



Your Questions Answered

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The following is a list of questions asked prior to and during the December 2022 online seminar. If your question is not covered or has not been answered yet, please do not hesitate to contact us.

Q: Is it possible to check Alternative Fuel and Raw Materials (AFR's) with XRF?

A: Yes, this is possible. The beauty of XRF is the analytical flexibility. This means that, with the same instrument, you can analyze your raw materials, your intermediate and final products as well as all kinds of alternative materials and even production derived

waste. Waste wood, used petrochemicals, plastics, paper, tires, slags, ashes, slurries, and more can be analyzed by XRF. Often, the process monitoring tasks are handled by the S8 TIGER Series 2, whereas incoming goods, raw mixes, and, in some cases, AFR's can be checked by benchtop instruments.

Q: How deep are the detection limits for heavy metals like Pb or Hg or Tl?

A: Heavy trace elements need to be monitored in many alternative fuels. With the S8 TIGER Series 2 and our unique PETRO-QUANT solution, heavy metals in alternative fuels can be quantified down to lowest ppm level. For instance, the lower limit of detection (LLD) of Tl and Pb is 0.2 ppm.

Q: Are there different requirements for XRD sample preparation?

A: Sample preparation is often a bottleneck in automated laboratories. There are different requirements for XRD and XRF. In some cases, a compromise for both techniques is possible, enabling the analysis of the same prepared sample on both instruments. It depends also on the available sample preparation equipment.

Q: We want to increase the % TSR from current levels of 9% to 12-15%, but high Cl % in raw meal is the limiting factor. Which spectrometer is most suitable for accurate analysis of Cl in hot meal samples?

A: Elevated concentration of Cl in alternatives fuels like tires can be accurately quantified with our benchtop XRF system. Typically, both the S2 PUMA Series 2 EDXRF as well as the S6 JAGUAR WDXRF are suitable. The optimal choice depends on various factors, such as sample throughput and required precision and accuracy. However, the bottleneck is often the sample preparation. Here, our application team can provide the necessary guidance.

Q: Does the benchtop system detect sodium?

A: Yes, the S6 JAGUAR, our benchtop WDXRF, allows to quantify Na accurately and precisely, even down to trace element levels. Our high-performance EDXRF system, the S2 PUMA Series 2 with the new HighSense XP detector, also enables the quantification of Na in cement and similar materials, compliant with ASTM C114.

Q: Can clays and calcined clays be analyzed by XRD?

A: Over the past couple of years, calcined clays are in the focus of the cement industry to reduce the CO₂ footprint. From the very beginning we supported these activities. We meanwhile do have the expertise and knowledge not only for XRD clay characterization, but also the methods to control the calcination process. However, in most cases, individual setup and development is required.

Q: Can hydration experiments be done by XRD?

A: That's more an R&D topic. We don't see this on plant operations level, as sample preparation is different. There are several scientific publications about that, recently there even has been a work on the structural data on CSH.

Q: How do we check and validate an XRF calibration? How frequently do we need to repeat the check?

A: Certified reference materials (CRM's) are commonly used to check and validate XRF calibrations. Stable glass beads are used as regular quality checks (QC's). Our systems are all equipped with QC standards to check the health of the instrument. Dedicated QC's, for instance a cement CRM from NIST, are added to the analytical methods. Our out-of-the-box solutions, like CEMENT-QUANT, already include such standards.

Q: What is the frequency of drift correction?

A: A drift correction may be necessary once a quality check is out of the specified limits. With Bruker's XRF instruments, a drift correction is rarely necessary, typically less than once per year.

Q: Is the filter automatically changed according to the measured elements?

A: All our XRF spectrometers are equipped with an automatic primary beam filter changer. Our software preselects the most suitable filter for a given application and the user can make manual changes if needed. We can also add customized filters to the filter changer.