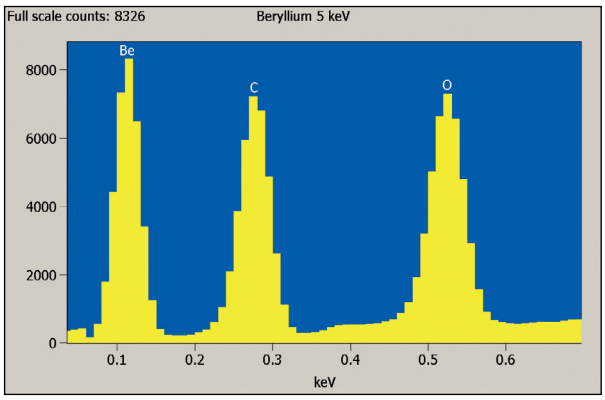
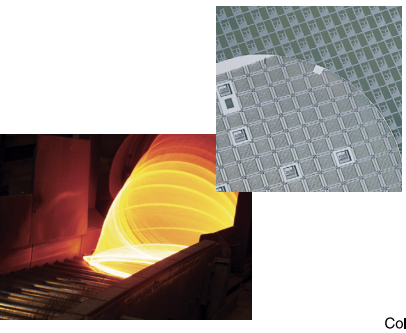
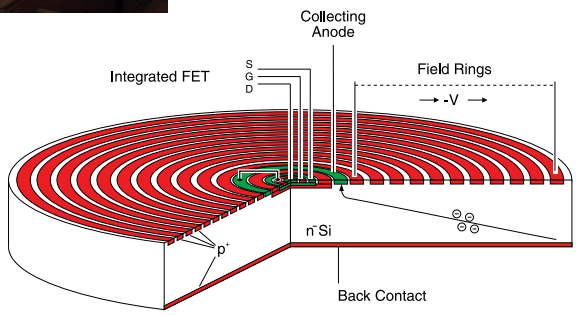
Thermo Scientific UltraDry

Silicon drift X-ray detector

The Thermo Scientific™ UltraDry™ silicon drift X-ray detector represents a new generation of X-ray detection. The UltraDry detector combined with our X-ray microanalysis system, gives users high-resolution high-throughput data collection with no-LN convenience.







Cross section of Silicon Drift Detector

The UltraDry X-ray detector provides superior resolution at incredibly high collection rates. Silicon drift detector technology establishes the foundation for the UltraDry design. Advanced field-effect transistor (FET) integration and a proprietary preamplifier stage create the extraordinary operating space that enables the superior performance of the UltraDry detector. By dramatically shrinking the size of the FET and by integrating it directly into the crystal structure, the device capacitance that leads to electronic noise is virtually eliminated.

By optimizing and characterizing the detector electronics, pulse pile-up and sum peaks are effectively handled;dead time is minimized and resolution is maximized on the fly across a wide range of operating conditions. The result is an extremely high data collection rate with no external or liquid nitrogen cooling and virtually no sacrifice in energy resolution.

The UltraDry detector is more than just a world class detector. It is part of a highly engineered, fully integrated X-ray microanalysis system. Advanced pulse processing technology coupled with unique algorithms to address zero-peak artifacts provides full light-element analysis down to beryllium.

The unique-to-Thermo slotted collimator design allows for consistent collection rates across the widest possible range of working distances, which is absolutely critical to dual EDS and EBSD acquisition.

The offered range of crystal active areas (10 mm^2, 30 mm^2, 60 mm^2, 100 mm^2) and the smallest in class packaging envelope provides the greatest solid angle of collection available for a detector on the market today. The result is a detector that provides the fastest collection and most accurate interpretation of X-rays.

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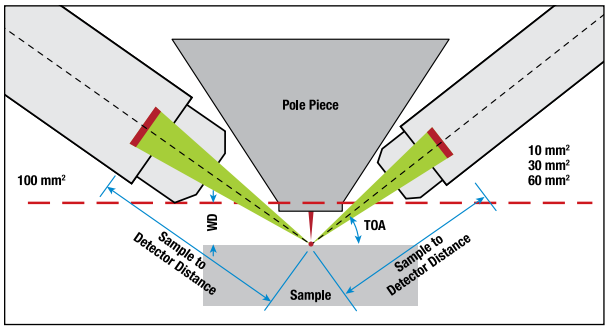
Specifications

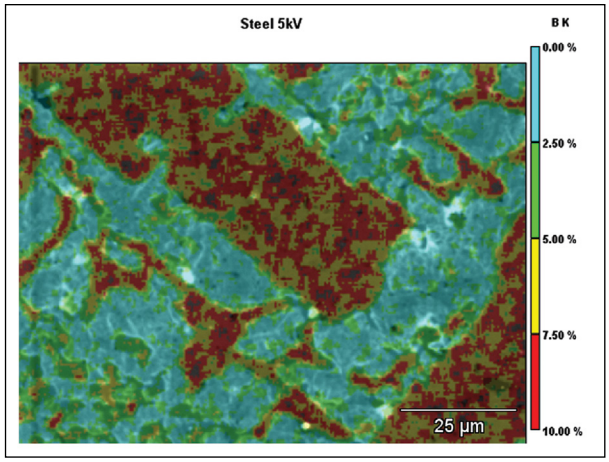
- FWHM measured (ISO 15632) at 5.89 keV (Mn-Kα) with 10,000 counts per second stored in the spectra, measured on the electron microscope
- WD range is measured by varying the vertical distance between the pole piece and the surface of the sample and measuring the input count. STD distance of 50 mm. TOA of 35°. The range is defined as within 25% of the peak count rate at the optimized working distance.
- Vertically slotted collimator to enable maximum WD range. Absolute requirement for dual EDS/EBSD acquisition mode.
- Light element sensitivity down to beryllium
- No auxiliary cooling connections, water or fans. No Liquid Nitrogen.
- Operating environment to 35 °C
- ±5 eV resolution change (±3 eV typical between 1% and 60% dead time) from minimum to maximum count rate at a given analyzer time constant
- ±5 eV peak shift (±3 eV typical between 1% and 60% dead time) from minimum to maximum count rate at a given analyzer time constant
- Input count rates >1,000,000 counts per second
- Motorized slide optionally available

Active Area (mm^2)	Available Resolutions (eV, Mn)	WD* Range (mm)	Max. Output Stores (cps)
Compact	133	10	300,000
10	123, 126, 129	10	300,000
30	127, 129, 134	10	300,000
60	127, 129, 134	10	300,000
100	134	10	300,000

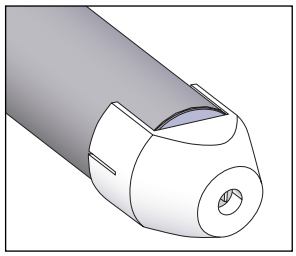
**WD range = Z distance over which input counts >50% of max counts at ideal WD*



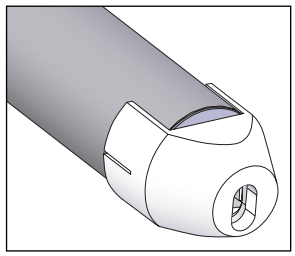
Detector tube diameters and improved solid angle performance



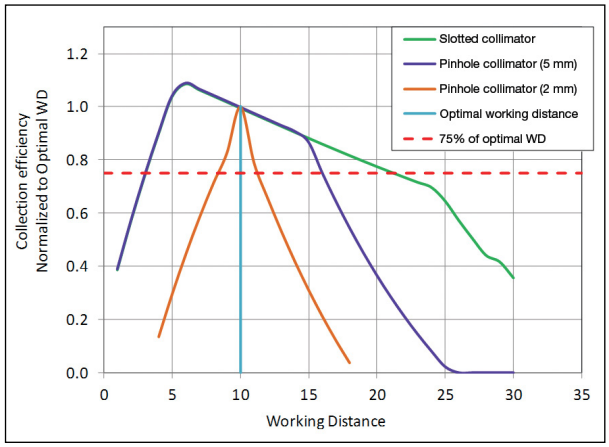
Boron composition in a steel matrix measured at 5 kV and a count rate of more than 50,000 cps



Pinhole collimator



Slotted collimator



Comparison of slotted and pinhole collimator efficiencies

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