

Minimising Risks & Maximising Efficiency

for Chemical Dosing Processors





Now more than ever, chemical processors, manufacturers, and producers are seeking methods and technology to reduce risks, improve efficiencies and maximise output. This is due to the increased pressure from unprecedented market forces and evolving regulations to offer consistent quality at a minimal cost.

This presents a valuable opportunity for manufacturers and systems integrators to address the fears facing the industry and offer their expertise along with the most appropriate and innovative products to improve the performance of the dosing system.

There is a wide range of challenges in chemical dosing, particularly for processors and manufacturers that are reliant on chemical dosing as a critical process. Consistency, accuracy, and safety in the use and control of chemicals are paramount no matter what industry you are operating in.

Without due consideration for the most appropriate measurement and control devices, any dosing process stands a significant risk of:

- Poor quality results - whether in the form of inconsistent end-product or incorrect chemical composition due to inaccurate flow monitoring and dosing control.
- Contaminated products - due to poor leakage and chemical resistance controls, causing a potentially serious health and safety risk.
- Flawed reliability – as a result of poor quality or incorrect use of products, causing increases in maintenance and parts costs as equipment breaks down, potentially even halting processes completely.



Ultimately, any of these risks can cause significant losses in revenue, serious detriment to an established brand, and, in the worst cases, even harm to consumers and lead to potential legal action.

The greatest challenge for OEMs (Original Equipment Manufacturers) and systems integrators in responding to customer needs is not only minimising the risks mentioned above but also offering:

- cost-effective and reliable solutions
- reducing maintenance downtime to a minimum
- highly accurate repeatability of the dosing

As accuracy and consistency are extremely important, chemical dosing equipment must not only offer impeccable quality and reliability but also meet the challenges of chemical resistance and operational efficiency.

Once these risks are eliminated and specific dosing challenges of processors are met, it is a lot easier for an organisation to choose which brand of equipment to invest in for their processes.

This whitepaper examines the most important factors and significant risks of chemical dosing processors and the various solutions that OEMs can provide.

These solutions are explored in detail by examining a collection of industry case studies to present real-world examples of chemical dosing challenges. Also, discussing the solutions OEMs employed to overcome these challenges and how to satisfy the end customer.

The key processes and most significant requirements identified in this analysis include:

- Flow Monitoring - The importance of flow control and measurement products to maintain the constant quality of a product
- Selection of the Correct Instruments and valves - To achieve long-term reliability and performance.
- System Integration - Allowing integration with pre-existing process control systems and the potential for ease of future upgrades.

To offer the most suitable solution, OEMs must also fully understand the product and its resultant processes. The type and number of raw materials composing the end-product, are significant to ensure chemical resistance is maintained and leakage is avoided.

The requirement for variable flow rates is also a significant factor to consider as any pipework and subsequent flow control system must allow for the complete range of flow requirements.



Offering unparalleled Accuracy with Innovative Precision Dosing Technology

Accurately measuring and controlling chemical products can be one of the greatest challenges for OEMs and a crucial factor in ensuring the end-user manufacturer achieves the required performance results.

The pressure of getting this right is heightened when operating in a harsh condition, which can affect precision. To determine the most appropriate equipment in such applications, additional considerations must also be made for specific processing requirements, with varying product characteristics, and safety approvals.

For example, a highly regarded paint producer in Belgium faced a specific challenge OEMs needed to overcome when looking to apply the most appropriate solution to meet their quality requirements.¹ As with all manufacturers, consistent accuracy and end-product quality are very important but for a paint manufacturer, it's critical that consistent paint quality and colour are maintained. As a single facility that produces a wide range of products, this brought a greater challenge for their systems as they required extremely precise dosing and control for varying compositions to deliver a consistent end-product.

High-grade process instrumentation products are essential to satisfy the quality standards in difficult processing environments. It is critical for the correct chemical resistance, good accuracy, and repeatability from all measurement devices within the system, particularly flowmeters and pressure transmitters, to ensure flawless results. The correct specification of valves and instruments within the control system must be in place to meet the customer requirements and provide a compatible solution.

To meet the highly specific quality requirements in developing this paint facility, the OEM implemented the Siemens SITRANS P DSIII differential pressure transmitter (now the P320 and P420 Series), along with the [SITRANS F M MAG Electromagnetic Flow Meter](#).

The modular nature of these solutions allowed them to be placed exactly where required in the process, offering excellent precision and full compatibility with their existing SIMATIC control system. Further, the two devices are fully integrated with the Siemen PLC automation and smart control system, allowing for a seamless installation and full automation capability.

By implementing field-proven flow and level measurement devices with complete data reporting capabilities, the OEM was able to save time and on-site cost, with a fully integrated system that could quickly and accurately automate production. The Siemens SITRANS range also provided additional value for the processor due to the instruments' excellent reliability and minimal maintenance requirement.

Delivering Exceptional Output Without Compromising Quality

The age-old question of quality over quantity can often lead to challenges for manufacturers and processors tasked with achieving both excellent output and product quality. As a result, OEMs are typically faced with the issue of delivering consistent results, while operating with maximum output and efficiency. This is a significant challenge regardless of the processing environment or end-product; however, it is achievable through the correct system design and instrumentation selection.

For OEMs challenged with delivering high-efficiency output along with guaranteed quality results, the processing environment must be fully considered to deliver the most appropriate solutions.

Although not exhaustive, some of the most critical factors to consider when determining the most appropriate solution are:

- Chemical composition – The nature of the chemicals, their effect on chemical resistance, and varying compositions to produce the desired products must be fully examined to offer the correct solution.
- Variable flow rates – The requirements for flow rates differ dramatically from one processor to the next and, should the selected equipment be unsuitable for the required flow rates, this can cause drastic problems to output and accuracy.
- Environmental factors – Whether selecting valves or flow monitoring systems, it is imperative to consider the exact position and environment in which the systems must be used to ensure the product will deliver the required results safely and efficiently.

Modular control valve products such as the [Burkert Type 2301 Globe Control Valve](#) are an excellent solution for even the most challenging processing environments. With a stainless steel body, a proven actuator, and a wide choice of trim sizes, they offer superior chemical resistance and a lengthy product lifecycle, minimising downtime and maintenance costs, and can be sized for the best performance. The type 2301 globe valve has sealing integrity guaranteed by the proven self-adjusting spindle packing with exchangeable V-seals. Each globe valve body can be fitted with up to five sizes of trim sets. These parabolic trims provide a reliable and repeatable characteristic to vary the flow. The control cones are available in either stainless steel or with a durable PTFE seal or PEEK seal for tight shut-off. Leakage class III, IV or VI are available. The design enables the easy integration of automation modules whether they are digital electropneumatic positioners or process controllers, which can be direct or remote mounted. The fully integrated system has a compact and smooth design ideal for clean environment applications.





Arming Processors with Flow Monitoring Data & Management Information

Delivering accurate, efficient, and consistent results is often a key focus for chemical processors. However, this is only half the challenge faced by OEMs in offering a complete solution to customers. As automation and industry 4.0 methodologies become more prevalent across all industrial processors, the recording of data and real-time access to insightful information is fast becoming a critical requirement.

Not only is reporting information crucial for monitoring quality and efficiency, but risk-averse processors are also well aware of the importance of data in ensuring key safety standards are upheld.

For a major brewery based in Denmark, their challenge as a premium beer producer was to demonstrate a perfectly consistent product in colour, taste, and viscosity while maintaining excellent hygiene quality standards.

As their product requires a long fermentation time, consistent regulation and measuring are crucial in ensuring the end-quality of the product and preventing the risk of contamination or spoilage.

The key challenge in this demanding application was to deliver extensive flow monitoring data at a critical point, within their pre-existing process to accurately measure their yield.

The manufacturing process employed brought unique challenges requiring pinpoint accuracy as their pre-existing meters were at the end of their lifecycle and more accurate results were needed.

The process involved boiling unfermented beer, or wort, in a brew kettle causing proteins to denature and coagulate.

The wort is then transferred to a whirlpool vessel which separates the coagulated material ready for cooling and fermentation. The OEM, working alongside Siemens, was tasked with comprehensively monitoring and reporting the sugar concentration within the wort at this critical control point to quantify the brew's yield. Not only would this data allow the producer to better measure their end-product, but also identify potential production issues earlier in the line.²

As the customer required a solution to integrate perfectly with their existing process and replace the incumbent meters, the OEM needed to implement a flexible solution capable of performing at the specific control point. Moreover, this process was particularly challenging due to the constantly fluctuating flow rates and temperatures involved in the process.

The Siemens Coriolis flow technology was the ideal solution, as the OEM installed the SITRANS FC430 within the existing process

equipment at the critical point adjacent to the whirlpool vessel. The new system was installed and tested alongside the legacy monitors, allowing the OEM to clearly demonstrate the monitoring requirements and for the customer to directly compare the results.

The FC430 utilizes a digital signal for reduced noise interference and enhanced accuracy, even in the most challenging applications. Thanks to its conveniently small size, the instrumentation was able to be positioned exactly at the critical point and provide more accurate mass and density readings.

The SITRANS system also provides precise density and temperature readings; with fast and reliable response times, offering a clear advantage over the incumbent monitors.

By matching the customer's specific requirements for a suitable flow monitoring product, the OEM delivered exceptional results and ensured the brewery received highly accurate measurements.

This is also a key example of how an OEM can collaborate closely with a customer to not only upgrade their legacy systems but fully demonstrate the benefits and improved performance of investing in a new solution.



Offering Innovative Chemical Control Solutions

Fine Controls have been supplying the latest in flow monitoring process controls and instrumentation equipment since 1994, coupling excellent customer service with the most innovative solutions from world-leading brands.

To find out how you can offer your customers the best solutions and minimise the most important risks facing them today, call **+44 (0)151 343 9966** to speak to our specialists.

