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Novel Trends in Dual Membrane Systems for Seawater Desalination (p.43)

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Neptune Pumps Meets with AWW

For the July 2010 issue, the Arab Water World magazine met with Mike Dowse from Neptune Pumps who offered us a great insight into the world of metering pumps. Mike Dowse is the Executive Director, Global Strategic Alliances and Business Development for Lansdale, PA-based for Neptune Chemical Pump Co., an operating company within Dover Corporation's Pump Solutions Group (PSG™).

Question: Precisely, what is a metering pump?
Answer: Funny you should use the word "precisely." Metering pumps inject controlled, "precise" amounts of liquids with high accuracy and repeatability into many processes.

Question: How is the amount controlled?
Answer: The simplest control is a manual micrometer dial, or other mechanical stroke-length adjustment used to adjust flow rate. The metering pump is adjusted to deliver a certain amount of chemical, fertilizer for example, to a flowing water line. The metering pump is wired such that when the water pump comes on, the metering pump comes on at the same time, allowing the chemical flow to be maintained in proportion to the water flow. There are also control systems such as variable-speed motors or electric stroke-length controllers that automatically adjust the metering pump output in response to changes in the line flow or pH or some other variable.

Question: When you talk about automatic speed control versus automatic stroke-length control, is one preferred or superior to the other?
Answer: When speed control is used, the metering pump slows down and the injections become less frequent. When stroke-length control is used the injection frequency is maintained and the doses become smaller, which provides better distribution of the chemical. Hence, for pH control where the flow in the line is constant, stroke-length control would be a better solution. If the metering pump is controlled to water flow, the speed of the pump would decrease as water flow slows and the distribution remains the same. Some Neptune pumps offer speed control as the only automatic option; other Neptune models offer both automatic speed and stroke-length control. Some sophisticated applications require both types of control on the same pump.

Question: Why do some pumps offer only automatic speed control?
Answer: Hydraulically actuated diaphragm pumps, like the Neptune Series 500 and 600, offer manual stroke-length adjustment and constant-speed motors as standard. Either automatic stroke length or automatic speed control are available and both may be installed on the same pump. Note that motor-driven, hydraulically actuated pumps should not be operated below 15 strokes per minute, so a higher-speed pump must be used to allow a meaningful control range. The smallest flow rates must use stroke-length control as pumps with low flow rates are already operating at slow speeds.
Mechanical diaphragm pumps like the Neptune Tacmina PZ electronic diaphragm pumps have both manual stroke length and manual speed control as standard. Automatic speed control is available but stroke-length control is manual only. Do note, however, that the PZ electronic diaphragm pumps operate at 300 strokes per minute, so at 10% flow rate/10% of speed, the pump is still operating at 30 strokes per minute and providing good chemical distribution.
Hydraulic pumps have a minimum speed at which they can operate similar to an automobile engine. The stroke cycle/characteristic of an electronic diaphragm pump does not change as the stroking rate decreases; the exact same stroke happens with less frequency. Hence an electronic diaphragm pump can be stroked once per minute or once per hour or even once per day.

Question: Do pumps wear out more quickly when operating at 300 strokes per minute?
Answer: The answer is counter intuitive. There are no gears or moving parts other than the pulse mechanism, the diaphragm and the ball checks. The higher stroking speed allows the diaphragm to travel a shorter distance, which actually increases diaphragm life as the shorter travel results in less flexing.

Question: What types of applications require metering pumps?
Answer: The list is almost endless, but for the readers of this magazine some of Neptune's more popular applications are in water and wastewater treatment, desalination, irrigation and a number of oil-and-gas applications. All of these involve injecting a controlled amount of an additive at a repeatable rate to the process, sometimes at very high pressures.

Question: Do these metering pumps all operate electrically?
Answer: All Neptune metering pumps are available to be powered by electricity, either single-phase or three-phase, and with motors suitable for hazardous areas, where required. Neptune also provides options to drive pumps by solar power, air motor, hydraulic motor, belt and pulley, or gasoline engine.

Question: Can you tell us more about Neptune pumps used in desalination or irrigation?
Answer: Neptune pumps are used throughout a new desalination plant in Australia. This is a large plant and is certainly a showplace, a credit to Sydney and to its owners and designers. Neptune pumps are used throughout all phases of irrigation, center pivot and drip for crops, as well as turf and golf, including sports turf such as the stadium where the Philadelphia Phillies baseball team plays.

Question: What do you see as future opportunities for metering-pump use.
Answer: In many industries, new uses and applications are being developed for metering pumps. Generally speaking, with manufacturers and plant operators becoming more and more concerned with reliability, uptime and properly sized/selected pumps. With that in mind, they are looking for pumping equipment that not only meets production quotas, but also does so in a cost-efficient and environmentally friendly manner. The design and operation of metering pumps can make them key components in a manufacturing operation that is looking to maximize production and cost-control. ■

Mr. Mike Dowse can be reached at pump@neptune1.com or 215-699-8700. PSG is comprised of six leading pump companies-Wilden®, Blackmer®, Griswold™, Neptune™, Almatec® and Mouvex®.