

Consider Peristaltic Pumps in Water and Wastewater

PERISTALTIC (HOSE) PUMP TECHNOLOGY, EPITOMIZED BY THE **ABAQUE™** SERIES FROM PUMP SOLUTIONS GROUP (PSG®), PROVES ITS WORTH IN CRITICAL WATER/WASTEWATER-HANDLING OPERATIONS

By Johannes Meijer



Complex water and wastewater treatment operations require reliable pump technology, like that offered by Abaque™ Series Peristaltic (Hose) Pumps (inset).

Water, in and of itself, is quite an amazing commodity. It is one of the building blocks of life—organisms ranging from human to plants to animals cannot survive without it. Municipalities could not exist without a readily available supply of water, teamed with the municipality's ability to consistently deliver that water to a wide array of, for example, residences, businesses, hospitals and community centers.

The operations in many of the world's major industries would also halt without water, which is used as an ingredient in thousands of finished products, from food to cosmetics. Water is also used as a cleaning or cooling agent for equipment in many heavy-duty industrial-equipment applications. In instances like these, water often becomes wastewater, which must either be treated or disposed of. With emphasis being placed on environmental responsibility in many industries, this

means that proper wastewater handling and treatment is becoming more and more crucial.

So, with water playing such a critical role in the lives and industries of Earth's inhabitants, there is paramount need for pumping technology that can efficiently, reliably and safely handle water, from its most pristine state to the soiled variety that flows into a water-treatment facility. Wastewater can be especially problematic for pumping equipment because it can become fouled with abrasives or solids that can harm pumps, or hazardous materials that must be contained in order to protect the safety of plant personnel and the environment.

This white paper will highlight why one type of pumping technology—positive displacement peristaltic (hose) pumps—can rise to the challenges inherent in the handling and treatment of water and wastewater in any of a wide variety of municipal and industrial applications.



With water cleanliness and availability a growing concern, its proper treatment will continue to be a front-of-mind concern around the globe.

The Challenge

The design and operational characteristics of peristaltic (hose) pump technology, which was patented in 1925 in France, make it a wise choice in a wide range of water-handling applications—from moving viscous and/or abrasive slurries to the transfer of water-thin, non-lubricating fluids and shear-sensitive materials. These characteristics make peristaltic (hose) pumps ideal for the full array of diverse operations within the water-and-wastewater industry.

Peristaltic (hose) pumps satisfy the requirements of such a wide range of water-and-wastewater applications because their operation is based on the alternating contraction and relaxation of the hose, forcing the contents to move through the pump and into the discharge piping. A smooth-wall, flexible hose is fitted in the pump casing and is squeezed between shoes on the rotor and the inside of the pump casing. This rotating action moves the product through the hose at a constant rate of displacement. The hose restitution after the squeeze produces an almost full vacuum that draws the product into the hose from the intake piping. The pump casing is lubricated to cool the pump and lengthen the service life of the shoes and hose. Since the product only contacts the hose and not the internal pump components, this pumping technology is very suitable for abrasive and corrosive applications.

This pump style also maintains excellent volumetric consistency, making it ideal for the strict dosing and 24/7 operating cycles that can be required in wastewater-treatment applications. The pump's seal-free design makes

it dry-run, self-priming and low-slip capable, and eliminates any potential leak or contamination points while simultaneously providing superior suction lift. Finally, peristaltic (hose) pumps are easy to operate and easy to maintain. The pump's reversible operation also allows for pumping in both directions.

In order to successfully handle the challenges of water-and-wastewater handling and treatment, the peristaltic pump's hose—which, because of its seal-less design, is the only component to actually come in contact with the pumped medium—needs to achieve the highest level of material compatibility, while also being able to reliably deliver the millions of pumping cycles that are required during its lifetime.

Another consideration when selecting a hose material is its "fatigue resistance." This trait defines how resistant to failure the hose material is as it runs through its millions of pumping cycles. A hose material that is susceptible to developing cracks and holes relatively early in its operational life is not as desirable as a material that can reliably handle the demands of the repeated contraction and relaxation of the hose, especially when particulate-laden liquids are being pumped. The reinforced construction of the peristaltic hose and its use of rubber compositions that have been specially designed for the stresses within the peristaltic hose allow for the optimum life cycle and performance.

The Solution

While peristaltic (hose) pumps can be a reliable component in the optimization of water-and-wastewater operations, one specific pump brand has risen above the competition



Whether handling pristine freshwater or soiled wastewater, Abaque™ Series Peristaltic (Hose) Pumps are a top choice for many in the industry.

to be a top choice for lime dosing applications—Abaque™ Series Peristaltic (Hose) Pumps from Dover Corporation's Pump Solutions Group (PSG®). PSG was formed in 2008 and has grown to become a global corporation with world-class facilities in the United States, France, Germany, India and China.

Abaque Series pumps feature a seal-free design that eliminates leaks and product contamination, which enables them to handle the toughest water-and-wastewater pumping applications, from abrasive and aggressive fluids to shear-sensitive and viscous materials. The pumps, which can run in either forward or reverse, are self-priming and offer suction-lift capabilities to 9 meters (25.5 feet), as well as the ability to run dry continuously without adversely affecting the pump's performance. Ductile-iron and steel construction lets the pump produce discharge pressures as high as 16 bar (232 psi).

The Abaque pump's hoses are available in three materials of construction, all of which have been chosen because of their high levels of fatigue resistance:

- **Natural rubber** – highly resilient with excellent abrasion resistance and strength
- **EPDM** – high chemical resistance, especially when handling concentrated acids, and alcohols
- **Buna®-N** – highly wear resistant to natural gas containing products

Abaque pumps are available in 10 different sizes and 19 total models with flow rates ranging from 1.7 to 1,249 L/min (0.46 to 330 gpm). They have been designed to handle products with water-like viscosities to those as high as 70,000 cSt (352,000 SSU), solid particle sizes from 1.5 mm to 18 mm (0.06 inches to 0.71 inches) and soft particle sizes from 1.5 mm to 31 mm (0.06 inches to 1.22 inches). All Abaque pumps can handle product temperatures ranging from 0°C to 70°C (32°F to 158°F) with models featuring an EPDM hose capable of handling maximum temperatures to 80°C (176°F). Optional equipment includes hose-failure detectors, vacuum kits and non-metallic (PPH and PVDF) inserts.

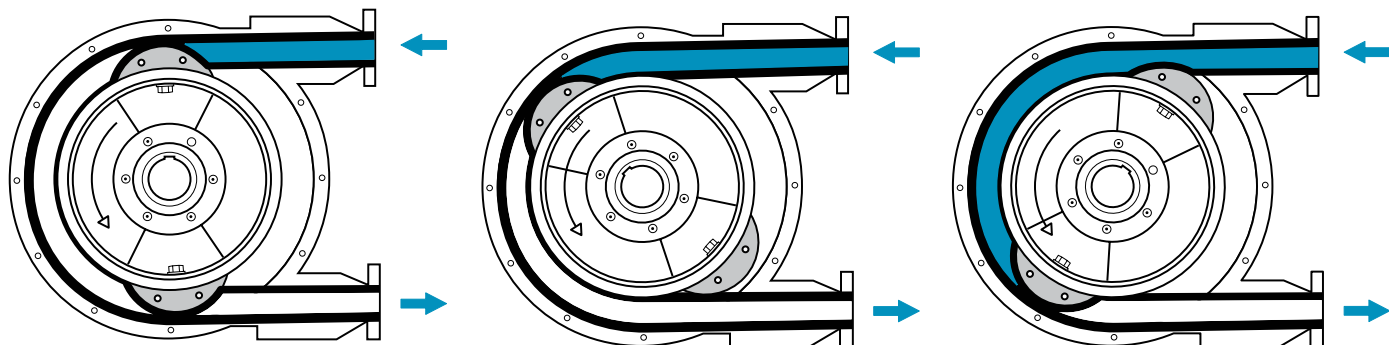
Conclusion

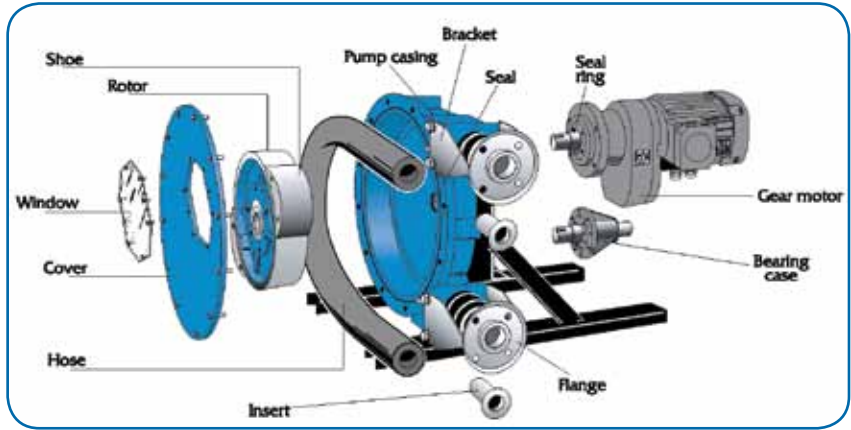
The water-and-wastewater universe is one of the most diverse in the global economy. This diversity means that the pumps used in all types of water-and-wastewater operations must be nimble and versatile enough to cope with fluids with many different levels of viscosity, temperature, corrosiveness, toxicity, abrasiveness and particulate levels, to name a few. These varying product characteristics must also be successfully handled while adhering to strict production quotas and environmental requirements. For more than 80 years, peristaltic (hose) pump technology, as epitomized by the standard-setting



Maintaining strict dosing rates in wastewater treatment is a constant concern and the operation of Abaque Peristaltic (Hose) Pumps delivers the chemical-dosing requirements that are required.

Below: The Abaque pump's hose restitution after the squeeze produces an almost full vacuum that draws the product into the hose from the intake piping.





The simple design of the Abaque Series Peristaltic (Hose) Pumps features a seal-free design that eliminates leaks and product contamination, which enables them to handle the waste and wastewater industry's toughest pumping applications.

operation and reliability of the Abaque Series Peristaltic (Hose) Pump family from PSG, has been a leading choice for water-and-wastewater handlers and treaters who know the value of highly reliable, environmentally friendly, maintenance-free pump operation.

About the Author:

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