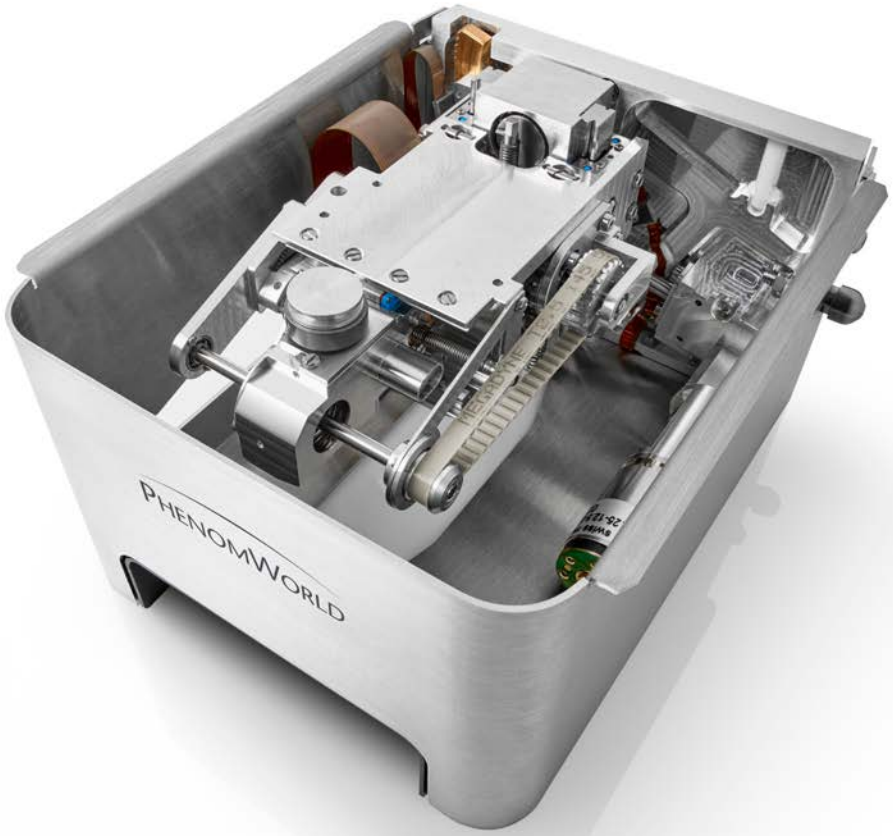
Phenom Eucentric Sample Holder

Easy and safe eucentric movements with 6 motorized axes



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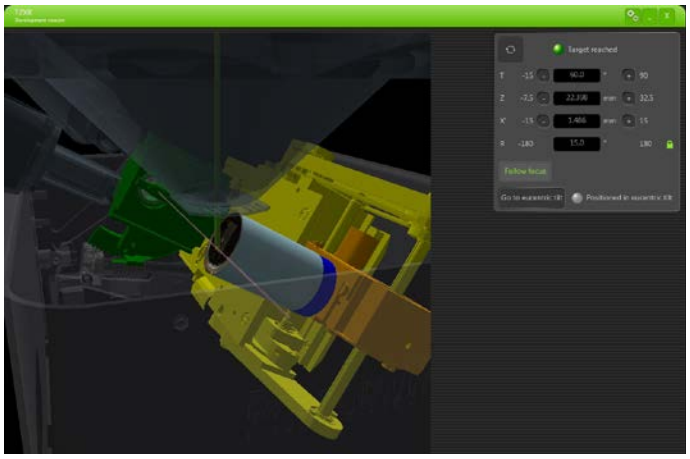
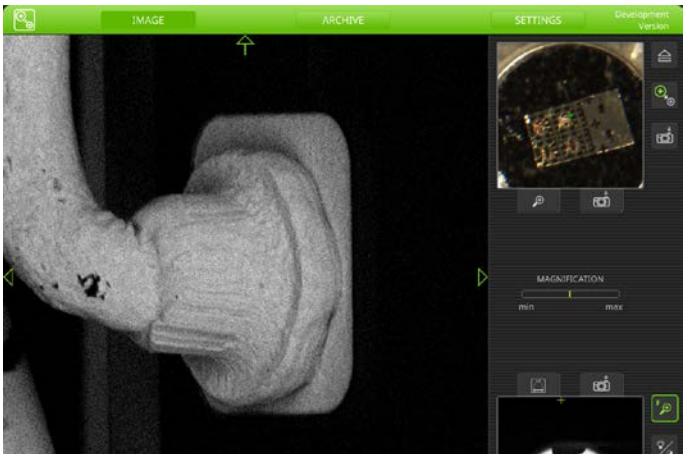


The sample and its position can be viewed in real-time with a 3D visualization mode



The Phenom XL user interface with a tilted sample. The meta data of all saved images include all relevant tilt and rotation angles.

In many SEM applications, a user can gain more insight into sample properties if the sample can be tilted and rotated. The Thermo Scientific™ Phenom Eucentric Sample Holder for the Phenom XL has been specifically developed with that purpose in mind. The holder contains a sub-stage that allows users to easily and safely look at a sample from all sides. A sample can be lifted, tilted, rotated and shifted without losing sight of the sample detail.

A unique sample holder concept

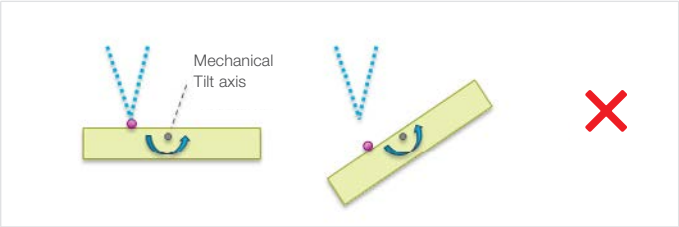
The Eucentric Sample Holder for the Phenom XL is truly the only one of its kind. It contains a sub-stage that fits in a desktop and allows both eucentric tilting and compucentric rotation. Because the stage is fully integrated into a regular Phenom XL sample holder, it can be simply loaded or unloaded within 1 minute. There is no need for a lengthy and expensive upgrade. The stage performance itself is also exceptional; samples can be tilted up to angles of 90˚. The holder itself features 4 motorized axes that allow the user to freely lift, tilt, rotate and shift the sample, in combination with the 2 motorized axes of the main stage.

The way of operating is also unique. The Eucentric Sample Holder can be controlled via an innovative user-interface that features a real-time 3D visualization module. This module shows the actual sample position and orientation at all times. The sample itself is also visible because an initial image taken with the Navigation Camera (standard on every Phenom XL) is projected into the visualization module. Finally, the user has full flexibility and can choose any viewpoint in, and even outside, the vacuum chamber. In addition to the 3D visualization module, the user interface also includes fully integrated anti-collision algorithms that enable worry-free operation of the stage by keeping both sample and SEM safe. There is no longer a need for the traditional chamber scope and touch sensors.

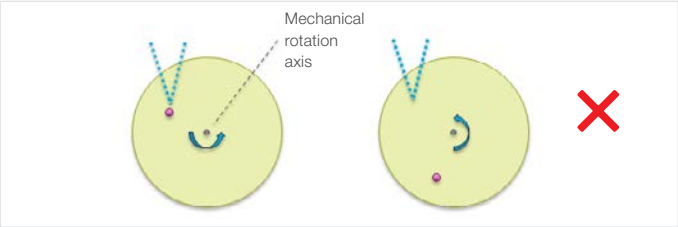
The user interface lets the user easily move the sample around. After loading, the eucentric height can be quickly found by using a dedicated knob in the user menu. Once at the right height, one can easily tilt, shift and rotate the sample without the need for major intermediate changes in SEM settings.

There are obviously many applications where tilt and rotation matter. Tilting or rotating a sample allows inspection of an object from different angles. This can be very useful in many cases, for example to measure the depth, height or thickness of features on the sample or to check the bonding between layers or components. Tilting a sample can also be useful in EDS analysis. Samples that are not entirely flat can be tilted so that the surface is horizontal, which will improve the accuracy of an EDS analysis.

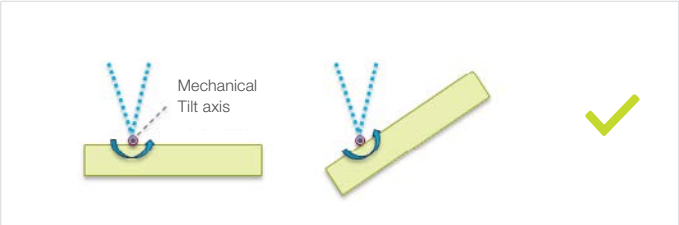
Eucentric Sample Holder Specifications
Automated movements
In 4 directions: Z (height), R (rotation), T (tilt) and x' (x-prime).
Particle parameters
Adds 2 more directions: X and Y
Particle parameters
360°
Particle parameters
Between -15° and +90°
Maximum sample size
• 90° tilt Ø ≤ 30 mm; height ≤ 32 mm • < 45° tilt Ø < 70 mm; height ≤ 32 mm
Eucentric Sample Holder
• Eucentric stage integrated into a Phenom XL sample holder • Aluminum suitcase for transport and clean storage • ProSuite 'eucentric stage' application



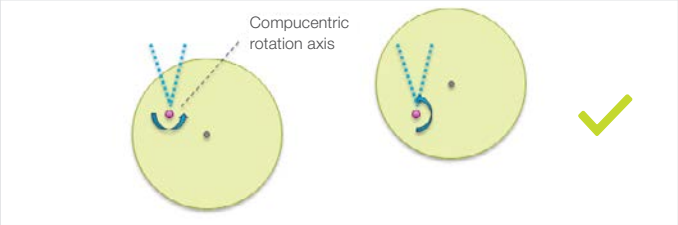
Tilting around an axis that does not coincide with the area of interest causes shifts in position and focus. The user has to make major adaptions to the SEM settings to reposition the sample and adjust the focus.



Rotating around an axis that does not coincide with the area of interest causes a shift in position. The user now has to refind the correct (x,y) position.



Tilting around an axis that coincides with the area of interest leaves focus and position intact.



Compucentric rotation keeps the position intact.

Tilting the sample

When a sample is tilted, generally both the area of interest and focus change (see the figure above). As a result, the operator is looking at a different location on the sample. What's more, the focus has changed leading to blurry images. With the Eucentric Sample Holder, the sample is first moved -both in height and in position- to coincide with the mechanical tilting axis. This is the so-called 'eucentric position'. When the operator now tilts the sample, both the area of interest and the focus of the sample remain intact.

The Eucentric Sample Holder allows tilting of samples up to angles of 90°. While tilting, the operator does not need to make major changes to the SEM settings.

Sample rotation

When a sample is rotated, generally the area of interest will shift. The operator then needs to adjust the (x,y) position to refind the correct position.

The Eucentric Sample Holder lets the user rotate around the position that is being imaged, also when the mechanical rotation axis does not coincide with the area of interest. This is called 'compucentric rotation'. The Eucentric Sample Holder will automatically use various motorized axes to keep the (x,y) position stable, even when the sample is tilted.

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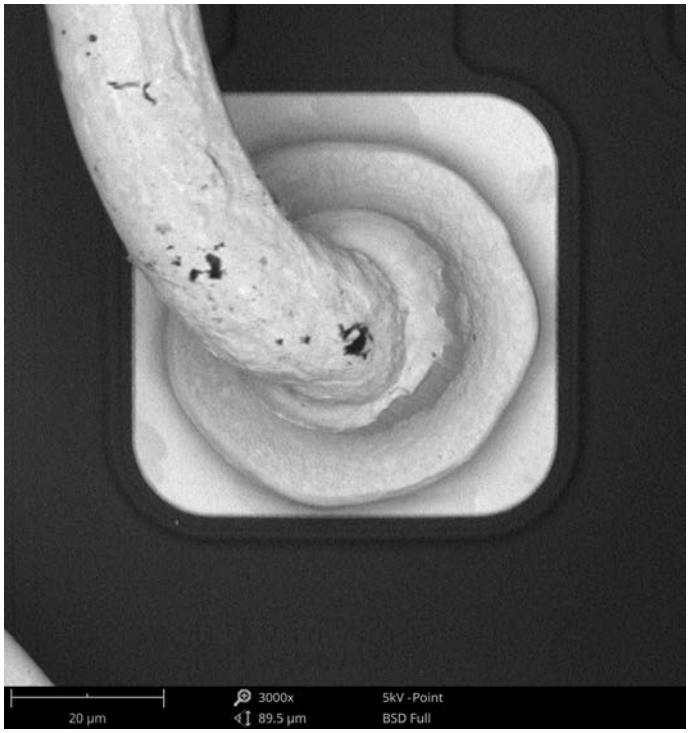
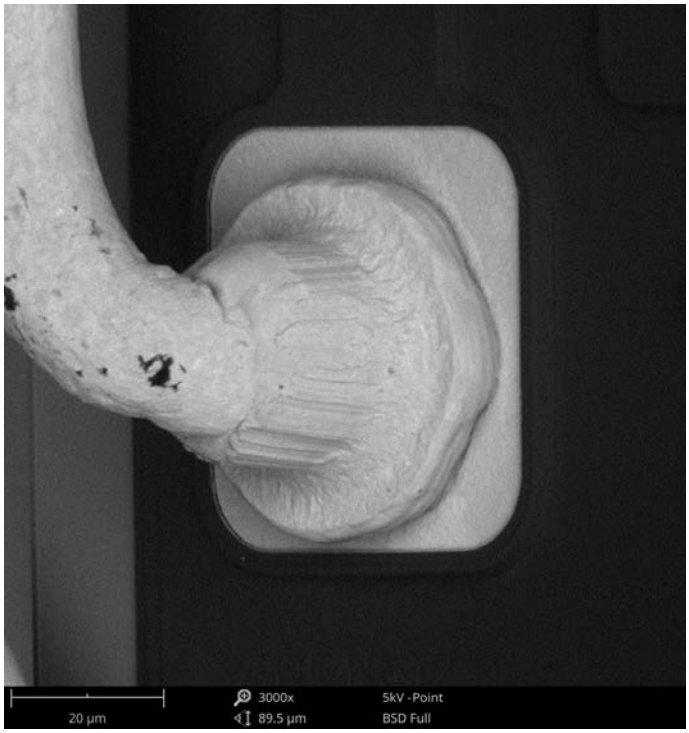
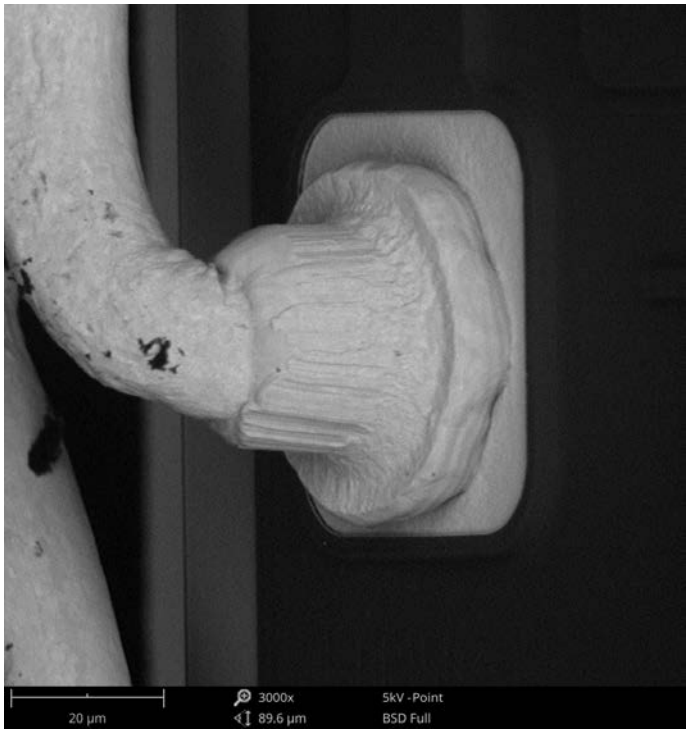


Bond pad, 0° tilt



Bond pad, 45° tilt



Bond pad, 60° tilt

Bond pad, 90° tilt

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