Metrohm Process Analytics

Solution provider for online, inline, and atline process analysis.

Metrohm
Process Analytics

From the lab to online process analysis: The best analytical solution

Process analyzers designed and manufactured by Metrohm Process Analytics are the preferred solution for process monitoring in a wide range of industries. Whatever your project requirements and budget, Metrohm Process Analytics has the right solution for you. We offer analytical systems for electrochemistry, ion chromatography, ion selective measurements, photometry, spectroscopy, and titration.

All these analysis techniques can be implemented in different process environments. But how to bring these solutions to your process is another question. There are four ways to implement analysis techniques in your process, and depending on which one you implement, you get several benefits in return.

Tailored solutions in industrial plants with online, inline, atline, and offline analysis

Offline measurements:

In this type of process analysis, samples are manually retrieved and transported to a remote laboratory from the take-off point of the process and high experienced chemists are needed to perform the analysis. The properties of the sample can vary between sampling and analysis, so direct process control is not possible, especially for unstable samples.

Features:

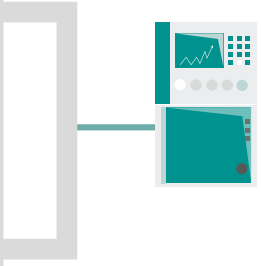
Reproducibility ✓ ✓ ✓ ✓
Cost Savings € € € €
Efficiency ★ ★ ★ ★
Safety ○ ○ ○ ○

Atline measurements:

With atline analysis, samples are taken manually from a take-off point to a process analyzer in proximity to the process. This method is ideal when multiple samples have to be taken at several sampling points along the process and across the production floor over long distances. However, continuous manpower is needed to collect samples and the frequency of analysis is not optimal.

Features:

Reproducibility ✓ ✓ ✓ ✓
Cost Savings € € € €
Efficiency ★ ★ ★ ★
Safety ○ ○ ○ ○



Online measurements:

Automation is the key feature of the two following analysis measurements. With online analysis, sample flow is directed from the process loop to the analyzer automatically (by the use of a fast-loop system) so very limited manpower is needed. This method permits automated sampling, registration, preconditioning, fast feedback of results, and efficient process control.

Features:

Reproducibility ✓ ✓ ✓ ✓
Cost Savings € € € €
Efficiency ★ ★ ★ ★
Safety ○ ○ ○ ○

Inline measurements:

For the most «real-time» analysis, inline analysis is the perfect choice. With this technique, a sensor, fiber or probe is used to connect the analyzer directly in the process stream for continuous analysis. The closer your analysis techniques get to be «real-time», the more benefits you get (*e.g.* higher safety, efficiency, cost savings, ...).

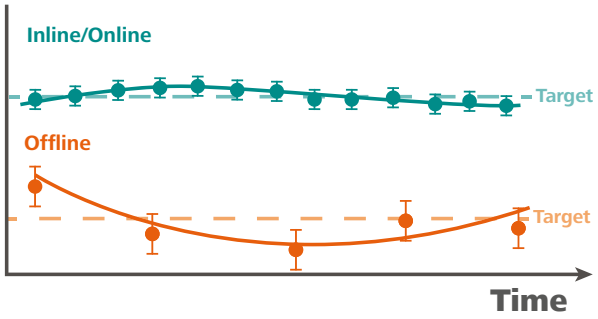
Features:

Reproducibility ✓ ✓ ✓ ✓
Cost Savings € € € €
Efficiency ★ ★ ★ ★
Safety ○ ○ ○ ○

The following pages give a direct comparison between offline and atline/online/inline analysis according to these four key qualities: **reproducibility**, **cost savings**, **efficiency**, and **safety**.

High analysis frequency - High quality products

Manual sampling is one of the main disadvantages of offline analysis. It is time-consuming and the sample has to be taken to the nearest laboratory, which implies that the characteristics of the sample no longer represent the current process conditions (temperature, moisture content, and many more). This means that any necessary process adjustments take place hours or even days after an out-of-specification reading, and reproducibility of results are not as efficient as with online and inline analysis



Reduce giveaways by € 2.3 M/month

by implementing inline analysis in a refinery @100,000 barrels per day

Petrochemistry

Time-consuming manual sampling and long distances to the laboratory are eliminated by utilizing online, inline, or atline process analyzers. Samples are more representative and reproducibility of results is increased as the measurements are performed exactly the same, every time.

Reproducibility

Process improvement with online analyzers - Safeguard your company's assets

Unforeseen plant shutdowns involve higher expenses and chemical analysis performed directly at the most critical process points is crucial to reduce the potential for unforeseen plant shutdowns. By providing data in «real-time» to the industrial control system (*e.g.* DCS or PLC), downtimes are reduced and costly company assets are safeguarded.

Many processes are controlled within tightly defined limits for many basic parameters (such as weight, temperature, and pH) or more unique parameters such as *acid concentration* in etching solutions, *acid-end groups* in polymerizations, product *moisture levels* in drying processes, *amine loading and amine concentration* in CO_2 scrubbers, and many more.

€ 5.5M/year

In savings when inline analysis is implemented on a spray dryer

Cosmetics

Regular control of process parameters is critical to maintain product and process specifications and to achieve optimal product quality and consistency in any industry. Deviation of these parameters from target can negatively impact on product quality and lead to excessive operating costs, e.g:

- Excess chemical consumption
- Reduced throughput/fluctuations
- Lower manpower/rework
- Out of specification products/rejects
- Lower yield
- Higher energy usage

Accuracy is key - Increase company profits

In offline analysis, samples are taken much less frequently than online, inline, or atline measurements, making it much more likely to overcompensate with chemical treatments when not deemed necessary at all. Therefore, increased analysis frequency and accuracy is key for efficient process adjustment and optimization.

Processes that rely on any analytical measurement will achieve the required accuracy depending on different aspects:

- The analytical instrument employed (Standard Error of Prediction «SEP»)
- Error of sampling from the process and sample preparation
- Frequency of analysis
- Process variation error

Offline laboratory analysis can negatively impact on process accuracy by introducing manual sampling error. Also, offline analysis limits the analysis frequency due to manual limitations and differences between analysts.

↑4%

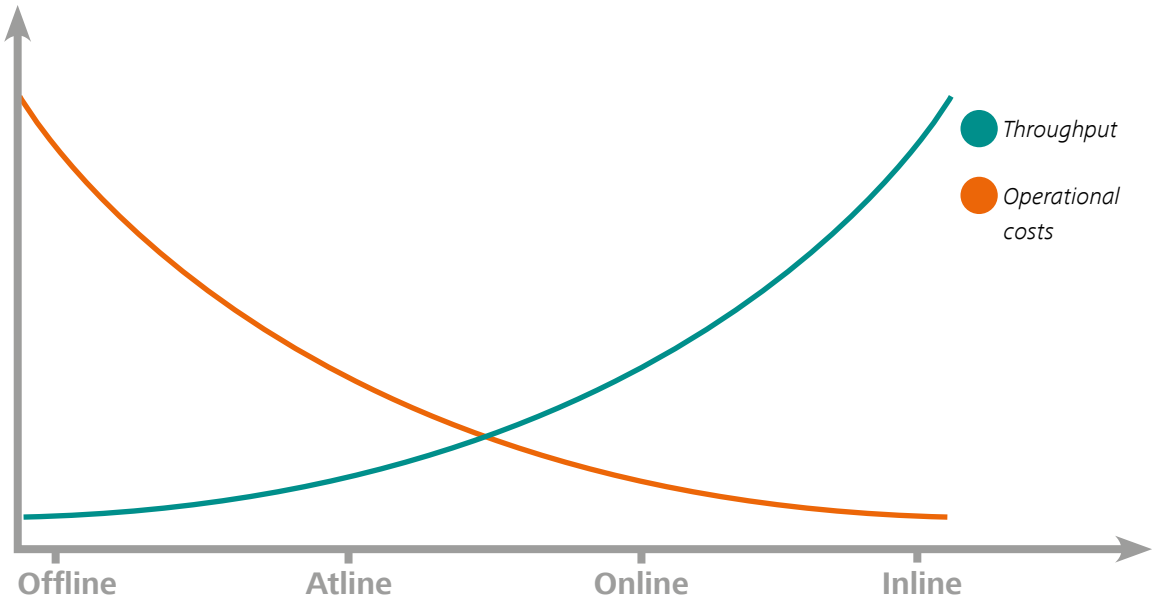
In extra revenues with inline analysis in fermentation process

Biofuels

ROI < 4 months*

by implementing online analyzer systems for liquor quality analysis

Pulp&Paper



*Process and analyzer-dependent

Safety benefits of process analyzers - Avoid incidents with process automation

Offline process analysis implies multiple manual steps and occupational hazards when exposed to toxic chemicals and hazardous areas of operation. All of these steps will be reduced or totally eliminated by using **online** or **inline** process analyzers, which reduces incidents, resulting in increased plant safety.

By limiting the manual handling steps, you eliminate any risk of exposure to hazardous chemicals. Furthermore, with automated sampling (online, or inline) you can:

- Detect dangerous sample composition
- Avoid hazardous sampling and laboratory analyses
- Analyze in hazardous zone (Ex-proof area)
- Monitor spillages
- Reduce waste water streams
- Detect of out-of-specification process streams

Introducing inline or online process analyzers reduces the *sampling error* and increases the *sampling frequency* as well as improving the prediction error for the analysis. Improving all these steps leads to significant improvements in process accuracy narrowing the normal operating window to ensure the process is operating at its highest **efficiency** and above all in the **safest** way.

80% of accidents

in process environments are due to **human errors.** *When* **online or inline** *sampling is implemented, the origin of accidents is less likely due to* **human errors.**

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