2060 CVS Process Analyzer

Reliable organic additive analysis for online process control
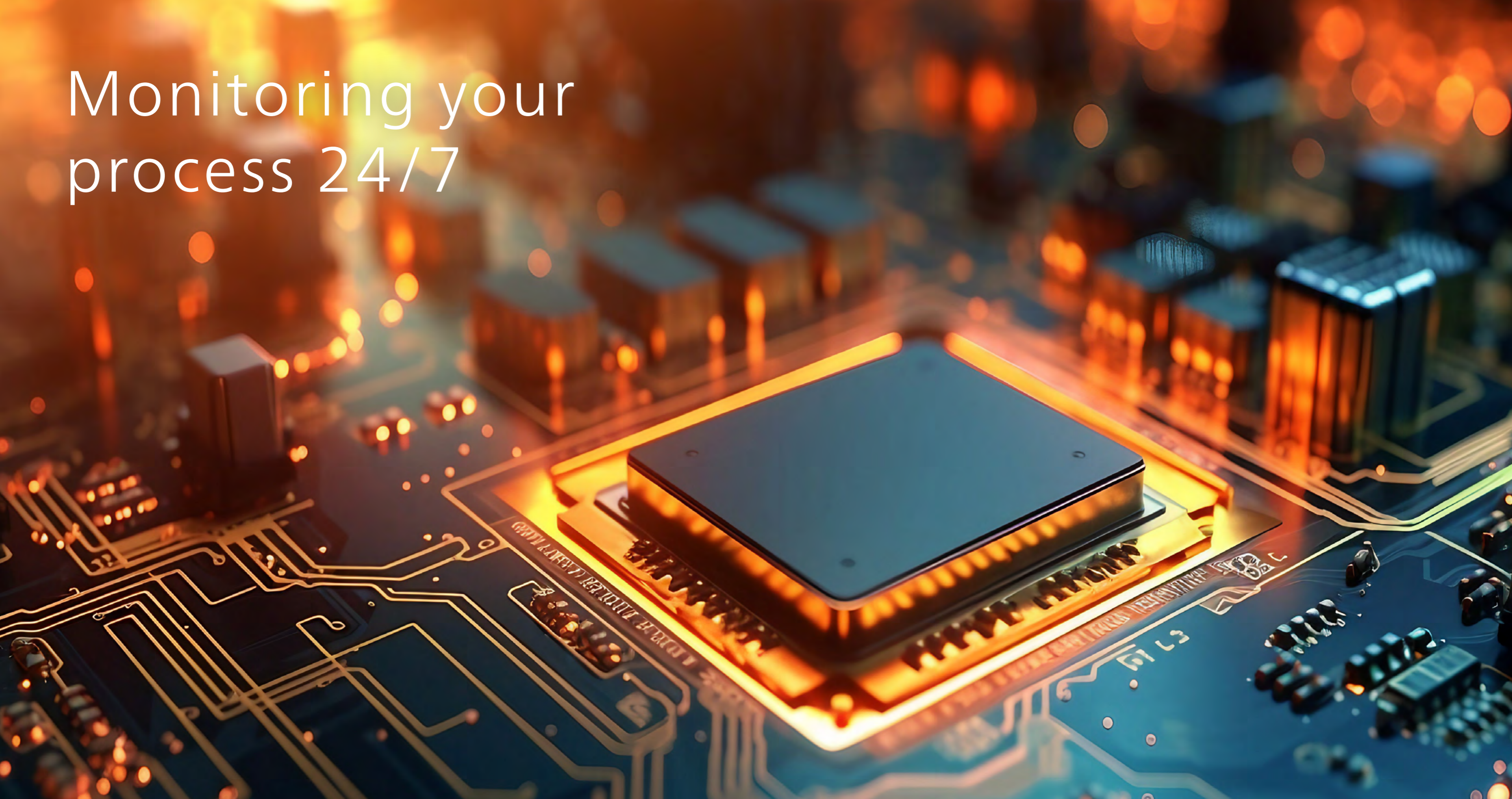
Metrohm means … Spectroscopy!

**PUSHING
THE
LIMITS
TOGETHER**

Metrohm
Process Analytics

Monitoring your process 24/7

Maximize profitability, comply with regulations, and increase plant safety

Metrohm Process Analytics is known as a pioneer in process analysis and has become one of the global process industry's preferred solution providers for monitoring key parameters in large scale industrial manufacturing processes.

The first multipurpose process analyzer was developed by Metrohm in the 1970's, with a limited range to handle four sample streams. Since then, Metrohm Process Analytics has continued to push the limits together with our customers by providing the best customized online analytical solution on the market.

The 2060 platform enables customized online monitoring of industrial processes with multiple parameters and streams. The platform consists of the most versatile analyzers in the Metrohm Process Analytics product portfolio. They enable 24/7 online or atline monitoring of chemical industrial processes, water, wastewater, other liquids, and gases.

CVS analysis goes online

Cyclic Voltammetric Stripping (CVS) and Cyclic Pulse Voltammetric Stripping (CPVS) are standard techniques within the electroplating sector for quantifying organic additives present in electroplating solutions. Particularly in the production of PCBs and semiconductor components, this method plays a crucial role in ensuring a quality product through precise control of the plating bath conditions.

Its primary applications are **acidic copper** and **tin-lead** electroplating baths. The quantitative assessment of additives relies on their impact on the metal deposition process. Because the test is based on an electrode reaction that mirrors the manufacturing process, it allows for quantification of the additive in the most representative conditions.

CVS or CPVS provides precise determination of additive concentrations, directly indicating the amount of additive per liter of bath solution. This precision facilitates accurate replenishment of bath concentrations, ensuring reliable and uninterrupted process operation.

This methodology has gained widespread acceptance in the electroplating industry, largely due to the precision of its analytical outcomes.

The 2060 CVS Process Analyzer is a high-tech online analyzer used in the PCB and semiconductor industries. It can detect organic additives in electroplating baths. It is cost-effective and integrates with online systems, making it highly versatile and efficient.
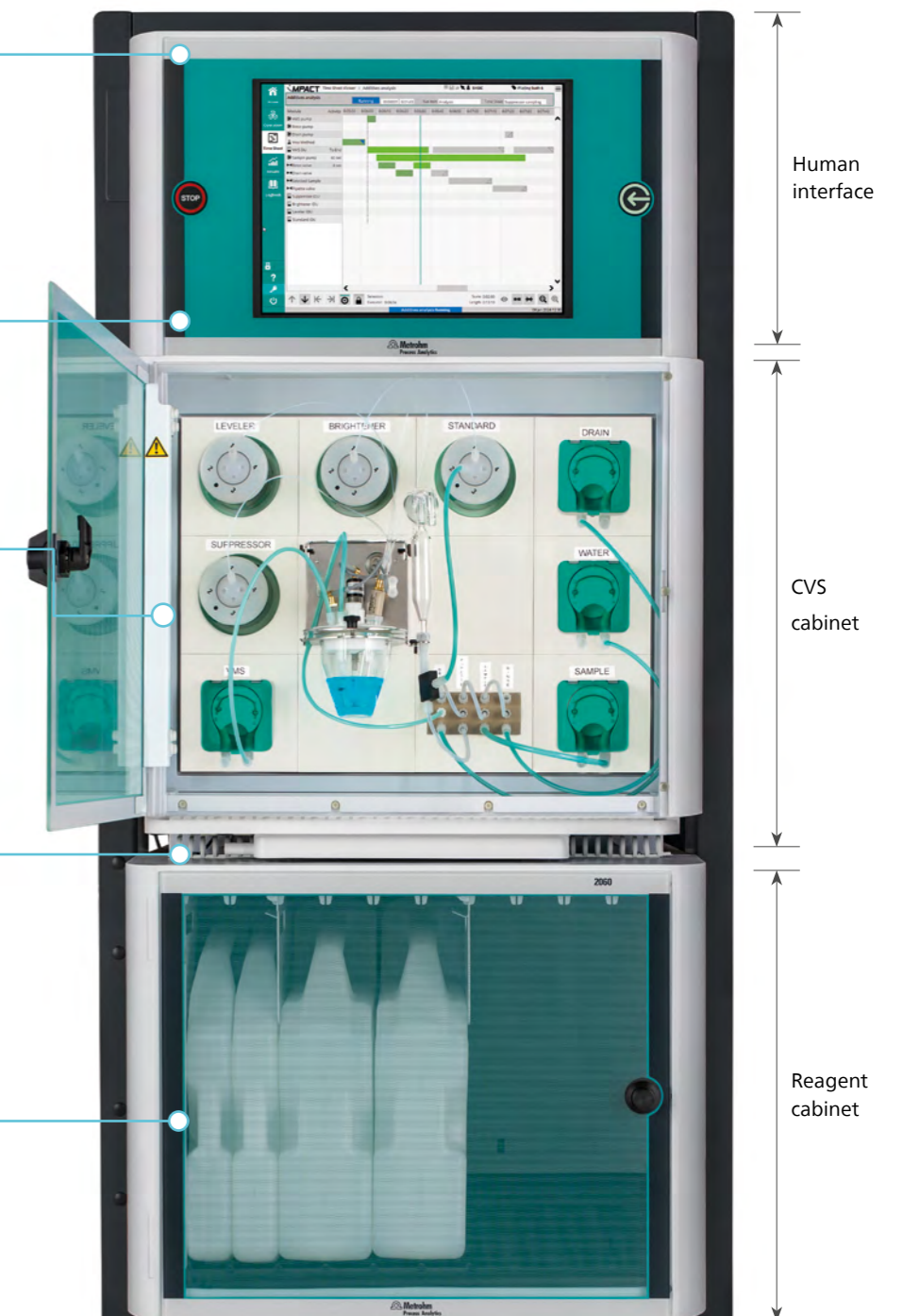
Easy-to-use software
User-friendly interface, context-sensitive UI.

Data integrity
All data is stored in an encrypted database to prevent data tampering

Modular desgin
Customizable wet part modules and cabinets for multiple analysis and preconditioning of the sample

Easy transferability
Data from the laboratory can easily be transferred thanks to the variety of industrial communication protocols

Multilevel access
Different access levels can be configured to make even the routine user feel at ease with the IMPACT software. Advanced users can have a deeper access to the software and change/edit parameters.

Human interface

CVS cabinet

Reagent cabinet

* Wet part cabinet layout may vary
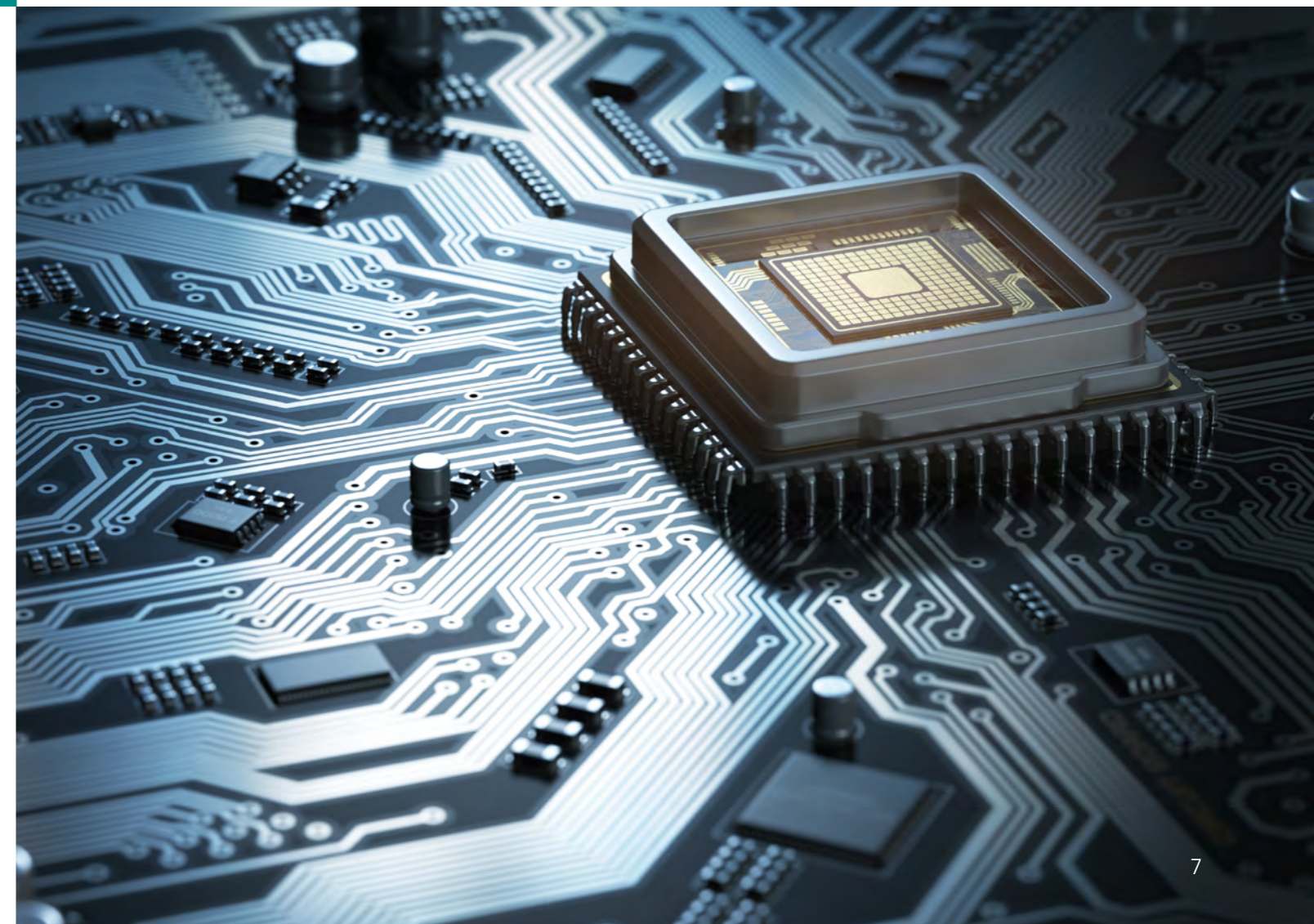
4

Plating bath analysis with CVS

Organic additives, including brighteners, suppressors, and levelers, play pivotal roles in electroplating applications. Brighteners improve the look of plated surfaces, suppressors aid to maintain uniform deposition, and levelers guarantee that coatings are smooth and free of defects.

Their combined effect on copper deposition is complex, impacting critical parameters such as deposition rate. Applying CVS analysis ensure that the optimal balance of these additives in the bath is maintained, leading to a reduction in defects, improved throughput, and minimized waste.

Metrohm Process Analyzers, known for their modular setup approach, have taken flexibility to the next level with the launch of the 2060 CVS Process Analyzer. Based on the 2060 platform, this analyzer provides a completely customized solution for online monitoring of organic additives along with other relevant components like metals, salts, or pH in electroplating baths.

MOST IMPORTANT APPLICATIONS

- Suppressor determination with DT (Dilution Titration)
- Brightener determination with MLAT (Modified Linear Approximation Technique)
- Brightener determination with LAT (Linear Approximation Technique)
- Leveler determination with RC (Response Curve)
- Chronopotentiometric measurement (CP)

	Technique		Calibration			
	CVS	CPVS	DT	RC	LAT	MLAT
Suppressor/carrier	✓		✓			
Leveler	✓			✓		
Brightener/accelerator	✓	✓			✓	✓

The 2060 CVS Process Analyzer's integrated liquid handling and sample preconditioning capabilities make electroplating bath quality control as simple as pressing a button. The analytical cabinet of the analyzer allows you to combine up to twelve wet component modules, providing unparalleled application versatility. Aside from CVS, these modules may be used for titration, photometry, sample preconditioning, and connecting multiple sample streams.

CVS ANALYSIS OF ORGANIC ADDITIVES IS A MEASUREMENT OF THE INFLUENCE OF THE ADDITIVES ON THE COPPER DEPOSITION.

Total control, total precision

Customized solutions depending on your needs

MULTIPLE TECHNIQUES IN ONE PLATFORM
The 2060 CVS Process Analyzer can integrate multiple techniques into a single platform. Its advanced programming capabilities extend beyond basic analysis, to include instrument self-checks and proactive operator communication instructions.

The 2060 CVS Process Analyzer incorporates intelligent programming functionalities that mark a new era of process control. Through intelligent conditional actions based on "if" statements, this analyzer assumes a proactive role. It continually monitors critical parameters in real-time, empowering users to make well-informed and precise decisio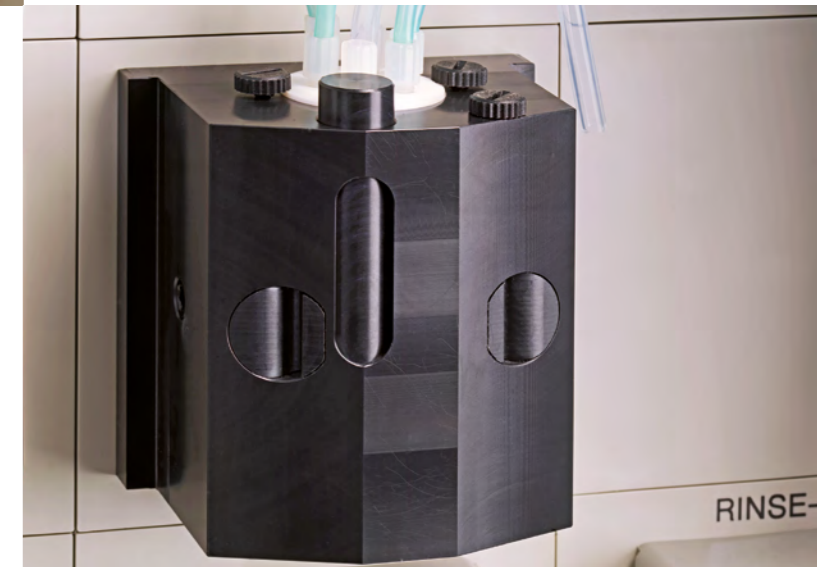ns. If a sample deviates from established limits, the analyzer responds promptly. It can increase the frequency of measurement, change the dilution factor, execute an electrode health check, or trigger an additional measurements such as titration or photometry for additional insight.

This responsive mechanism enables early detection warnings, allowing for immediate corrective actions before problems escalate. The adaptability of this process analyzer to diverse process conditions enhances productivity, minimizes defects and waste, and ensures consistent process stability.

CLEANLINESS
Electrochemical measurements require clean conditions that could be challenging to maintain in a process environment. 2060 CVS Process Analyzer offers an enclosed reagent cabinet, clean and durable FEP and Chem-Durance (TM) tubing, self-cleaning schedules for the electrodes and vessels, and the possibility to add water purification systems to ensure impurities do not interfere with the CVS measurements.

TEMPERATURE STABILITY
Temperature fluctuations can influence CVS results. The 2060 CVS Process Analyzer ensures that measurements are performed in stable conditions using thermostated analysis vessels and temperature monitoring.

ANALYSIS
Metrohm's vast experience with automated laboratory CVS analysis includes protocols for hundreds of additives. These proven methods are coupled with robust automation practices to deliver maximum accuracy and repeatability in the process environment.

PROCESS CONTROL
The 2060 CVS Process Analyzer can do much more than provide analytical results. The system can be programmed to trigger additive dosing into the plating bath when the analysis indicates that levels are low. Customized dosing limits and protocols ensure that that process control is carried out prudently.

PARALLEL ANALYSIS TECHNIQUES
When a more thorough analysis is necessary, the 2060 CVS Process Analyzer seamlessly incorporates comprehensive techniques such as titration and photometry measurements.

WORKING ELECTRODE
The 2060 CVS Process Analyzer supports the use of Metrohm's robust platinum CVS rotating disk electrodes (RDE) that come in a variety of sizes and materials to suit all CVS protocols. For additional peace of mind, monitoring of the health and lifetime of the electrode is automated by the 2060 CVS Process Analyzer.

MAINTENANCE
Not only does the IMPACT software provide the results from the analysis, it also performs health checks more commonly used on the whole system and proactively informs operators of potential issues. Alarms are triggered if hardware faults are detected, or analytical data are trending out of range.

viva tiamo™ titration and more

From lab to process analysis – A seamless integration

Metrohm's reputation for high quality laboratory instrumentation and excellent support is built on 15 years of experience in CVS analysis.

The 2060 CVS Process Analyzer contains the same analysis hardware and software as Metrohm's professional CVS laboratory instrument, ensuring that CVS measurements taking place in the laboratory can be precisely replicated on the production floor.

EVERY MINUTE COUNTS – ADVANTAGES OF ONLINE PROCESS ANALYZERS

In laboratories, sample analysis are mostly carried out offline. However, this is not applicable in industrial process environments. Since such offline sample analysis do not necessary represent the current process conditions. Any necessary process adjustments could take place hours or even days after an out-of-specification reading, causing losses of raw material, final product, and even company assets.

Online analysis with industrial process analyzers saves time by automating measurements directly at the point of use (POU). Reducing manual sampling lowers costs, increases the safety of plant operations, and much more:

- High analysis frequency leads to high quality products
- Protection of your company assets
- Increase your company profits
- Avoid incidents with process automation

RESILIENT COMPONENTS SELECTION FOR RELIABLE PROCESS ANALYZERS

1 Success in CVS analysis relies on precise control of the volumes in the analysis vessel as well as accurate dosing of reagents and standards on the microliter to milliliter scale. The 2060 CVS Process Analyzer makes use of Metrohm's trusted automated burettes (Dosinos) to ensure accurate, precise, and flexible dosing.

3 A maintenance-free, long-life **Ag/AgCl gel reference electrode** has been chosen for its suitability in continuous operation within automated systems and online instruments, such as the 2060 CVS Process Analyzer.

2 Crafted from durable materials such as titanium and stainless steel, the **platinum rotating disk electrode** and its drive axle have been designed to endure acidic bath conditions.

Metrohm service and support – close to you

WE ARE A STRONG PARTNER

We are present in more than 170 countries globally. Our local specialists make sure our make sure our analytical technology is smoothly is smoothly implemented at your company. Please feel free to contact us and we can work together on your application to develop an ideal solution that meets your individual requirements.

www.metrohm.com