

THE TCW DOSING SYSTEM: A CASE STUDY



Automatically Dosing Sulfurous Acid Solution In-Line Using TCW's Peristaltic Dosing System

A customer approached TCW requesting a simpler way to add H_2SO_3 in-line to freshly destemmed and crushed grapes. The wanted a system that would automatically and precisely sulfite the grapes as they pumped them from their destemmer to their fermenters. This customer is a well-known high-end winery that produces several hundred thousand cases per year, and has a strong focus on biodynamic farming and environmental responsibility.

This customer owns a Ragazzini Rotho MS3T peristaltic must pump, and are very satisfied with its simple operation, rugged construction, and simple maintenance, with only one common wear part: the peristaltic tube.

Ideally, they wanted to dose H_2SO_3 directly into the outlet of their larger Ragazzini must pump as it transfers grapes from a destemmer to their tanks, eliminating the need to adjust sulfite levels in their tanks; a difficult and potentially dangerous process that could result in uneven or heterogeneous distribution of sulfurous acid.

The customer already owns an H_2SO_3 dosing system from another manufacturer that uses inert gas to pressurize a small vessel and push H_2SO_3 in controlled one-shot doses, but determined it would not be appropriate for this application which calls for continuous low-level dosing rather than single "shots" of sulfurous acid. With their one-shot doser there was too great a possibility of over-dosing sulfurous acid solution if the operator accidentally triggered it too many times.

The Assignment

The customer tasked TCW with providing a solution that met the following criteria:

1. It must be rugged and cart-mounted for easy use and transportability in an outdoor winery with uneven surfaces.
2. If they need to stop the must pump, the doser should stop as well. I.e. the dosing system should be synchronized with the must pump.
3. It must be accurate. This customer's wines adhere to strict protocols regarding sulfite levels, and their winemaker does not want to exceed them.
4. It should be able to dose a specific volume, set by the winemaker. For example, the user should be able to say they want to dose 150 ml and have the pump stop automatically once that volume has been reached.
5. It should be able to dose for a set length of time at a given flow rate. For example, 50 ml per minute for 20 minutes, and stop once the time has elapsed.
6. It should be easy to use by operators with a wide variety of technological skill levels.

They additionally expressed a desire to have this new dosing system replace the aforementioned barrel dosing system, which they expressed dissatisfaction with.

Their primary complaint was that their existing barrel doser often required repair. It utilizes several expensive parts that frequently break down because of their exposure to sulfurous acid, particularly the valve and the flow meter. When these break, they must be replaced at a significant cost, well over \$1,000.

Because the Ragazzini accurately produces a known volume with each rotation, no expensive flow meters are required. Likewise, the pumped material is not under pressure, as with the old system, so no valves are required. The pump is, itself, a kind of control valve. Furthermore, Ragazzini peristaltic pumps only have one common wear part: the peristaltic tube, which has good compatibility with H_2SO_3 , is relatively inexpensive (about \$150 for the PSF3S as of the time of writing), and typically lasts years without needing to be replaced.

The Result

TCW accepted the challenge and designed a dosing system that exceeded the customer's expectations.

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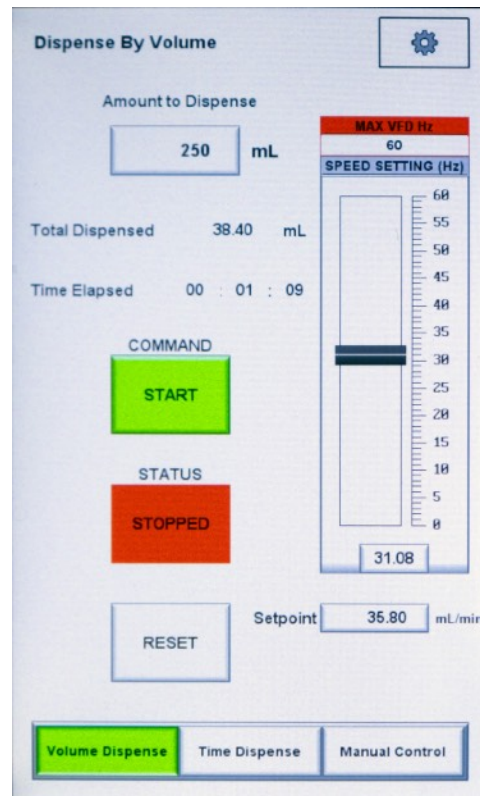
The dosing system we designed utilized Ragazzini's Rotho PSF3S peristaltic pump, the smallest pump Ragazzini manufactures. The PSF3S offers flow rates from 7 to 83 ml per minute, well within the customer's desired specs.

The system employs a clear, intuitive touchscreen interface that lets the operator select the mode: time dose, volume dose, or manual operation.

Users can set the total amount they want to dispense, hit start, and walk away, assured that the job will be completed.

We additionally made the pump capable of accepting remote control, allowing the dosing system to be used for barrel additions. The operator can place the system's output hose into a barrel, tap a button on the remote, and the pump will begin operation remotely. Once complete, they can transfer the hose to the next barrel and repeat the operation.

The customer was thrilled with the final product, stating: "The doser worked perfect. Exactly what we needed. We took a video of the whole setup with the must pump and the doser in action and sent it to ops team for the whole company and they really liked it. And there's even some interest in doing something similar for other facilities."



Touch control screen

They were particularly happy that the system's final price was several thousand dollars less than their existing dosing system, in spite of offering more features.

Conclusion

The TCW dosing system is the ideal solution for commercial wineries seeking to make dosing more efficient, safer, and less error-prone. Ragazzini peristaltic dosing pumps are extremely robust and gentle, allowing them to be used to dose abrasive fining agents, acidic compounds, or even delicate enzymes and ingredients. Contact us at sales@tcwequipment.com so that we can work with you to design a dosing system for your facility.