

Advances in Low-Maintenance Chemical Dosing

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KEY TAKEAWAYS

- Water and wastewater treatment challenges require continuous improvements in the technology used in the treatment process.
- Built in response to customer needs, Qdos revolutionized chemical metering.
- Watson-Marlow developed the Qdos CWT, a next-level peristaltic chemical metering pump.

in partnership with



OVERVIEW

Increasing regulatory compliance in water and wastewater management, coupled with staffing challenges, requires investment in technology to help meet current and future requirements for environmental compliance and staff safety, as well as for mitigating reputational and financial risk. Dosing pump failure can have a significant negative impact on compliance, staffing, and operations.

Watson-Marlow Fluid Technology Solutions (WMFTS) developed the Qdos peristaltic pump to address these challenges. With their latest Qdos® CWT™ model, pumphead life is extended by up to four times as long as traditional pumps. Easily changeable pumpheads reduce labor and maintenance costs, and safety features built into the pump lower compliance violation risk.

CONTEXT

Mike St. Germain explained challenges facing wastewater treatment facilities and talked about how Qdos pumps can help mitigate those challenges. Chris Miller described the features of Conveying Wave Technology (CWT) and how the Qdos CWT pump works. Cory Sonner shared Vessco customer success stories using the Qdos pump.

KEY TAKEAWAYS

Water and wastewater treatment challenges require continuous improvements in the technology used in the treatment process.

There are several challenges affecting water and wastewater treatment in the industrial and municipal markets. Tightening regulatory standards increase the importance of water recycling and reuse, which makes accurate treatment and minimization of chemical addition critical. Process failures—especially catastrophic failures—and disruption are costly and reduce output. Staffing and budgetary constraints further contribute to a need for improved technology. With the average age of the water treatment workforce increasing, staffing and training are expensive, and with numerous budget constraints, all are forced to do more with less.

The most common causes of dosing pump chemical failure are poor suction conditions, loss of prime, and lack of turndown. When a pump is not able to feed the chemical, the water or wastewater is not being treated, resulting in potential violation of regulatory requirements, or having to pull staff from other responsibilities to service pumps.

Mitigating equipment failure should be non-negotiable at any site, and disruptions can be minimized at the point investment decisions are being made and pump equipment selected. Reliable equipment and easy maintenance ease the burden of challenges faced by wastewater treatment plants.

Built in response to customer needs, Qdos revolutionized chemical metering.

Although a chemical pump is a small piece in the overall water and wastewater treatment process, it is a critical piece. Ten years ago, WMFTS gathered input from customers and prospects on desired requirements for chemical metering pumps. Some of the key issues identified included:

- Reduced time spent maintaining accurate feed
- Improved accuracy through the entire feed range
- Elimination of priming issues with products that off-gas, or are viscous or abrasive such as bleach, polymers, defoamers, and lime

- Improved health and safety
- Simplified operation and maintenance and reduced risk to operators
- Simplified installation, commissioning, and pump selection
- Reduced carbon footprint
- Reduced number of pump models required to handle all applications

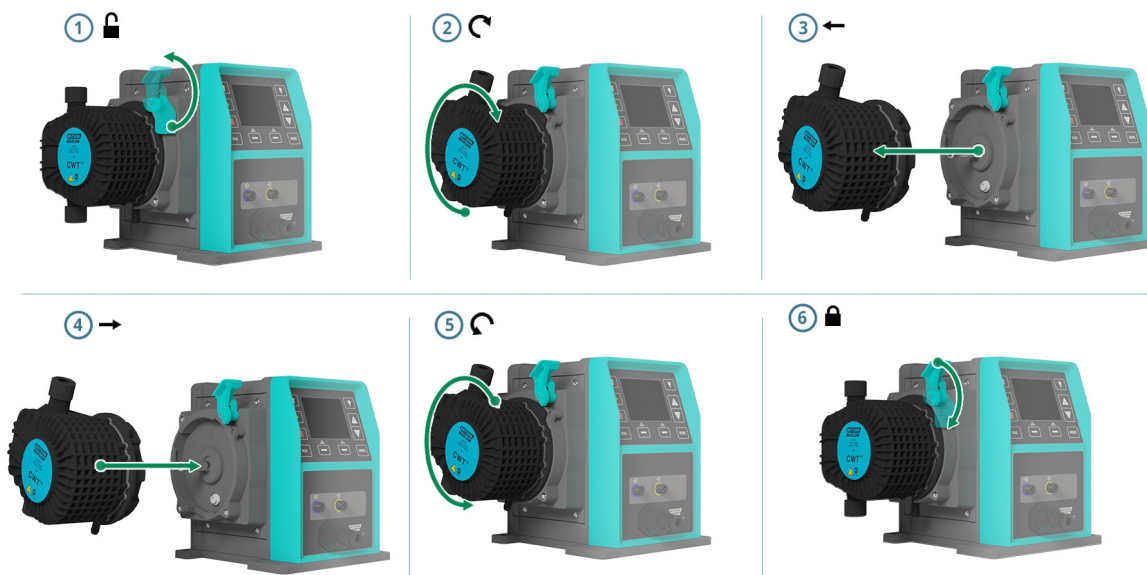
In response, WMFTS created an easy-to-maintain pump: Qdos. Qdos is a true positive displacement pump. The only variance is the rate at which the tubing is occluded or squeezed, resulting in reliable accuracy. WMFTS integrated an optical leak sensor in the Qdos design, which stops the pump after a few drops and keeps the chemical safely contained in the pumphead. A 20,000-to-1 turndown ratio allows operators to go from 0.001 to 31.7 GPH, and as a result facilities need fewer models and spare parts for their operations.

Peristaltic pumps don't have check valves and don't lose prime, so true positive displacement ensures repeatability and accuracy from 0.001 gallons per hour to maximum feed rates (dependent on Qdos model selected). Operators can be confident that the feed is accurate, every time, and with the need for only limited spare parts for the wide range of pressures and pump flows that they have to hit.

You asked for easy. How does 30 seconds sound? That's all it takes to swap the only spare part on Qdos: the pumphead.

Mike St. Germain, WMFTS

Figure 1: Replacing the pumphead on a Qdos pump



Watson-Marlow developed the Qdos CWT, a next-level peristaltic chemical metering pump.

The latest pump developed by WMFTS, the Qdos CWT, has all the benefits of peristaltic pump technology but with a significantly longer service life than traditional tubing pumps. Qdos CWT is the world's first peristaltic pump with no tube.

Figure 2: Qdos CWT



Qdos CWT has a service life two to four times higher than traditional pumping models, making it ideal for unmanned, remote sites. Qdos CWT offers high performance, with pressures up to seven bar (100 psi), and the ability to run maximum flow and maximum pressure at the same time while maintaining the consistent high accuracy Qdos is known for.

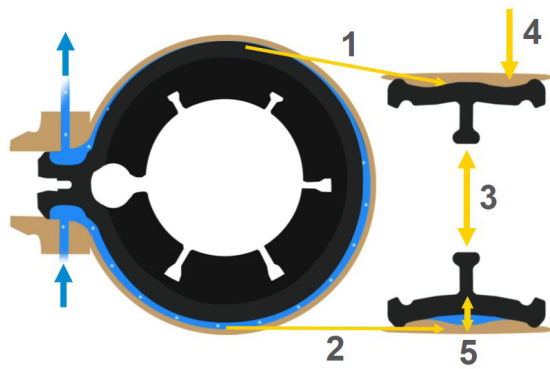
Qdos CWT can pump more concentrated chemicals, resulting in improved sustainability through reduced transportation, less storage, and more compact feed systems benefits. And by eliminating ancillary equipment such as strainers, degassing valves, background valves, and more, Qdos CWT simplifies installation.

If you can run an iPhone, you can operate a Qdos. The pumphead life, ease of installation, operation, and maintenance tip the scales in our favor.

Cory Sonner, Vessco Inc.

Pumphead life is determined primarily by the number of occlusions, but there are a couple other contributing factors, which include compatibility and pressure. Qdos includes an easy way to track hours pumped and volume pumped to guide proactive changing of pumpheads.

Figure 3: Qdos CWT's patented, unique fluid contact element



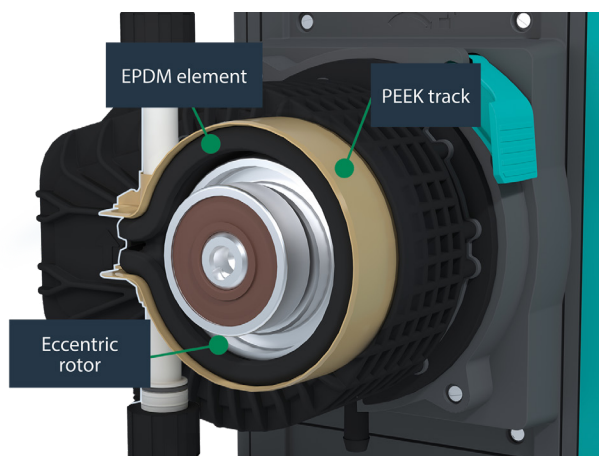
1. Eccentric drive occludes the fluid element on one side
2. Opens the element on the opposite side
3. Mechanical opening and occlusion of element without material stress
4. Low stressed in occluded state – no tube "cheeks"
5. Minimal movement of elastomer

Qdos CWT uses an eccentrically driven rotor that occludes the membrane on one side of the rotation, while mechanically opening the occlusion on the opposite side. This pushes the fluid around the pumphead using the peristaltic principle. Like traditional peristaltic pumps, it has a suction discharge port; however, while conventional peristaltic tubes are compressed flat via the plastic deformation, the Qdos CWT pump uses an EPDM element, which is elastically compressed against a PEEK track. This reduces material stress and fatigue, providing longer service life, reduced maintenance, and less plant disruption.

With Qdos CWT, we see lower mechanical stresses than with a peristaltic tube, resulting in longer consumable life . . . not reduced by elevated temperatures, and less affected by pressure increases than traditional peristaltic pumps. The membrane does not burst or leak, which ensures fluid containment after end of life, minimizing operator exposure to chemicals, reduced maintenance, and less downtime.

Chris Miller, WMFTS

Figure 4: Detailed view of Qdos CWT



CASE STUDY: Vessco, Inc.

Since 1978, Vessco has been a leader in the supply of water and wastewater technologies, covering industrial and municipal markets. Watson-Marlow supports Vessco from small plants with a couple of chemicals at low pressures, to multi-MGD plants feeding over 12 chemicals, with high pressures and high flows.

The City of Grinnell, Iowa, operates an ion exchange softening plant that may be moving to an ARO in the near future (2028). Superintendent Jordon Altenhofen inherited a plant with many different pumps, with a wide range of flows. With no feedback on leaking, etc., Mr. Altenhofen also lacked insight on whether and when his pumps were actually pumping.

Vessco reviewed the requirements of all pumps in the plant and determined that the pressures and chemical feed rates fluctuated quite a bit. Because Qdos offers turndown and limits the need for spare parts, the City of Grinnell was advised to replace an initial set of pumps in the plant with the Qdos CWT pump. Mr. Altenhofen reported that the first Qdos CWT pumphead he replaced after installation had run for 115 days (2534 hours), pumping 26,394 liters (6972 gallons) of chlorine.

ADDITIONAL INFORMATION

- **Future Qdos CWT developments** include increased pressure capabilities, new membrane materials, higher feed rates, feed verification, and total customer solutions that will include chemical feed systems.
- **For more information on Qdos CWT**, visit <https://www.wmfts.com/en-us/brands/watson-marlow-peristaltic-pumps/cased-pumps/qdos-cwt/>.

BIOGRAPHIES

Cory Sonner

Sales Engineer, Vessco Inc.

Cory manages capital project equipment sales for Vessco Inc, industry leaders in the supply of water and wastewater technology in North America. He is also an active member of the Water Environment Federation, American Water Works Association, and the Rural Water Association. Cory has a broad range of experience having worked as an applications engineer, project engineer specializing in water treatment product design, and on to technical sales manager. He is a graduate in mechanical engineering from Iowa State University.

Chris Miller

Central District Sales Manager, Watson-Marlow Fluid Technology Solutions

Chris has over 20 years' experience working with peristaltic pumps, including nine within Watson-Marlow Fluid Technology Solutions. He has taken roles in operations as well as sales and currently covers the central US region for the company. Chris works closely with channel partners and customers to satisfy their pumping requirements. With a background in production management and a degree in mechanical engineering from the University of Cincinnati, he has vast experience and knowledge of rotating equipment.

Mike St. Germain

Vice President of Process Industries, Watson-Marlow Fluid Technology Solutions

Mike has been providing solutions in water and wastewater treatment for 30 years and has been with Watson-Marlow Fluid Technology Solutions since 2019. He first moved into technical sales for a water and wastewater solutions provider in 1991, having graduated with an engineering degree from the University of Windsor in Ontario, Canada. Mike is currently based in North Carolina.

Joanne Vanderheyden

Global Business Development Operations Manager, WMFTS

Joanne is Operations Manager for Watson-Marlow's Global Business Development team, supporting both the life sciences and process industry sectors. She has worked across numerous WMFTS production sites and sales operations globally, bringing a distinctive perspective to customer solutions. She is a chemical engineering graduate from the University of Maryland.