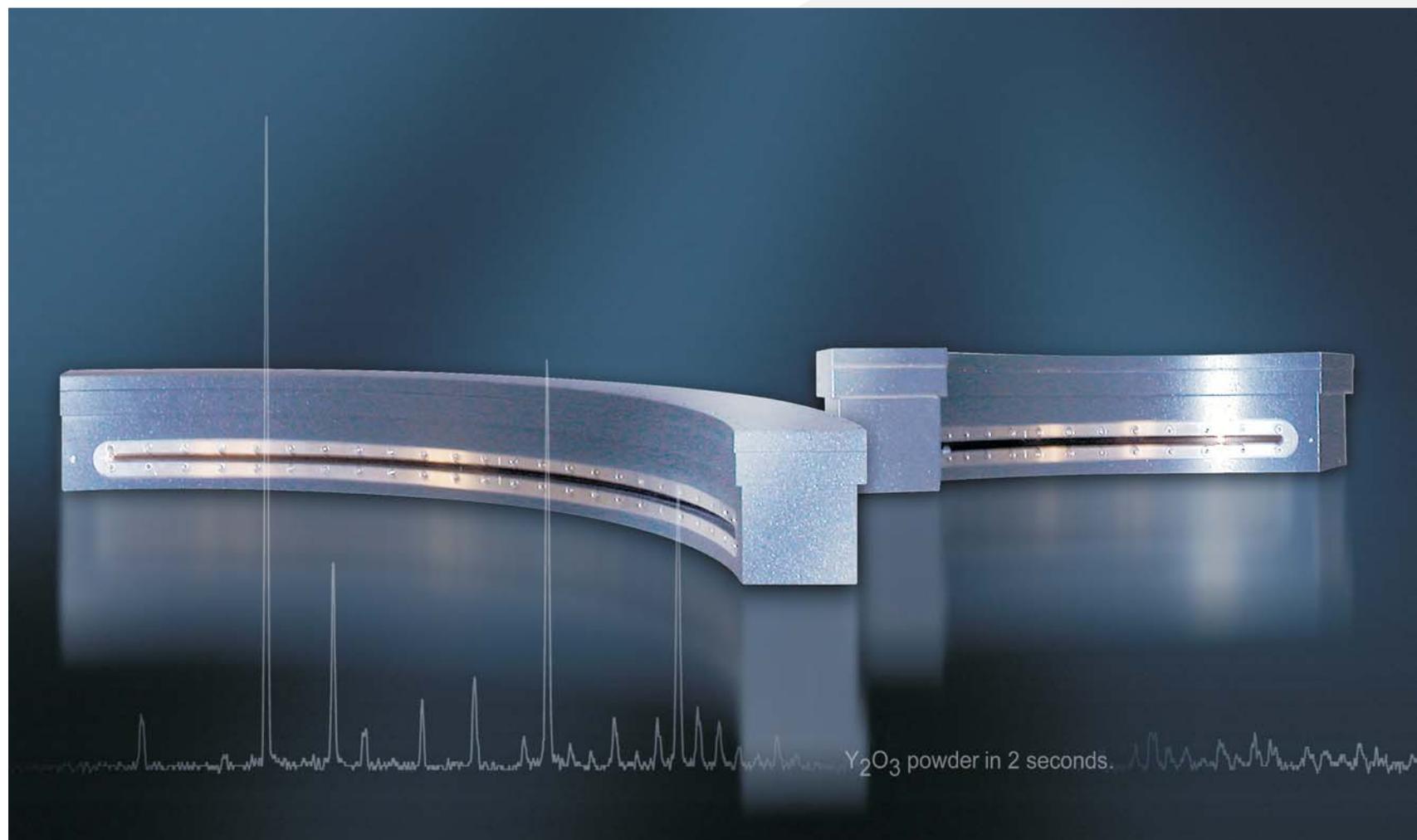


## Equinox Xray Position Sensitive Detectors

Position sensitive detectors ( PSD ) have been around for many years and their successful application to X-ray diffraction experiments has been well documented. Early PSD detectors were based on fragile wire anode technology which was problematic due to the fact that they were easily damaged by over exposure to X-rays and were very noisy due to micro phonics and vibration. To overcome these problems, Inel have pioneered a new technology in which the fragile wire anode has been replaced by an indestructible steel alloy blade anode which is non microphonic, does not suffer from over exposure to the X-ray beam and is very rugged.

Inel patented detectors are based on the use of rugged blade anode technology in that the blade anode design is non microphonic, does not require maintenance and because it is not affected by the direct X-ray beam, the Equinox detector is the only technology acceptable for X-ray diffraction experiments



Equinox PSD X-ray Diffraction detectors enable diffraction experiments to be made on powders, solids and liquids in real time. The detectors are curved about a segment of a circle which can be either 110 - 120 - or 90 degrees allowing the user to select a detector that provides optimum resolution. When used as part of an X-ray diffractometer or other diffraction experiment the detectors will measure all angles of 2 theta simultaneously.

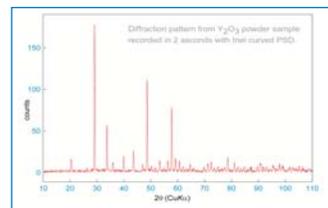
The detectors have no moving parts and eliminate the need for mechanical scanning devices such as complex scanning goniometers used in conventional diffraction instruments.

### Unique Design

Equinox PSD detectors are a curved chamber into which a solid blade anode and segmented cathode is mounted. Within the chamber there is also a cathode assembly and with the addition of argon-ethane gas, the detector can be defined as a proportional type detector. When an X-ray photon becomes incident on the detector anode an electrical charge develops on the cathode at a position that is spatially coincident with the incident photon. This electrical charge can be measured in terms of its intensity and position about the anode / cathode circle. This signal is digitised by an A to D converter and then stored in a memory buffer. The desired S:N is achieved by multiscan accumulation. In practice an excellent diffraction pattern can be recorded in just a few seconds and at very high resolution.

### Resolution

Equinox PSD detectors are essentially spatial detectors used in such a way that they are made to intersect the Debye Scherer diffraction pattern. The radius of



the detector determines its position about 2 theta and the distance to the sample determines angular resolution. This unique design provides an opportunity to limit the incident X-ray beam width on the sample to less than 100 microns with a conventional X-ray source and to less than 20 microns with a micro X-ray source providing a superb opportunity for micro diffraction experiments. To meet the needs of today's diffraction experiments Inel have designed detectors with differing curvatures providing a choice of resolutions from 0.04 to 0.1 degrees FWHH

### Angular & spatial calibration

To achieve absolute angular accuracy the detector software allows the user to calibrate the detector to an amount that exceeds its resolution limit allowing data to be used with the most sophisticated X-Ray diffraction data refinement programs

### Curved or Linear

There are experiments that require linear detectors as an alternative to curved and

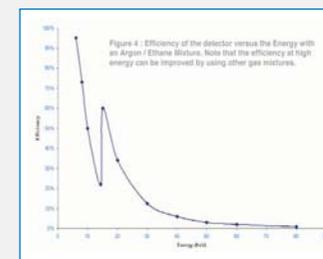
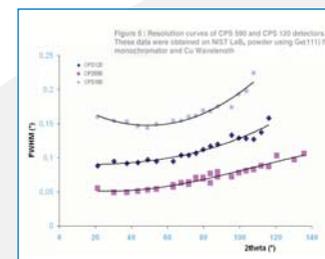
to meet this need Inel have designed a range of detectors of varying lengths of which one is sure to provide an experimental solution. The technology is generally similar to that of the curved design in which a rugged blade is used as the anode. The resolution of linear detectors is also spatially defined and therefore the detecting resolution is related to its position within the experiment

### Applications

Inel Equinox detectors will find applications in all types of Xray diffraction experiment especially as a direct replacement for existing scanning goniometers using single point detectors. Also to upgrade an existing X-ray diffractometer when its useful life has come to an end but when the existing X-ray generator is still in good order. A curved Equinox detector will bring an old diffractometer back to life providing years of extra use and at very high performance. They can also be used to convert an existing diffraction system for use in a kinetics experiment. Remember Equinox detectors see and measure all angles of diffraction simultaneously and are therefore perfect for kinetics and dynamic studies. The detectors can be used to substantially speed up analytical times enabling samples to be analysed in just a few seconds.

### On Line

Equinox detectors do not require a scanning goniometer and can therefore be used to advantage in any Online application from cement analysis, pharmaceutical raw material production, phase change monitoring and much more.



### Curved Position Sensitive Xray Detectors

Cat Nos	Curvature Radius	Resolution FWHH	Degrees 2 Theta
CPS180	180 mm	0.095	110 degrees
CPS120	150 mm	0.069	120 degrees
CPS590	500 mm	0.040	90 degrees

### Linear Position Sensitive Xray Detectors

Cat Nos	Spatial Resolution	Length cathode
LPS50	160microns	50mm
LPS100	160 microns	100mm
LPS200	160 microns	200mm

### Specifications

Resolution	Measured on LaB6 powder with Ge monochromator
Gas mix	Ethane / Argon (Other gas mixes also available)
Maximum count rate	100,000 cps
Quantum efficiency	75% CuKa
Minimum measure time	0.1 seconds
Maximum measure time	24 hours
Mounting	Vertical or horizontal
Will it fit	Fits all existing X-ray diffractometers
Power	115 / 230V 50/60Hz



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