



# M4 TORNADO | 60mm<sup>2</sup>

- Enhanced Sensitivity with 60 mm<sup>2</sup> XFlash® SDDs

With the new 60 mm<sup>2</sup> silicon drift detector (SDD) option for the M4 TORNADO, you can now create the perfect storm of information. It offers the XFlash® technology's well known ultra high speed spectra acquisition, but with 50 % higher sensitivity compared to the standard 30 mm<sup>2</sup> SDD.

The additional sensitivity of the larger 60 mm<sup>2</sup> detector allows measurements with primary filters or light element samples to be significantly faster. To utilize this increase in intensity, a high throughput pulse processor has been added.

## Low Intensity Applications

- Low yield, thin or light element samples
- Use of primary filters
- Low kV or tube current conditions

## Speed and Sensitivity Benefits

- Up to 50 % higher sensitivity
- Get to the result faster under challenging conditions

## Double Speed with Double SDD

As with the standard 30mm<sup>2</sup> SDD, the double 60mm<sup>2</sup> SDD offers compared to a single detector:

- Double sensitivity
- Double throughput up to saturation

## XFlash® Technology

The M4 TORNADO is equipped with XFlash® technology as standard, featuring a 30 mm<sup>2</sup> detector with an energy resolution of better than 145 eV up to 300 kcps input count rate. An optional second 30 mm<sup>2</sup> SDD **doubles sensitivity and throughput**, while keeping resolution constant, i.e. 600 kcps input count rate. The high throughput processor allows up to 750 kcps input and 275 kcps output count rate.

## 60 mm<sup>2</sup> XFlash® Detector

The new 60 mm<sup>2</sup> XFlash® Detector is now optionally available, featuring the same energy resolution as the 30 mm<sup>2</sup> SDD, but **50 % higher sensitivity**. Here too, an optional second 60 mm<sup>2</sup> SDD **doubles sensitivity and throughput** for challenging applications with light element, low yield or thin samples, or when using primary filters.

## Dual X-ray Source Excitation

The flexibility to equip the M4 TORNADO with one or two X-ray sources each with a different target material, with either polycapillary optics to **produce a small spot**, or with collimator for increased **high energy range excitation** intensity, makes the spectrometer a very versatile instrument. The second source allows for a **wider range of elements and materials to be excited and analyzed quantitatively**. Both sources have 5 primary filters.

## MicroSpot 20

With the advanced halo-free polycapillary optics, its spot size achieves a spatial resolution of 20 µm for Mo K $\alpha$ . This allows **analysis of small particles, inclusions and imperfections or distribution analysis of inhomogeneous samples**.

## FlexiSpot 200

With a large spot size, averaging of **inhomogeneous samples** can be achieved, improving the precision of quantification. FlexiSpot allows the excitation of a 200 µm spot with the polycapillary optics.

## TurboSpeed Stage

The TurboSpeed X-Y-Z stage is extremely fast and highly precise, and enables distribution analysis „on-the-fly“ and fast mosaic creation for sample overview images. Repeatability and stage resolution are at 4 µm, with mapping speed at up to 100 mm/s.

## MultiScope

The M4 TORNADO comes equipped with a chamberscope and a new high grade, co-axial, dual magnification light microscope, allowing simultaneous low and high magnification imaging and overview. The new microscope has lower chromatic aberration and less image distortion, producing higher quality micrographs.

## EasyLoad

The motorized stage has pre-programmed positions for load and eject, making it easy to load samples. The click&go interactive microscope image allows focusing, moving and positioning by mouse click enabling a quick start of measurements.

## MQuant

Working with inhomogeneous samples requires reliable standardless analysis. The intuitive MQuant feature allows just this by using fundamental parameter algorithms based on the Sherman equation. Accuracy is improved with a single-point calibration applied to adjust for complex matrix effects.

## XMethod

This feature makes it easy to manage calibrations and standards and enables the user to develop and optimize analytical methods for complex applications. These methods can be used for the standardless and standard-based quantification of composition and coating thickness of metallic multilayer stacks.

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