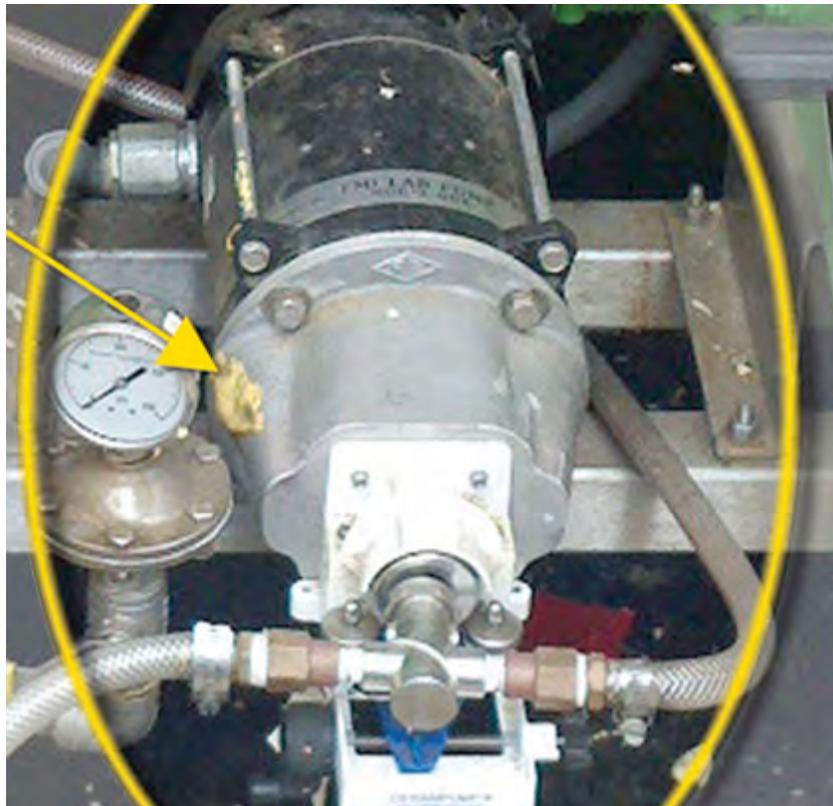




**Herb Werner**  
Fluid Metering, Inc.

---

## One Moving Part, One Answer



For small and mid-size treatment facilities, Fluid Metering, Inc.'s (FMI) valveless QDX metering pump is the answer for low volume addition of methanol for nitrate removal in wastewater effluent. The release of high nitrogen concentrations of wastewater effluent into bays and watersheds is of great environmental concern as it can have a devastating effect on water ecosystems. Through a process known as "denitrification," water treatment facilities convert the excess nitrate into nitrogen gas, which is then vented into the atmosphere.

**CERAMPUMP QDX**The CeramPump® QDX hazardous duty metering pump from Fluid Metering has proven to be an excellent choice for methanol metering for waste water denitrification due to its unique valveless design. This is especially applicable in small to mid-size treatment facilities where flow rates are extremely low causing valved pump designs to become air-bound and lose prime.

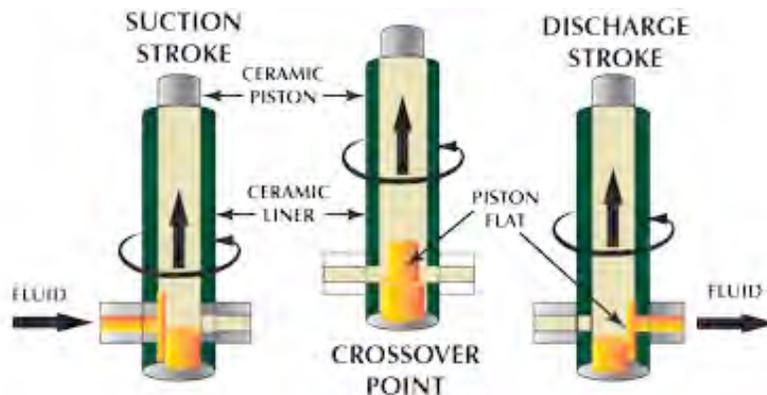
The CeramPump® has only one moving part in contact with the process fluid, a rotating and reciprocating ceramic piston. Similar to conventional piston pumps, the piston's reciprocation performs the pumping function. However, this is where the similarity to conventional piston pumps ends.

**HOW IT WORKS**The piston simultaneously rotates during the pumping cycle and is synchronized to alternately open and close the inlet and outlet ports of the pump effectively functioning as a valve. At no point are the inlet and out ports interconnected, thus eliminating the need for check valves. The pump drive is FMI's QDX hazardous duty drive, typically required for pumping methanol.

The valveless CeramPump® technology was first patented by Fluid Metering over fifty-five years ago. Fluid Metering's pumps, have only one moving part to accomplish both the pumping and valving functions, thereby eliminating the check valves that are present in all other reciprocating (syringe pumps, diaphragm pumps, bellows, piston) designs.

**WHAT YOU KNOW, IN A WHOLE NEW WAY**FMI's valveless metering pump uses a unique rotating and reciprocating ceramic piston, moving within a precision mated ceramic liner to accurately pump fluid in one direction without allowing any backflow. The reciprocation action of the piston is similar to a standard piston pump. As the piston moves back, it draws fluid into the pump chamber.

As it moves forward, fluid is pushed out of the pump. The simultaneous rotation alternately aligns a flat of the end of the piston with inlet and outlet ports, effectively functioning as a valve.



**DESIGN ADVANTAGES** There are a variety of key advantages that come with using FMI's patented CeramPump® valveless piston pumping technology:

**Valveless Design** The valveless feature of the CeramPump® design is its most significant feature. There are typically four check valves present in diaphragm, bellows, and traditional piston pumps. Even during normal operation, these will wear over time and not seal properly allowing backflow. As a result, accuracy drifts and minimally the pumps need recalibration. Eventually, the check valves need to be serviced.

**Ceramic Internals** The CeramPump® uses sapphire-hard ceramics for both the piston and mated liner. These components are dimensionally stable in that they will not change shape or dimension over time. Therefore, the pumping chamber remains stable for millions of dispenses without downtime or recalibration. In addition to dimensionally stable they are chemically inert which allows our pump to work in a greater variety of chemicals.

**Accuracy and Precision** Throughout the pumping cycle the inlet and outlet ports of the FMI valveless metering pump are never interconnect ensuring accurate fluid flow in one direction preventing any backflow (without check valves). As a result FMI pumps accuracy is held from microliters to the full flow range and output does not change more than  $\pm 1$  percent of set value. Inaccurate pumps can generate waste and incur extra costs.

.....

#### **About the Author**

Herb Warner is the marketing manager for Fluid Metering, Inc. For over fifty years Fluid Metering's pumps have been used for precision fluid control in chemical process, pharmaceutical manufacturing, mining, water and wastewater treatment, environmental monitoring, and food processing, as well as medical and analytical instrumentation. For more information, call 800.223.3388, email [pumps@fmipump.com](mailto:pumps@fmipump.com), or visit [www.fmipump.com](http://www.fmipump.com).