

When you see details clearly, the right decisions are obvious

Sharper insights. Faster decisions. Learn how the latest upgrades to the FXE-190 can streamline your imaging and elevate your results. The improved FXE-190 nano CT provides more power, clarity, and resolving power than ever before.

Making difficult inspection possible

The improved FXE-190 Nano CT rapidly detects the smallest defects across a wide range of lab applications. As samples continue to shrink in size, X-ray inspection becomes increasingly crucial for detecting microscopic defects – from materials science and failure analysis of electronics to medical and biological samples. Speed is equally essential: acquiring high-quality data quickly allows users to spend more time analyzing and producing actionable insights, optimizing the overall workflow. This calls for a stable beam and high-power X-ray output at high resolution.

Increased resolution

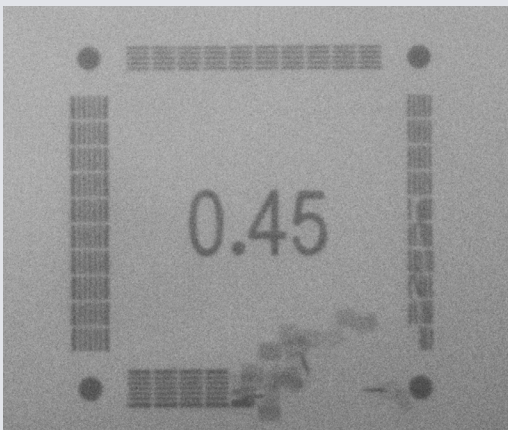
We have increased the FXE-190 Nano CT module's ultimate resolving power, making it capable of achieving 0.45 μm resolution when using the high-resolution target (HRP target). Figure 1 shows a standard mask sample with clearly resolved 0.45 μm structures. Not only are the vertical and horizontal features simultaneously resolved, but fine defects on the mask are also visible – particularly in the lower right corner.

Achieving such high resolution also requires an optimized imaging chain, including the right choices in optical magnification and detector properties. The integrator is responsible for this.

"When defects are small and time is short, the improved FXE-190 delivers the resolution and imaging speed you need."

Chris Nicholson, Product Manager

Fig. 1: The 0.45 μm structures are clearly resolved by the FXE-190 nano CT.



Increased power

The improved FXE-190 Nano CT can now operate at higher power, fully utilizing our high-power target (HPT) design. In addition, the maximum power density for each focusing mode has increased.

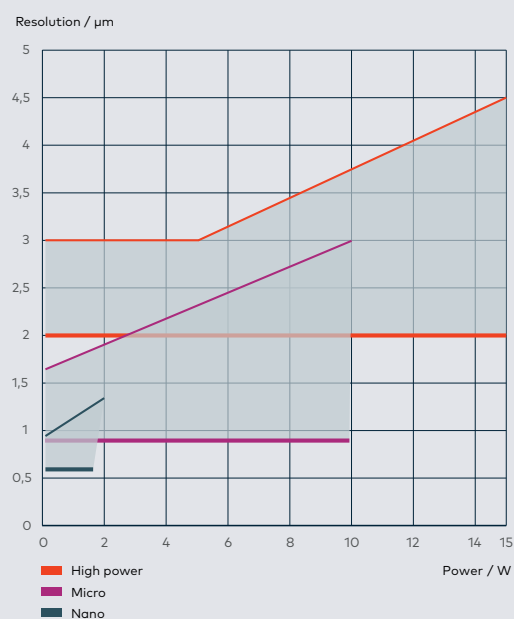
Higher X-ray flux enables faster inspection through higher incident power on the target. Target power has doubled, now reaching up to 30 W.

Figure 2 summarizes the performance, focusing on resolutions below 5 μm . The graph's spread reflects how resolution depends on accelerating voltage. The best resolutions are found between 160–190 kV, marked by thick colored lines for each mode.

- In high-power mode, a resolution of 2 μm can be reached at up to 15 W.
- In microfocus mode, a sub-micron resolution of 0.9 μm is achievable at up to 10 W.
- In nanofocus mode, 0.6 μm is possible with up to 1.6 W using the HPT.
- With the HRP target, the ultimate resolution of 0.45 μm is achieved at up to 1.4 W.

Fig. 2: Resolution and power available in different operating modes using the high-power target. Thicker lines represent 160–190 kV behavior, and thinner lines at 60 kV.

High power target



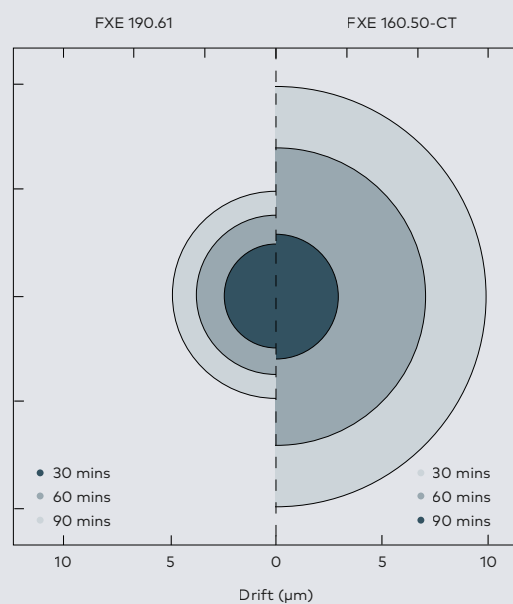
Increased stability

The FXE-190's internal cooling ensures exceptional focal spot stability. A stable focal spot is critical for long-duration, high-resolution imaging, and detailed 3D tomography.

Figure 3 shows data collected after powering the module from cold. The total focal spot shift over 90 minutes remains under 5 μm , with just 1 μm drift between 60 and 90 minutes. Compared to an externally cooled module (FXE-160.50-CT), this shows more than 50% improvement in long-term stability.

This internal stability means the module is ready for precision imaging almost immediately after start-up.

Fig. 3: Focal spot drift measurements over time for the FXE-190 nano CT with internal cooling (left) and FXE-160 Micro CT with external cooling (right).



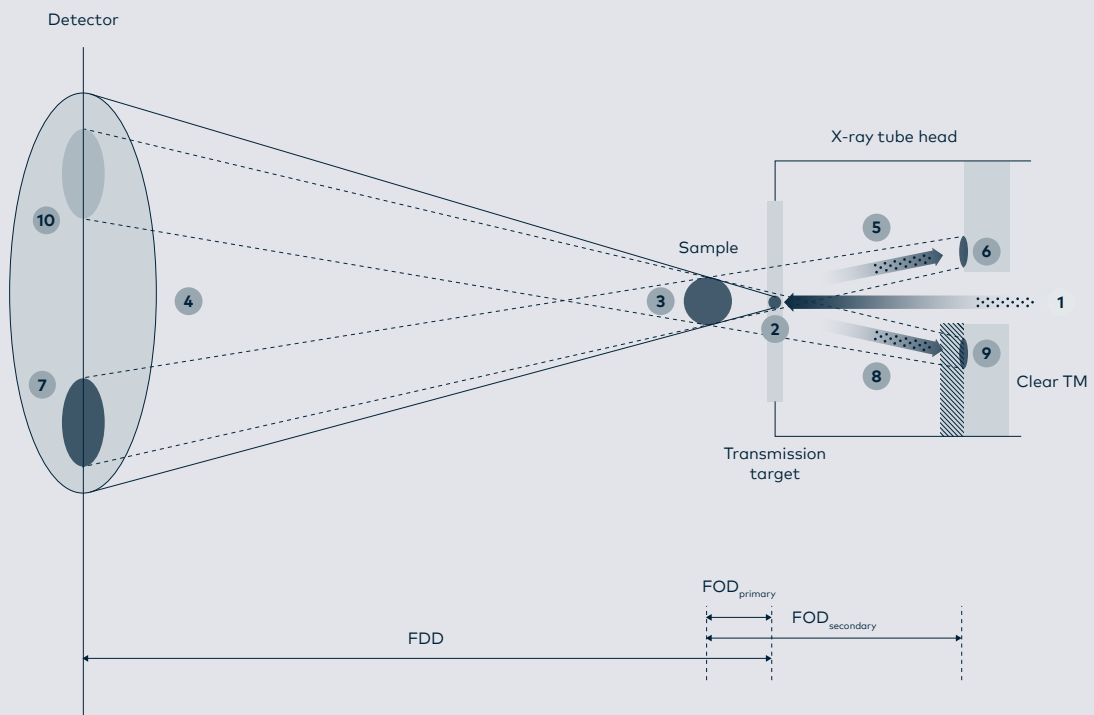
Increased clarity

Comet's Clear™ technology minimizes artefacts caused by extra focal radiation – a common challenge in transmission-type X-ray tubes.

A simplified explanation is shown in Figure 4. The primary electron beam (1) generates X-rays on the target (2), which pass through the sample (3) and are captured on the detector (4). However, secondary electrons (5) are also produced. These collide with internal tube components (6), generating secondary X-rays that can interfere with the primary image (7). Because their focal object distance (FOD) is larger compared with the X-rays generated in the target, the resulting image is smaller and overlaps with the main image, reducing clarity.

Clear™ technology addresses this by adding low-Z materials inside the tube. When secondary electrons (8) hit these materials (9), the efficiency of secondary X-ray generation drops significantly compared to standard materials. The resulting X-ray spectrum also shifts to lower photon energies, which the target material naturally filters out. As a result, secondary artefacts (10) are significantly reduced – leading to clearer 2D images and more accurate 3D reconstructions.

Fig. 4: Schematic of the X-ray generation and imaging process, highlighting the secondary X-ray beam and its reduction with Comet's Clear™ technology.



Get more and start your next-level imaging today

Whether you're solving complex failures or uncovering unseen structures, the improved FXE-190 Nano CT helps you move faster and with greater clarity.

Key benefits at a glance:

- Increased resolution: 0.45 μm JIMA resolution with the high-resolution target (HRP)
- Increased target power: up to 30 W using the high-power target (HPT)
- Higher power density across all operating modes
- Increased focal spot stability
- Reduced artefacts thanks to our proven Clear™ technology

When clarity matters, the FXE-190 helps you make every decision count.

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