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PRODUCT SPECIFICATIONS

MICROSCOPE - Phenom Pro Generation 5

# Phenom Pro Desktop SEM

## Fast and excellent imaging on a desktop SEM


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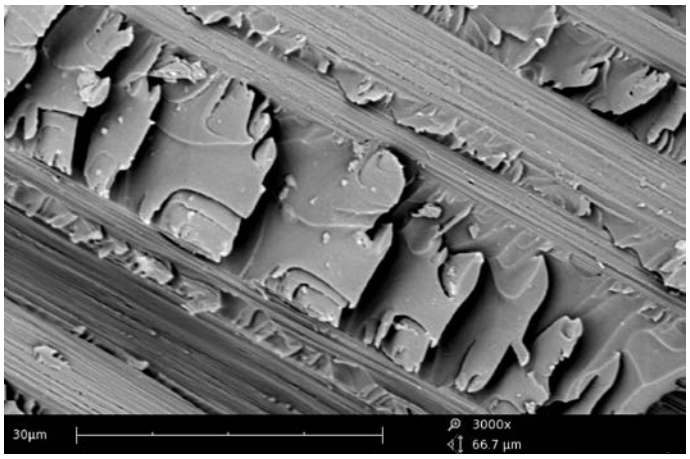
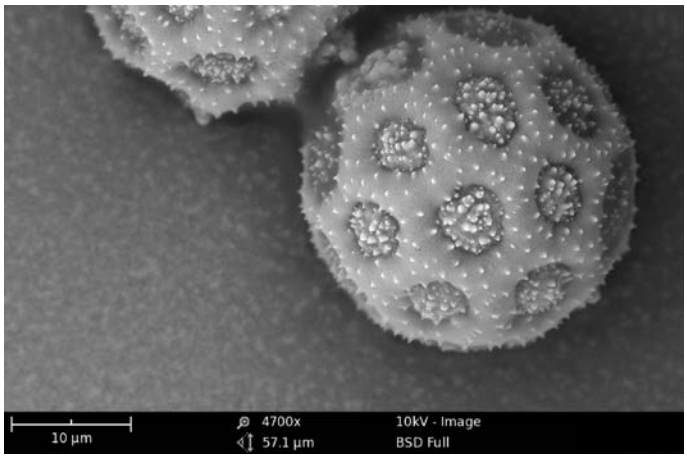



Carbon fiber composites material




Pollen

The Thermo Scientific™ Phenom Pro Generation 5 is Phenom-World's high-end imaging desktop scanning electron microscope (SEM). In combination with a large range of sample holders and automated system software, it can be tailored to suit a multitude of applications.

### Phenom Pro Desktop SEM

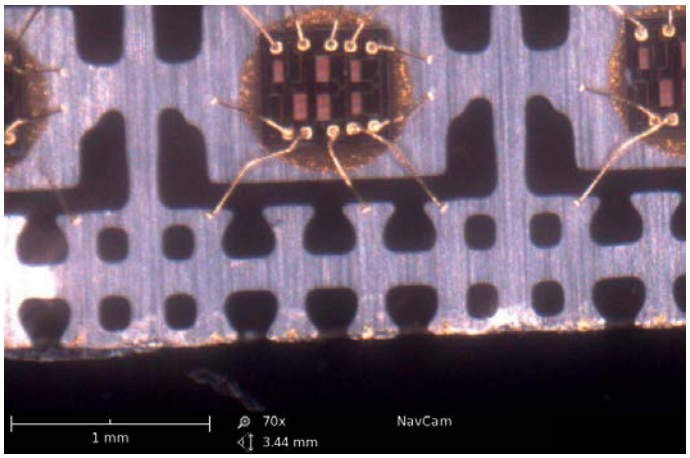
Phenom-World is focused on enabling its customers to keep pace with continuously shrinking feature sizes and to increase productivity while bringing down the costs of analysis. The Phenom Pro is the most effective and fastest imaging oriented desktop SEM on the market. Its unique design makes it suitable for use in a wide variety of applications and markets. With custom made detection hardware, a high brightness source and a state-of-the-art color navigation camera, it is an extremely powerful desktop SEM. The zoom functionality of the color navigation camera narrows the gap between optical and SEM imaging.

The current Phenom Pro is based on the 5th generation platform and offers automated and mechanized accessories such as ProSuite and active sample holders.

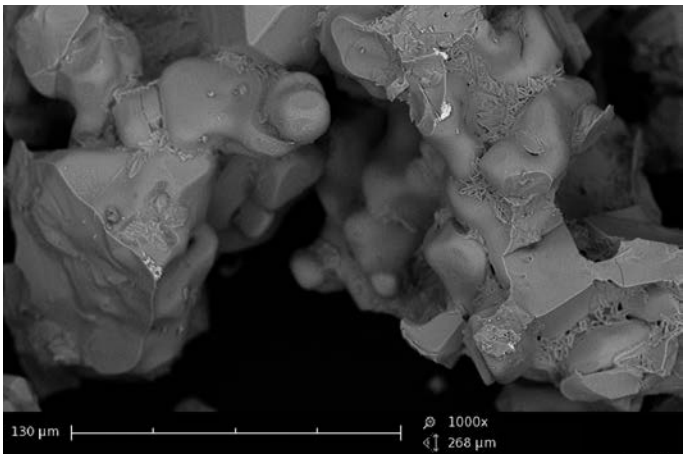
The Phenom Pro can be upgraded to Phenom ProX with EDS or equipped with the Phenom ProSuite application platform. Also, an optional SE detector is available.

Compared to its predecessors, the Phenom Pro Generation 5 has a 20% better resolution and an even better user experience. Users are enabled to address a wider rage of applications, including samples sensitive to electron beam irradiation.

| Imaging Specifications | |
|---|---|
| **Imaging modes** | |
| Light optical | Magnification range: 20 - 135x |
| Electron optical | • Magnification range: 80 - 150.000x<br>• Digital zoom max. 12x |
| **Illumination** | |
| Light optical | Bright field / dark field modes |
| Electron optical | Long lifetime thermionic source ($CeB_6$) |
| Acceleration voltages | Default: 5 kV, 10 kV and 15 kV |
| Resolution | < 10 nm (BSD)<br>< 8 nm (SED) |
| **Detector** | |
| Standard | Backscattered electron detector |
| Optional | Secondary electron detector |
| **Digital image detection** | |
| Light optical | Color navigation camera |
| Electron optical | High-sensitivity backscattered electron detector (compositional and topographical modes) |
| **Image formats** | |
| JPEG, TIFF, BMP | |
| **Image resolution options** | |
| 456 x 456, 684 x 684, 1024 x 1024 and 2048 x 2048 pixels | |
| **Data storage** | |
| USB flash drive, Network | |
| **Sample stage** | |
| Computer-controlled motorized X and Y | |
| **Sample size** | |
| • Up to 32 mm (Ø)<br>• Up to 100 mm (h) | |
| **Sample loading time** | |
| Light optical | < 5 s |
| Electron optical | < 30 s |




Example of a chip viewed with the navcam




Cement sample

### Never lost navigation and ease-of-use

The color navigation camera in the Phenom Pro provides information that helps the operator to make a link between the optical and electron optical images. Users are ready to take images after only 10 minutes of basic training. A large variety of sample holders is available to accommodate a large range of samples. Sample loading is fast and easy thanks to our patented sample vacuum loading technology.

The optical camera, the motorized stage and the intuitive user interface work together to help navigate swiftly to any region of interest. Upon clicking on the position of the optical image to investigate, the stage automatically centers the region of interest. Switching to the electron imaging mode is fully automated and fast at the touch of just one button. A high resolution image is available within 30 seconds after loading the sample. Saving images is practical and easy on a USB memory stick or network storage location for offline analysis and distribution.

The acceleration voltages of the Phenom Pro can be set at any value between 4.8 kV and 15 kV, with default settings at 5 kV, 10 kV and 15 kV. This allows the users to make higher resolution images at the same magnification, providing even more details from the sample than before. At the same time, the Phenom Pro can also be used with very low beam current settings. The combination of variable acceleration voltages and variable beam current settings offers a high level of flexibility, creating the best results for a large variety of samples.

## System Specifications

### Detector type

- Imaging module
- 19” monitor
- Rotary knob
- Mouse
- Diaphragm vacuum pump
- Power supply
- USB flash drive

### Dimensions & weight

| | |
|---|---|
| Imaging module | 286(w) x 566(d) x 495(h) mm, 50 kg |
| Diaphragm vacuum pump | 145(w) x 220(d) x 213(h) mm, 4.5 kg |
| Power supply | 156(w) x 300(d) x 74(h) mm, 3 kg |
| Monitor | 375(w) x 203(d) x 395(h) mm, 7.9 kg |

## Requirements

### Ambient conditions

| | |
|---|---|
| Temperature | 15°C ~ 30°C (59°F ~ 86°F) |
| Humidity | < 80% RH |
| Power | Single phase AC 110 - 240 Volt, 50/60 Hz, 300 W (max.) |

### Recommended table size

120 x 75 cm, load rating of 100 kg

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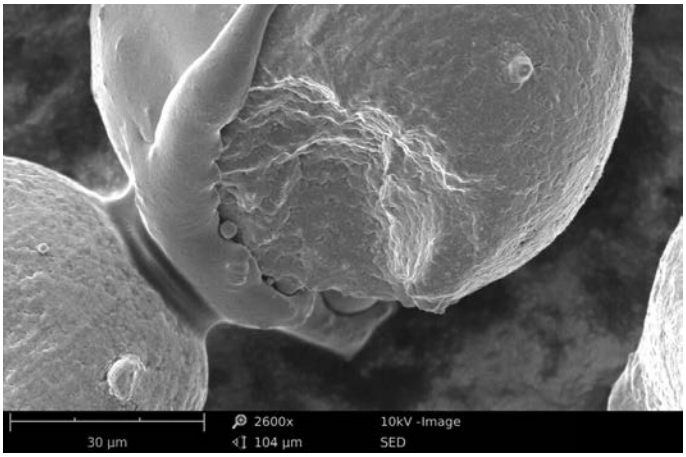
Phenom ProSuite




Speed steel

## Phenom ProSuite

Phenom ProSuite is an optional software application platform that has been developed to further enhance the capabilities of the Phenom desktop SEM. Phenom ProSuite enables maximum information to be extracted from images obtained on the Phenom Pro SEM. It offers multiple solutions to specific application needs. Phenom ProSuite contains standard applications such as Automated Image Mapping and Remote User Interface. Optional applications are 3D Roughness Reconstruction, FiberMetric, ParticleMetric and PoroMetric. Virtually all the physical properties of a sample can be revealed using the Phenom desktop SEM in combination with Phenom ProSuite.

## Secondary Electron Detector

A secondary electron detector (SED) is optionally available on the Phenom Pro. The SED collects low energy electrons from the top surface layer of the sample. It is therefore the perfect choice to reveal detailed sample surface information. The SED can be of great use for applications where topography and morphology are important. This is often the case when studying microstructures, nanostructures or particles.

| ProSuite Specifications | |
|---|---|
| **System** | |
| • Automated collection of images<br>• Real-time remote control<br>• Intuitive single page user interface<br>• Standard applications included: Automated Image Mapping & Remote User Interface | |
| **Optional** | |
| 3D Roughness Reconstruction | • Based on “shape from shading” technology, no stage tilt required<br>• Fast reconstruction |
| FiberMetric | • Fast and automated collection of all statistical data<br>• Large range of fibers and pores can be measured |
| ParticleMetric | Morphology and practicle size data for submicron particle applications |
| PoroMetric | Fully automated visualization and analysis of pores |
| **SED Specifications** | |
| **Detector type** | |
| Everhart-Thornley | |

Find out more at **thermofisher.com/phenomworld**

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