

OnStream slurry XRF analyzer



QCX[®] PERI[™] PX2100

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Single stream solution

Few stream solution

Multi stream solution with multiple multiplexers – up to 14 streams supported by analyzer – also with foreign brand multiplexer, retrofitted with control from PERI controller.



On-Stream X-ray Analyzer

PX2100 provides elemental analysis of slurry using energy dispersive x-ray fluorescence (EDXRF). PX2100 uses the latest in x-ray technology to provide a flexible analyzer system with minimal maintenance requirements.

The PX2100 analyzer system offers state-of-the-art sensitivity and short analysis cycle times for monitoring slurry process streams in mineral processing plants. PX2100 supports multiple streams via a multiplexer system. In replacing other analyzers, the PX2100 works with existing multiplexers via its internal multiplexer control system. For new installations, a multiplexer system can be designed and delivered as part of the FLSmidth project scope.

The analyzer uses a Si-PIN detector with a detection range of approximately 500 keV to 30 keV, which includes the primary emission lines from Oxygen to Xenon*. The detector incorporates a thermoelectric cooler to maintain the detection surface at -30°C without using liquid nitrogen as required by other systems on the market. The low power x-ray tube (50W) requires only

air cooling, so additional water-based heat exchangers are unnecessary. PX2100 uses a thermoelectric cooler on the enclosure to maintain a constant temperature inside the analyzer cabinet.

The analyzer is housed in a NEMA 4X/IP66 enclosure, and includes a rugged touch screen for local display and control of the analyzer.

PX2100 connects directly to plant information networks using a standard Ethernet protocol (TCP/IP). X-ray spectra, assay information, analyzer alarms and events are all stored in an internal Microsoft SQL Server database, which is accessible to other computers on the plant network, such as FLSmidth ECS™ or QCX® PC Servers offering high level control & optimization based on the acquired analyzer data. The unit can be remotely controlled and serviced via networked or dial-up connections.

*Although the detector is capable of detecting x-ray events from lighter elements, the fluoresced x-rays from those elements are significantly reduced at the detector due to attenuation through air and the transmission efficiency of the sample cell and housing windows. This means in practice that only elements with atomic number 20 (Calcium) or higher can be measured with sufficient analytical performance in a slurry process stream.

Features at a glance...

Near-Stream sampling

- Configurable for one to 14 streams with modular multiplexing
- Unlimited number of elements per stream
- Can be retrofitted to existing sampling systems
- Controls composite sampler, calibration sampler and demultiplexer
- Provides detection and warning of sample flow problems

Analytical

- Flexible I/O accommodates new and retro-fit sampling requirements
- Low power X-ray tube
- Economical Si-PIN detector or very high performance high rate SDD (Silicon Drift Detector)
- Multi-channel analyzer and digital pulse processor
- Built-in reference sample for every measurement
- Many elements and %Solids with a single detector

User and plant interface

- Windows-based graphical touch-panel user interface
- Local or remote data historian
- Connectivity using OPC
- Remote control from plant DCS/PLC
- Remote diagnostic and configuration capability
- Integrates into existing Windows-based secure environments
- Seamless connectivity to FLSmidth ECS & QCX systems

Maintenance

- Front panel user interface provides local monitoring and control; simple Run/Stop switch
- Easily replaceable sample windows
- NEMA4X/IP66 stainless steel enclosure and cooling system, resists corrosion and can be washed down
- Thermoelectric cooling system requires minimal maintenance

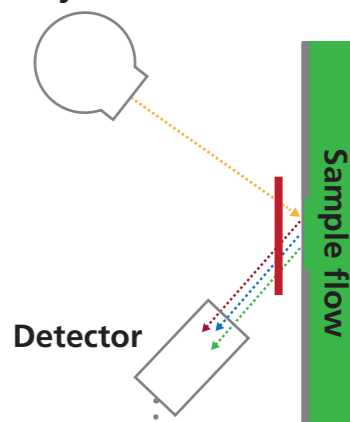
Safety

- ¼" stainless steel housing prevents X-ray leakage
- Hardwired interlocks for the sample door and maintenance access
- Employs enclosure, detector and X-ray tube temperature sensors, as well as X-ray on/off lamp failure detection.

Sample flow (~50-60 l/m) enters a flow cell, where the X-ray tube through a plastic window illuminates the sample and a reference wire with a broad spectrum of X-rays producing excitation and scatter over a wide range of energies. Fluorescence and scatter from the sample are detected and converted into a spectrum (energy vs. intensity) by the Energy Dispersive detector.

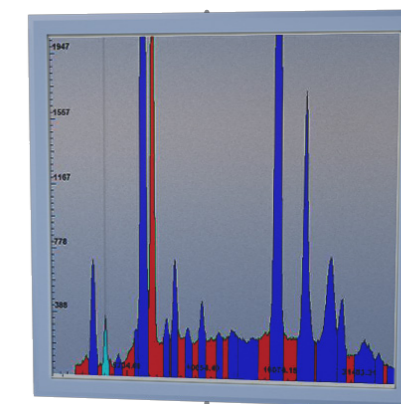
The spectrum of raw counts is retrieved from the Digital Pulse Processor (DPP) and further analyzed by the computer, and elemental assays are calculated based on regression models. Results are sent to the supervisory control system and also recorded in the PX2100 historian.

X-ray tube



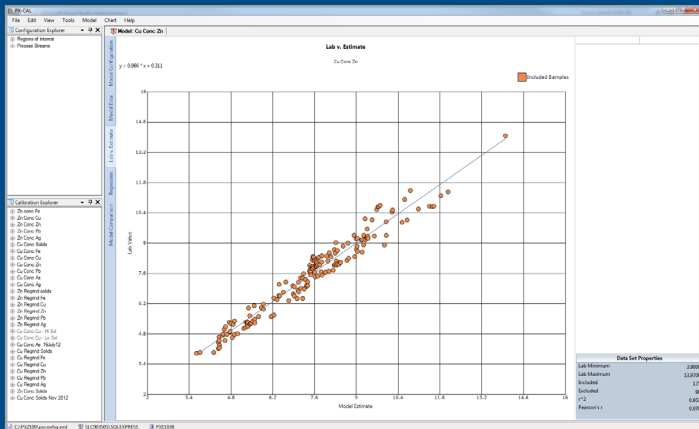
Detector

DPP



Data Historian

OPC



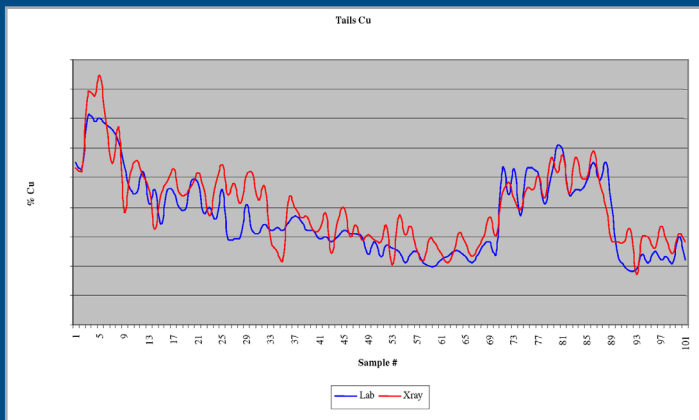
Calibration of intensities (cps) from Raw X-ray Spectrum vs Reference sample data (%)

Typical Standard Errors for Base Metals:

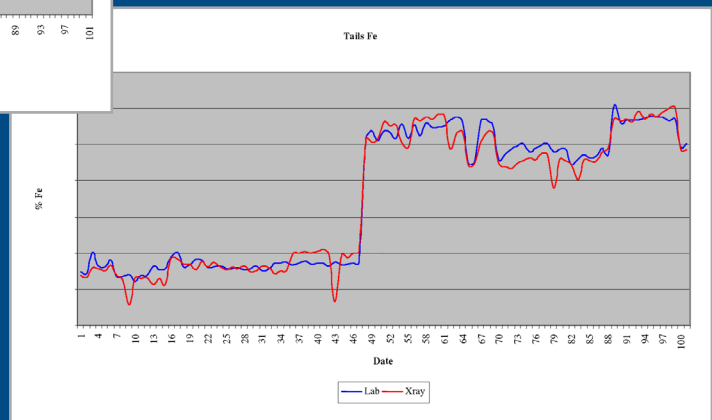
- Feed 5 to 10 % Relative
- Conc. 2 to 8 % Relative
- Tails 5 to 12 % Relative

Typical Copper Concentrate Calibration:

- 15 to 30% Copper R2=0.97
- 2 to 23 % Solids R2= 0.99



PX2100's analytical capability has been demonstrated via trials conducted at several installations. The tests have comprised both PX2100 versus lab data and PX2100 versus data obtained by other brand on-line analyzers installed in parallel. The graphs show typical comparative performance. Installed applications include feed, concentrate and tailing process flows for Copper, Moly (Molybdenum), Silver, Lead and Zinc concentrators.



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