



Blue-White®

Collaboration Between Departments Increases Performance and Profitability in Mining Operations

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In mining operations every department has its own priorities with regard to which chemical dosing pumps or metering systems to be purchased. For example, engineering may focus on technical specifications like flow rates, pressures, and footprint, while operations will prioritize ease of maintenance, simplicity of use, and calibration requirements. Procurement traditionally focuses on price alone, not always considering the long-term impact of their decisions. Management will most often look at the budget but should perhaps be emphasizing return on investment (ROI) and linking dosing strategy to key performance indicators (KPIs). Ultimately, the best choice will be made when the multiple disciplines, including engineering, operations, and procurement teams work together.

Without collaboration between all departments, it can be difficult to see the total life cycle costs, which may result in systems that are expensive to operate and maintain, or that underperform.

Although they are not always thought of as such, chemical dosing pumps are a critical component in mining operations. Dosing pumps can directly influence process efficiency, costs, and safety. Having effective and efficient pumps is essential in order to achieve consistent recovery rates, control reagent use, and maintain compliance, and choosing the right pump goes far beyond simply considering the upfront cost. It's also imperative to consider the total cost of ownership (TCO) and to understand how various dosing pump features (or lack thereof) directly impact overall plant performance, revenue, operational costs, process stability, and environmental compliance.

Total Cost of Ownership (TCO) Vs. Price

The most common misconception when considering chemical dosing pumps is often that purchasing cheaper systems will save money. In reality, the lowest-cost solution often leads to higher TCO due to increased maintenance, shorter lifespans, poor dosing accuracy, excess reagent consumption, process inefficiencies, and increased downtime.

Key cost drivers beyond initial capital expenditure (CapEx) include operating expenses (OpEx), maintenance, reagent waste, labor, and lost production. It may be surprising to know that even a small percentage of improvement in chemical dosing efficiency can save hundreds of thousands of dollars, and possibly even millions, in operating expense. Automation and minimal-maintenance requirements reduce the need for continuous oversight, which is particularly important when considering remote mining sites. In addition, less maintenance means less need to stock spare parts, reducing inventory and resulting

in less waste. For example, consider only the occasional pump tube or diaphragm replacement, versus replacing the entire pump head because one component is worn.

Technical and Design Considerations

When choosing the best chemical dosing systems for any application site-specific designs and features based on the application are a key consideration, and include:

Material compatibility. The pump must use the correct materials for components such as valves, piping, and



Figure 1. Peristaltic pumps are the most commonly used pump type in mining operations due to the type of chemicals used.

sensors in order to avoid degradation from harsh mining chemicals like acids and flocculants.

Pump type. Peristaltic pumps (Figure 1) are preferable in most mining applications and work well with lower pressures. They typically handle viscous chemicals, slurries, or off-gassing fluids far better than diaphragm pumps because there are no check valves to clog. However, diaphragm pumps do have their place. They are often better suited for higher pressure applications — typically above 70-80 PSI.

Automation and other advanced features. Fluid feed alone should not be the only consideration. For example, the ability to maintain targeted dosing rates and ensure consistent results, Repeatability, is crucial. Additionally, automation and remote accessibility allow for real-time adjustments to dosing rates based on changing process conditions. Integration with existing plant systems (SCADA/ PLC/DCS) is crucial for effective control and data collection. Predictive maintenance alerts, consumption trends, and digital monitoring are especially beneficial for remote or multi-site operations. A “Smart Pump” will address all of these aspects.

Maintenance factors. Simplicity of maintenance and ease of use should be considered prior to purchase. Due diligence at the beginning can help to avoid problems such as frequent breakdowns caused by clogging, vapor lock and loss of prime, especially with slurries, viscous chemicals and off-gassing chemicals. All common problems for many mining operations. Similarly, operators should examine whether the pumps have readily available replacement components and spare parts.

Operator safety. Poorly designed systems can expose operators to toxic or corrosive chemicals. Features like quick disconnects (Figure 2) and the ability to evacuate chemicals from the pump tube will significantly reduce operator exposure and risk during maintenance and waste disposal.

Robust design. Finally, a chemical metering system must be designed to hold up in the environment in which it will be used. Mining operations often take place under extreme conditions, such as high temperatures and/or humidity, remote locations, dusty environments, and more. These factors should be accounted for in system design and particularly when choosing the component materials.

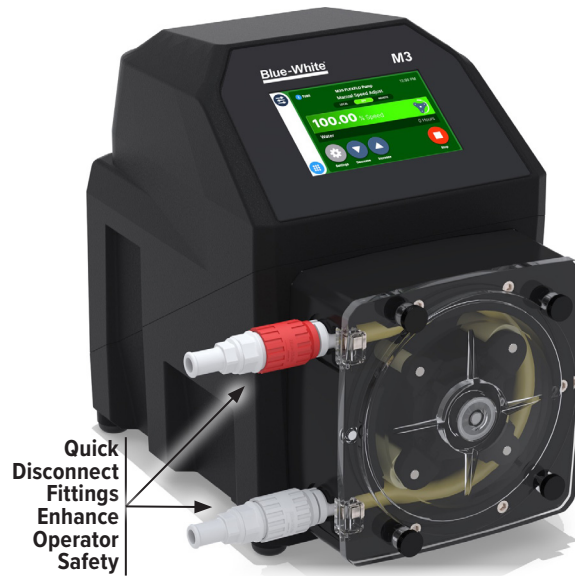


Figure 2. Blue-White’s quick disconnect fittings use specially designed check valves to prevent chemical backflow. This helps keep operators safe when working with caustic and other dangerous chemicals, as well as reduces the time associated with maintenance.

Ask The Right Questions

When evaluating chemical dosing system vendors, stakeholders should inquire about technical support, post-sale service, and demonstrable success through case studies or benchmarks. At the same time, it is important to look for what differentiates vendors, particularly as it pertains to system capability, customization, and support quality. While dosing systems may seem like a small investment when compared to the overall operation, it is worth taking the time to consider all possible factors and features to ensure top performance. It’s important to recognize that chemical dosing can often be undervalued, but

investing in an optimized system is a strategic lever to improve overall plant KPIs like recovery rates, throughput, water treatment efficiency, and more.