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System Comparison

Stop outsourcing. Keep your SEM work in-house.

The capital and operational differences between different desktop SEMs are smaller compared with floor model SEMs. When a decision has been made in favor of a desktop SEM, the next step is to evaluate between these models, because their specs are far similar compared with floor model systems.

The best way to decide is to evaluate your samples and compare the imaging and analysis results. However, the operational costs are also important and there are also differences between models. Our main goal is to offer a high quality and very robust system with the minimum maintenance required to keep it in the best condition.

Operational costs overview table

Topic	Desktop SEM	Floor model SEM
Capital investment (average)	< $100,000	> $100,000
Floor space required, including pumps and services	< Office desk space	> Office desk space
Air conditioned room	Not required	Often required
Other room preparations like gases, cooling and site survey	Not required	Often required
Dedicated operator	Not required	Often required
Maintenance	Low cost	High cost

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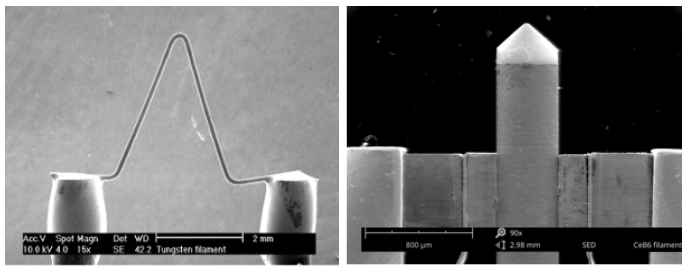
Maintenance

Keeping the vacuum system in optimal condition. This is similar between all desktop SEM systems, as they all have a pumping system consisting of a pre-vacuum pump and turbo molecular pump. This maintenance is usually performed by the supplier's service engineer.

Replacing the electron source. This is the most important and expensive consumable during the lifetime of any SEM system. The longer the lifetime, the more expensive the source probably is, but fewer interventions are required. The Phenom desktop SEM is the only tabletop instrument with a long-lifetime CeB_6 source, which has a typical lifetime of about 1,500 operating hours. Depending on usage, it takes 1.5 to 2 years before the Phenom's source needs replacing. This is done by a trained service engineer who often combines the visit with routine maintenance. As a customer, that means that you will have a worry-free operation during the whole, predictable, long lifetime of the source. You do not even need to have any spare sources on stock, as the CeB_6 degrades gradually, so service notifications can be done well in advance.

A tungsten source has a much shorter (average 100 hours) lifetime and breaks suddenly, which makes it impossible for a service engineer to support unless they are always on site. This is why lab operators have to replace their own source, and often have to clean other source-related parts in the SEM column due to debris from the broken tungsten source. Do you really want to do that, as it means unscheduled downtime for both you and the system?

So the conclusion is that as well as the superior CeB_6 source, resulting in high quality imaging, the source has a worry-free and time-saving operation. To see a full comparison of the properties of a tungsten versus CeB_6 source, please read our blog Tungtsen vs. CeB6 electron source: Choosing the right desktop SEM.



Tungsten CeB6

More benefits

- **Power consumption**
  If electricity costs are part of your yearly operational costs, the power consumption of the Phenom microscope is very low, with an average of about 100 W/hour.
- **Robustness**
  This is the key to providing a good system uptime and avoiding expensive repairs. The Phenom's unique loading concept eliminates the risk of damaging internal parts when loading samples. It is simply not possible to load a sample which is positioned too high, which means there is no risk of damaging lenses or detectors inside the system. This is important to know, especially if you have multiple operators in your lab.
- **Time to image**
  As the Phenom's loading and unloading time is very short (depending on the model between 30 sec and 60 sec), the time to image and analysis time is very short, which enables a very high sample throughput.

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

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