered by the Phenom, is used for that purpose today by leading manufacturers. Fibermetric™ automates analysis and delivers hundreds of measurements in minutes.

### Manufacturing process and quality control

One of the most important objectives of Failure Analysis (FA) is to provide engineers with the root cause information needed to adjust or modify the manufacturing process for higher yields

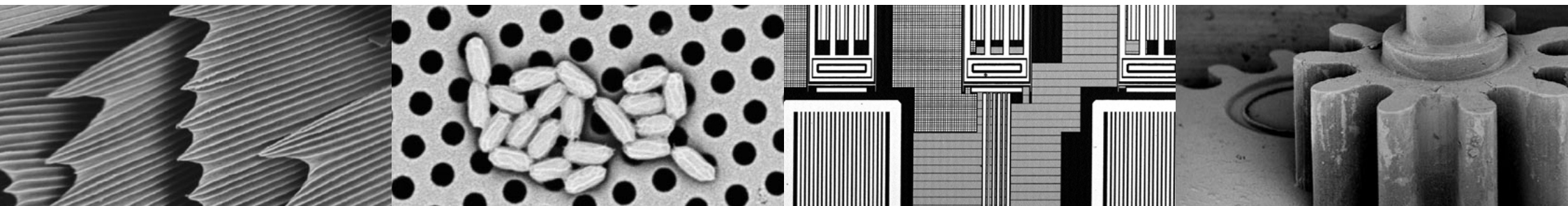
and/or a faster ramp to volume. With a Phenom electron microscope, you can improve the efficiency and effectiveness of sample preparation for higher quality FA results. Staff members don't have to wait for specially trained personnel or a high resolution lab SEM to obtain superior images. The Phenom empowers more people to obtain the images they need, when they need them.


### Integrated Learning

Engaging students of all ages with microscopy is easier than ever. The Phenom achieves the ease of use of a light microscope with automated touch screen control, 30 second sample loading and only a few minutes of training. Sample variety is limited only by imagination. The Phenom stimulates the development of investigative techniques, active learning and scientific inquiry skills by giving students an interactive, dynamic and fun learning tool.

### Forensics

The potentially high human impact of forensic analysis demands the highest standards of accuracy. The Phenom SEM provides high magnifications and is as easy to use as typical laboratory-grade optical microscopes. The Phenom cuts away the time, difficulty and expense of the conventional SEM. The electron image is displayed less than 30 seconds later, with the resolution and depth of focus typical of a SEM. The Phenom is a true walk-up tool that forensic experts can use for their initial analysis, taking away the sample load of the conventional SEM.



A close-up photograph of a man and a woman, both wearing white lab coats, engaged in a conversation. The man is on the left, looking towards the woman on the right. The woman is smiling and looking back at him. The background is a bright, clinical setting with a window and some equipment.

**‘The ease of use has increased  
the overall efficiency of our team’**

# Brilliant images, high throughput, ease of use

## Superb image quality

The Phenom has an innovative user interface and intuitive touch screen controls. This allows superb quality images to be produced with minimal operator training. A unique electron optical design reduces the complexity normally associated with electron microscopes.



Main screen



Archive screen

## Fast sample preparation

The Phenom is designed to handle a wide range of samples with minimal preparation by using application specific sample holders.

## Instant sample loading

Samples are loaded instantly with Phenom's patented vacuum technology. Insert the sample holder, close the door and the Phenom is ready to go.

## Shortest time to image

The first optical image appears within five seconds. Twenty seconds later a first electron optical image will be visible.

## Never lost navigation

You always know your position on the sample with Phenom's never lost navigation. Onscreen insets provide a clear overview of the sample. Overviews of the optical and electron optical images provide clear reference points at all times. The sample can easily be moved by touching the feature of interest on the screen; the motorised stage will instantly move to the desired position.



## Stub Sample Holder

This standard holder is designed for high resolution (30 nm) imaging and can accommodate 3D type samples.



## Metallurgical (mount) sample holder

This (optional) holder supports resin mounted samples (schlieffen). Embedding and polishing are common techniques used to create flat samples for microscopic investigation.



## Charge Reduction Sample Holder

This (optional) holder virtually eliminates the need for sputter coating. Samples such as paper, polymers, organics, ceramics and coatings can now be imaged in their natural state, providing more valuable back scatter material contrast information.

## Micro Tool Holder

This (optional) holder makes it possible to image a wide range of axial shaped objects such as drilling bits and milling tools. The holder has been specially designed for the micro manufacturing market, where the Phenom is used as a quality inspection tool in order to meet and maintain the high quality standards in this type of industry.



**Phenom quickly pays for itself**

The Phenom offers a fast Return on Investment (ROI) because of its economical price, which is comparable with medium class light microscopes, whereas its performance is way beyond.

For a fraction of the cost of outsourcing electron optical imaging, a company can bring high resolution imaging in-house for everyone to use.

**System details**

- Magnification range 24x – 24.000x
- Dimension imaging module 286 x 566 x 495 mm – 50 kg
- Touch screen controls
- Image options – JPEG, TIFF both in 456<sup>2</sup>, 684<sup>2</sup>, 1024<sup>2</sup>, 2048<sup>2</sup> pixels
- Sample load time < 30 seconds

## Phenom-World

**Phenom-World BV** is a part of the NTS-Group based in Eindhoven, The Netherlands. NTS-Group and FEI Company have been working together on the Phenom project since its inception, and NTS has provided much of the design and engineering expertise that helped to make Phenom the successful product it is today.



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