



**Malvern
Panalytical**
a spectris company

EPSILON XFLOW

On-line elemental analysis of liquids,
designed for your process



GAIN VALUE BY DIRECT INSIGHT INTO YOUR PRODUCTION PROCESS

Increasing competitive pressure and more stringent regulations drive the need for more efficient processes. Real-time process monitoring is the method to realize this. It ensures an optimal use of resources and consistent product quality.

The Epsilon Xflow, an on-line analyzer for liquids, can help you to monitor liquid-based production processes. It is designed for the continuous analysis of the elemental composition of liquids, providing real-time insight in your daily operations. The ability to respond immediately to changing process conditions ensures highly efficient production and optimal quality of your product.

On-line monitoring provides fast and accurate control of essential process parameters. It saves time, prevents costly waste and ensures adherence to tight product specifications. The Epsilon Xflow analyzer, using energy dispersive X-ray fluorescence (EDXRF) technology, is equipped with the essential attributes to realize direct process control.

For stand-alone process control several essential output types are available, and remote access capabilities allow direct integration into your manufacturing execution system.

Epsilon Xflow

- Leading EDXRF technology
- Fast, simultaneous multi-element analysis
- Applicable for a wide range of liquid processes
- Highly repeatable results enabled by the latest flowcell technology
- Interface to manufacturing execution systems
- Proven user interface for easy operation and maintenance
- Remote service and application support options



Advantages of XRF analysis

- Fast response, robust, low maintenance, non-destructive and zero-waste
- Excellent repeatability and accuracy at low detection limits
- Simultaneous analysis of a wide range of chemical elements ranging from sodium to americium (z=11 to 95), like sulfur, iron, nickel, vanadium and calcium
- Flexibility to cater for many different process streams and process conditions.



TURN-KEY SOLUTION CUSTOMIZED TO YOUR NEEDS

Our specialists realize a complete solution according to your specifications. The offer takes care of different process requirements and parameters, and the full solution can include sample conditioning systems, waste management solutions, housing and/or sample recovery. The result is a turn-key solution, customized to your site and process needs.



Epsilon Xflow Benefits

- Excellent short- and long-term repeatability
- Low maintenance and remote access options
- Fast multi-element analyzer with low detection limits
- Processes monitoring and control via direct interface to many manufacturing execution systems
- Customizable to your process conditions
- Chemical resistance to a wide range of liquids
- Designed for ATEX Zone 1 & 2 requirements

The complete solution

Malvern Panalytical offers a full operating solution, starting from the sampling point, up to data integration in production processes.

- Sampling
- Process flow selection
- Sample conditioning
- Integrated validation
- Analog outputs for automatic process control
- Remote access
- Housing and shelter

Sample conditioning

Various conditioning options can be provided to make the sample suitable for the analyses such as:

- Particle filtration
- Cooling
- Heating
- Mixing

Compatible with a wide range of process conditions

The on-line solution can be made of materials able to cope with your specific process conditions with respect to: pH, pressure, temperature and more.

Integrated Epsilon 4 performance

The proven and most advanced Epsilon 4 X-ray fluorescence excitation and detection technologies are now incorporated in the Epsilon Xflow. A well-designed optical path, a wide range of excitation capabilities for light and heavier elements and a high-resolution SDD detector system contribute to the unique Epsilon 4 performance. Based on EDXRF technology the Epsilon Xflow has the flexibility to analyze all elements from Na-Am.

Safety guaranteed

Malvern Panalytical's highest priority is full X-ray safety of all instruments for users and their surroundings.

The Epsilon Xflow is designed according to the strict requirements prescribed by ATEX regulations for safe operation in explosive atmospheres.

Adaptable to different climates

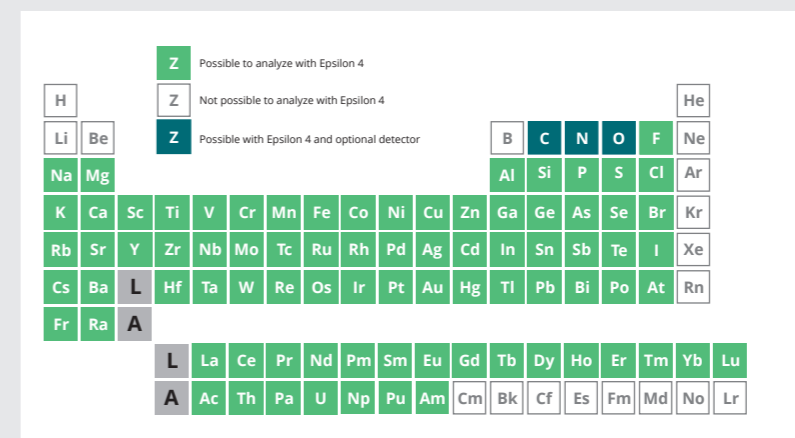
The Epsilon Xflow can be placed in tough industrial environments. Optional air-conditioning, heating or shelter to cope with challenging weather or plant conditions are available to provide a long-term solution.

Low and easy maintenance

The flowcell is easily accessible for preventive and corrective maintenance when required. A flush option is available for remote cleaning of the flowcell window.

Control your process

The data output of the Epsilon Xflow can directly activate components like valves in the production process. The Epsilon Xflow can be integrated easily into the manufacturing execution system and accessed from a central control room to monitor, control and steer production processes.



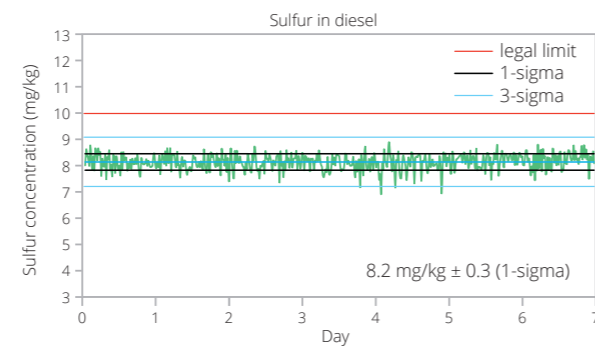
INDUSTRY SOLUTIONS

INDUSTRY EXAMPLE:

Accurate blending of ultra low sulfur fuels

Environmental regulations, like Tier 3 in the USA or Euro VI in the European Union, set the allowed limit for sulfur content in road fuels to 10 mg/kg. Constant close compliance with regulations will maximize profit by minimizing the 'give-away' and preventing costly reprocessing.

The Epsilon Xflow is capable of continuously analyzing ultra-low sulfur diesel process streams with accuracy and precision, allowing for production closer to limit offsets and thus reducing operational costs. The example of road diesel demonstrates the capability of the Epsilon Xflow to analyze with excellent repeatability and accuracy over a longer period.

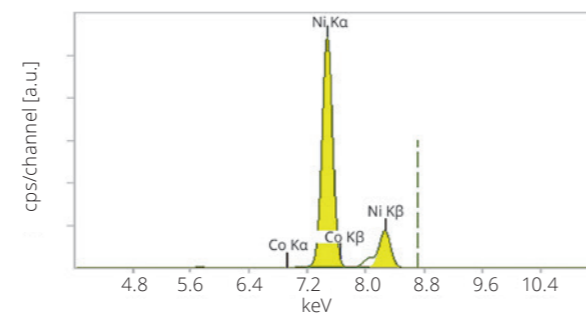


20 minutes per measurement point

INDUSTRY EXAMPLE:

Real-time analysis of liquors and reagent during ore processing

To extract metals like copper, nickel or uranium from ores, aggressive and mostly highly acidic liquids are utilized. The Epsilon Xflow can cope with these challenging process conditions and still offer the required accuracy and stability over longer periods of operation. This is demonstrated by analyzing an H_2SO_4 leaching solution, containing nickel, with the Epsilon Xflow. The results clearly indicate the capability of the Epsilon Xflow to handle these highly acidic solutions. The on-line analyzer offers its users direct and accurate feedback of the leaching process, which enables real-time monitoring of mining process operations.

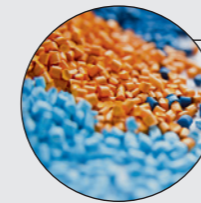


71 measurements at 45°C		
Element	Average (wt%)	1-sigma (wt%)
S	7.4	0.1
Ni	10.8	0.1



PETROCHEMICALS

- Accurate blending of ultra low sulfur fuels
- Control real-time desulfurization processes to optimize margins
- Enable pro-active reaction on catalyst killers (Fe, Ni, V) to extend catalyst life-time
- Control the blending and production of lubrication oils



POLYMERS

- Accurate dosing of additives
- Monitor homogenous catalysts in polymerization processes
- Control PTA production processes



ENVIRONMENTAL

- Monitor hazardous compounds in waste- and process streams
- Control the use of chemicals in wood preservation processes



MINING

- Monitor and react to changes in in situ leaching processes
- Check mine wastewater compositions
- Real-time analysis of liquors and reagents during ore processing



METALS

- Monitor yield in precious metal recovery
- Analyse the depletion of plating baths and powder coatings



FOOD

- Accurate dosing of nutrients in food and feed streams
- Control the salt concentration in food streams



WHY CHOOSE MALVERN PANALYTICAL?

We are global leaders in materials characterization, creating superior, customer-focused solutions and services which supply tangible economic impact through chemical, physical and structural analysis.

Our aim is to help you develop better quality products and get them to market faster. Our solutions support excellence in research, and help maximize productivity and process efficiency.

Malvern Analytical is part of Spectris, the productivity-enhancing instrumentation and controls company.

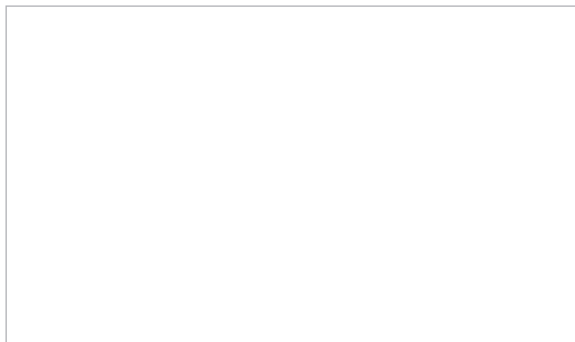
www.spectris.com

SERVICE & SUPPORT

Malvern Analytical provides the global training, service and support you need to continuously drive your analytical processes at the highest level. We help you increase the return on your investment with us, and ensure that as your laboratory and analytical needs grow, we are there to support you.

Our worldwide team of specialists adds value to your business processes by ensuring applications expertise, rapid response and maximum instrument uptime.

- Local and remote support
- Full and flexible range of support agreements
- Compliance and validation support
- Onsite or classroom-based training courses
- e-Learning training courses and web seminars
- Sample and application consultancy



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