

Watson-Marlow Fluid Technology Group – white paper: Chemical savings in modern manufacturing processes

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Chemicals play a major role in most modern manufacturing processes. Even drinking water and fresh food is treated with chemicals. In years gone by, large volumes of chemicals were used across industry, but today things are different. Dosing volumes for the latest generation of high-performance, nano-based chemicals can almost be expressed in drops.

In line with this trend, global spending on chemical dosing equipment is growing, mainly driven by increased production and the rise of more specialist chemicals. Most manufacturing industries, environmental sectors and food processing, are familiar with chemical dosing pumps, as this is primarily the technology used to introduce process chemicals.

Although various types of chemical dosing pumps exist, 62% are solenoid or stepper motor driven diaphragm pumps supplied by a handful of suppliers. The question, however, is whether this will be sufficient for the near-future challenges which the industry is facing? Or is a fundamental change needed, where conventional diaphragm technology needs to be replaced by something else?

This white paper evaluates the industry's latest position on the accuracy of dosing pumps, benchmarking the two leading diaphragm pump models and a relative new entrant to this market, the Qdos chemical dosing pump.

It is known that conditions such as pressure, running speed, product viscosity, temperature and various other variables affect flow accuracy in dosing pumps. The basis of the white paper focusses on a conditioned test, where flow was measured against discharge pressure when running the pumps at various speeds. Here, diaphragm technology showed a significant flow drop-off in the pressure range up to 4 bar absolute.

In tests, the biggest loss in flow took place at the point where the diaphragm pump started to see pressure; on average, the pump lost 25% of its capacity in the pressure range 0-0.8 bar absolute. At higher pressures, the pump only delivered half of what was shown on its set-point display. In contrast, the Qdos showed full linearity across the entire tested pressure and performance window.

Full details are revealed in the white paper, along with further sections on pump accuracy and the actual environmental impact relating to reduced chemical consumption. The paper also includes a technology outlook and an overview of potential future research.

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