



PANalytical
get insight



SPC

Statistical Process Control - monitors your production process and spectrometer performance



Full automatic system control can be set up using SPC and the SuperQ sample changer software.



The versatile Zetium sample changer allows for (SPC-based) intervention at any time.

Statistical Process Control monitors your performance

Statistical Process Control (SPC) has been proven to be a valuable tool in many laboratories to monitor processes and performances of various analytical instruments. Often the individual instruments are set up to transmit the results to a Laboratory Information Management System (LIMS) that carries out SPC to verify the quality of measurements. With this setup, separate actions need to be started when measurement results are not acceptable. With the SuperQ SPC module, the results from PANalytical XRF spectrometers can be checked before transmission to LIMS.

The outcome of a SPC evaluation can immediately be used to start the measurement of check or corrective samples such as standards and drift monitors, using the sample changer of the Zetium spectrometer. In this way the system performance is automatically verified, reducing the need for separate actions by the LIMS system. In this note, the operation of both SPC and the sample changer are detailed to show this benefit.

Application of SPC

One of the strong points of SPC is that in many cases a change in the process, or in the instrument performance, is noted before the measurement is out of control, i.e. when the results are still within the acceptance limits. Timely actions can be taken, to prevent the next batch of material being discarded, thus saving costs.

Apart from quality control, SPC can also be used to provide a continuous record of system performance for ISO-type laboratory accreditation.



Use of automatic sample batches

Batches can be scheduled to start at a specified date/time or as response to the result of a measurement. The automatic batches are used with samples analyzed on a regular basis, such as re-calibration or instrument drift corrections. The samples used in an automatic batch usually remain on the sample changer. With the automatic batches one can now monitor the spectrometer performance by combining automatic batches with SPC.

A practical example

A calibration maintenance protocol requires that a quality check sample is measured at 05:00 on a Monday morning and the results are automatically passed to SPC for trend analysis. In the event that the results fall outside the tolerance limits, SPC can instruct the sample changer to load and measure the drift monitor samples. Once the automatic drift correction is complete, the check sample can be re-measured to establish whether the measurements are back within the accepted limits.

In the event that measurements of the check sample fail again the sample changer batch measurements can be stopped to allow operator intervention. The Zetium sample changer conditional batch window, illustrated in Figure 1, has been set up to manage the calibration maintenance protocol described above.

Different types of check samples can be used to assess and distinguish between the instrument stability and/or other parameters in the production process (e.g. sample preparation, or product composition).

The SPC software is easily set up and the results are clearly displayed (Figure 2). The user interface of the Zetium sample changer clearly indicates, by the use of colors and symbols, the measurement status of each sample (Figure 3). Additional information can be obtained by placing the mouse tip over the sample of interest.

Automation of analysis

SPC can be seen as the first step in the automation of routine analysis and calibration maintenance. Once sample batches have been defined on the sample changer, shift operators only need to use the routine sample measurement queue to load process samples. The calibration maintenance continues automatically in the background, thereby maintaining the system performance.

The combination of SPC, sample changer batch measurements and SuperQ monitor correction is ideally suited for system incorporation into larger automation projects, which may include sample preparation equipment with belt or robot sample transfer mechanisms.

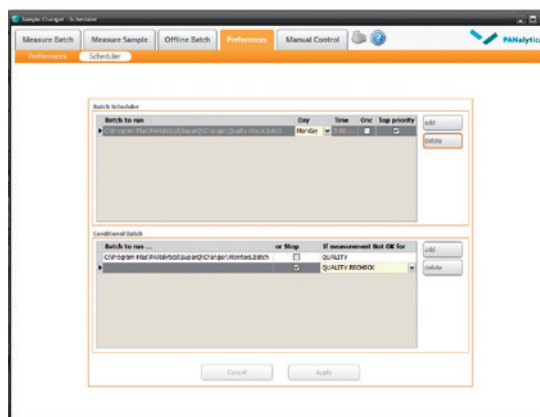


Figure 1:
An example of a practical procedure for automated quality control

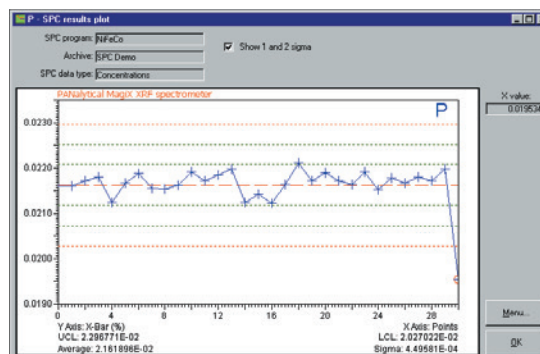


Figure 2:
SPC result will instruct the instrument monitor measurements to be carried out.

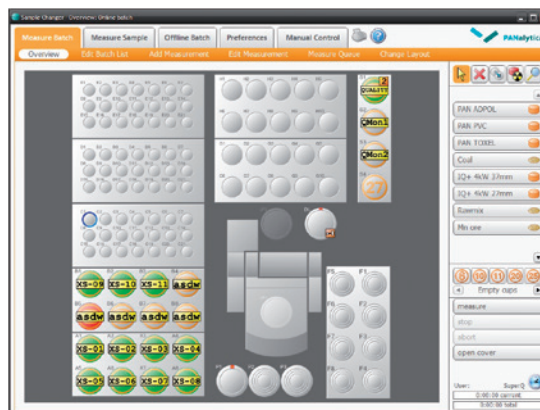


Figure 3:
The Zetium sample changer window shows all essential information by using of colors and patterns.

About PANalytical

PANalytical's mission is to enable people to get valuable insight into their materials and processes. Our customers can be found in virtually every industry segment, from building materials to pharmaceuticals and from metals and mining to nanomaterials. The combination of our software and instrumentation, based on X-ray diffraction (XRD), X-ray fluorescence (XRF) and near-infrared (NIR) spectroscopy as well as pulsed fast thermal neutron activation (PFTNA), provides our customers with highly reliable and robust elemental and structural information on their materials and is applied in scientific research and industrial process and quality control.

PANalytical employs over 1,000 people worldwide. The company's headquarters are in Almelo, the Netherlands. Fully equipped application laboratories are established in Japan, China, the US, Brazil, and the Netherlands. PANalytical's research activities are based in Almelo (NL) and on the campus of the University of Sussex in Brighton (UK). Supply and competence centers are located on two sites in the Netherlands: Almelo (X-ray instruments) and Eindhoven (X-ray tubes), in Nottingham, UK (XRF applications and standards), in Quebec, Canada (fusion sample preparation) and in Boulder CO, US (near-infrared instruments).

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The company is certified in accordance with ISO 9001 and ISO 14001.

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PANalytical is part of Spectris plc, the productivity-enhancing instrumentation and controls company.

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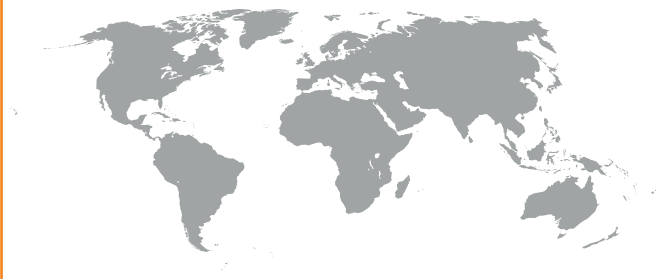
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- **ECONOMY:** indispensable coverage for self-sufficient operations
- **ADVANCED:** cost-effective support for routine usage
- **PREMIUM:** flexible package for high equipment usage
- **ELITE:** most comprehensive package for demanding environments

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