Phenom ProX
The perfect all-in-one desktop SEM

**Phenom ProX**
All-in-one imaging & analysis system

**Fully integrated EDS**
Analysis is as easy as imaging with fully integrated EDS detector and software

**Multiple acceleration voltages**
Between 5 kV and 10 kV for high resolution images and 15 kV for great analysis results

**Magnification**
Magnification range up to 130,000x

**Elemental Mapping & Line Scan**
Revealing the distribution of elements within the sample

**Never lost navigation**
Swift navigation to any region of interest
The Phenom ProX desktop scanning electron microscope (SEM) is the ultimate all-in-one imaging and X-ray analysis system. With the Phenom ProX desktop SEM, sample structures can be physically examined and their elemental composition determined. Besides point analysis, the optional Elemental Mapping and Line Scan software allows further analysis of the distribution of elements.

Phenom ProX

All Phenom-World products are intuitive to use, fast to create results and built to high quality standards. These core principles have been used to develop and create the Phenom ProX spectroscopy system for best-in-class imaging and analysis. As well as viewing three-dimensional images of microscopic structures, there is often a need to identify the different chemical elements in a specimen. This is accomplished in the Phenom ProX with the Element Identification (EID) software package and a specially designed and fully integrated Energy Dispersive Spectrometer (EDS). The Phenom ProX is the most extended solution for fast and user-friendly imaging and analysis. This is enhanced by additional sample holders that allow for example sample tilting and cooling for imaging an even greater diversity of samples.

**Imaging Specifications**

**Imaging modes**
- **Light optical**
  - Magnification range: 20 - 135x
- **Electron optical**
  - Magnification range: 80 - 130,000x
  - Digital zoom max. 12x

**Illumination**
- **Light optical**
  - Bright field / dark field modes
- **Electron optical**
  - Long-lifetime thermionic source (CeB$_6$)
  - Low, imaging, spot analysis and mapping mode, beam currents selection

**Acceleration voltages**
- Default: 5 kV, 10 kV and 15 kV
- Advanced mode: adjustable range between 4.8 kV and 15 kV imaging and analysis mode

**Resolution**
- ≤ 14 nm

**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
- ProSuite PC

**Sample Stage**
- Computer-controlled motorized X and Y

**Sample size**
- Up to 32 mm (Ø)
- Up to 100 mm (h)

**Sample loading time**
- **Light Optical**
  - < 5 s
- **Electron Optical**
  - < 30 s
Step-by-step data collection
A dedicated software package is included and installed on
the Pro Suite PC to control the fully integrated EDS detector.
Analysis has become as easy as imaging, since there is no need
to switch between external software packages or computers.
The EDS-technique analyzes X-rays generated by the electrons
from the electron beam interacting with the sample. The
Phenom CeB$_6$ electron source generates the highest number of
X-rays in its market segment.

The element identification software package allows the user
to identify any hidden elements within the sample via the
spot mode analysis. All results are verified using iterative peak
stripping deconvolution. The step–by–step guided process within
the software helps the user to collect all X-ray results in an
organized and structured way. Optionally, this software can be
expanded with the Elemental Mapping and Line Scan option.

### EDS Specifications

<table>
<thead>
<tr>
<th>Detector type</th>
<th>Silicon Drift Detector (SDD)</th>
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<tbody>
<tr>
<td></td>
<td>Thermoelectrically cooled (LN$_2$ free)</td>
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<tr>
<td></td>
<td>&gt; Detector active Area 25 mm$^2$</td>
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<tr>
<td></td>
<td>&gt; X-ray window Ultra-thin Silicon Nitride (Si$_3$N$_4$) window allowing detection of elements B to Am</td>
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<td></td>
<td>&gt; Energy resolution Mn Kα ≤ 137 eV</td>
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<tr>
<td></td>
<td>&gt; Processing capabilities Multi-channel analyzer with 2048 channels at 10 eV/ch</td>
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<tr>
<td></td>
<td>&gt; Max. input count rate 300,000 cps</td>
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<tr>
<td></td>
<td>&gt; Hardware integration  Fully embedded</td>
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<tr>
<td>Software</td>
<td>Integrated in Phenom ProSuite</td>
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<tr>
<td></td>
<td>Integrated column and stage control</td>
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<tr>
<td></td>
<td>Auto–peak ID</td>
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<tr>
<td></td>
<td>Iterative strip peak deconvolution</td>
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<tr>
<td></td>
<td>Confidence of analysis indicator</td>
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<tr>
<td></td>
<td>Export functions: CSV, JPG, TIFF, ELID, EMSA</td>
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<tr>
<td>Report</td>
<td>Docx format</td>
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### System Specifications

<table>
<thead>
<tr>
<th>Dimensions &amp; Weight</th>
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<tbody>
<tr>
<td>Imaging module 286(w) x 566(d) x 495(h) mm, 50 kg</td>
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<tr>
<td>Diaphragm vacuum pump 145(w) x 220(d) x 213(h) mm, 4.5 kg</td>
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<tr>
<td>Power supply 156(w) x 300(d) x 74(h) mm, 3 kg</td>
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<tr>
<td>ProSuite 375(w) x 203(d) x 395(h) mm, 7.9 kg</td>
</tr>
<tr>
<td>Standard ProSuite System including: 19&quot; monitor with PC and network router mounted 375(w) x 250(d) x 395(h) mm, 9 kg</td>
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</table>

### Requirements

<table>
<thead>
<tr>
<th>Ambient conditions</th>
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<tr>
<td>&gt; Temperature 15°C ~ 30°C (59°F ~ 86°F)</td>
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<tr>
<td>&gt; Humidity &lt; 80% RH</td>
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<tr>
<td>&gt; Power Single phase AC 110 ~ 240 Volt, 50/60 Hz, 300 W (max.)</td>
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</tbody>
</table>

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<tr>
<th>Recommended table size</th>
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<tr>
<td>150 x 75 cm, load rating of 100 kg</td>
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Elemental Mapping and Line Scan

Elemental Mapping reveals the distribution of elements within the sample. The selected elements can be mapped at a user specified pixel resolution and acquisition time. The real time mapping algorithm shows live build-up of the selected element maps while storing spectra of each pixel. This allows elements to be added or removed at any time during or after the mapping process. Mixing any number of elements with the backscatter image gives users a clear insight into the distribution of elements within the sample.

Mapping can be done on the image as a whole or to save time, on a Selected Area (SA). Any area can be selected in a rectangular shape on the image location. Line Scan allows analysis to be performed over a selected line. The number of points and dwell time per point can be selected individually. A line profile of every selected element is displayed on the screen. On top of that, the results can be easily exported and reported via an automated template. Multiple analyses can be performed in sequence without user intervention.

Elemental Mapping and Line Scan Specifications

Elemental Mapping

- **Element selection**: 10 individual user-specified maps, plus backscatter image and mix-image
- **Selected area**: Any size, rectangular shaped
- **Mapping resolution range**: 16x16 – 512x512 pixels
- **Pixel dwell time range**: 10 – 250 ms

Line Scan

- **Line Scan resolution range**: 16 – 512 pixels
- **Points dwell time range**: 50 – 250 ms
- **Total number of lines**: 12
- **Report**: Docx format