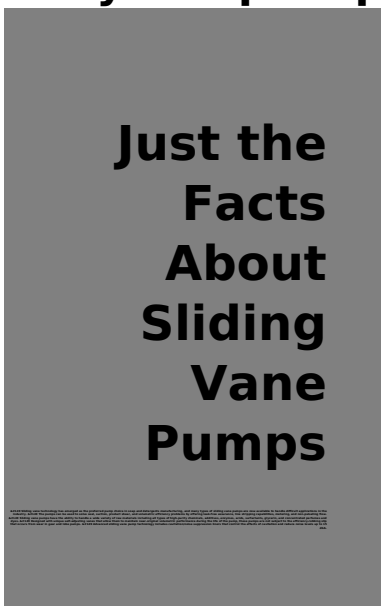
Sliding Vane Pumps Wipe Away Soap and Detergent Manufacturing Problems

These pumps provide the highest level of performance and efficiency over time while adapting to advances in an industry with many complex processes and varied new ingredients.



By Wayne Harris Over the past several years, the manufacture of soaps and detergents has become a more complex process with changes in raw materials and ingredients, the introduction of new chemicals, the addition of expensive fragrances, colorants, and preservative additives, and advances in soap-making processes. With this in mind, traditional pumping technologies no longer meet the demands of reliability, product loss prevention, environmental protection, and process efficiencies. However, as processes have evolved, sliding vane technology has emerged as the technological leader and the preferred pump choice in soap and detergent manufacturing. Sliding vane pumps are used in a wide variety of soap and detergent applications and have the ability to be used at several stages throughout the manufacture of

nearly all products in the soap and detergents industry &#151 moving natural and synthetic raw material feed stocks from petrochemical and oleo chemical processing facilities to storage and transports, throughout the blending, filling, and bottling processes within the detergent manufacturing facility, and in the batch or continuous process at soap plants. Sliding vane pumps also have the ability to handle a wide variety of raw materials including all types of high-purity chemicals, additives, enzymes, acids, surfactants, glycerin, and concentrated perfumes and dyes.

Sliding vane technology has always offered high efficiency and low maintenance advantages over traditional gear and lobe pumps. These are important factors in today's era of high energy costs, lean personnel staffs, and high demand for increased profitability. But these reasons alone are only part of a much bigger picture. For even greater flexibility, efficiency, and productivity, advanced vane pump designs include motor speed technology, advanced "designed in" features such as a hydrodynamic journal bearing, and one mechanical seal. These innovative features improve the fundamental pumping process in the manufacture of soap and detergents. Sliding vane pumps are designed with unique self-adjusting vanes that allow them to maintain near-original volumetric performance during the life of the pump. In other words, these pumps are not subject to the efficiency-robbing slip that occurs from wear in gear and lobe pumps. In addition, vane pumps are designed around the bearings and seals so that they offer longer life and greater product loss prevention than other technologies. Therefore, by virtue of their design, vane pumps are ideal for handling expensive fine chemicals

and fragrances where other pumps may experience seal difficulty. Sliding vane pumps have a number of vanes that are free to slide into or out of slots in the pump rotor. When the pump driver turns the rotor, centrifugal force, rods, and/or pressurized fluid causes the vanes to move outward in their slots and bear against the inner bore of the pump casing forming the pumping chamber. As the rotor revolves, fluid flows into the area between the vanes (hydraulic segments) when they pass the suction port. This fluid is transported around the pump casing until the discharge port is reached. At this point, the fluid is squeezed out into the discharge piping. Each revolution of a sliding vane pump displaces a constant volume of fluid. Variance in pressure has minimal effect. Energy-wasting turbulence and slippage are minimized and high volumetric efficiency is maintained.

Constructed with long-lasting, non-metallic composite vanes that automatically adjust clearances and sustain the highest levels of flow performance and efficiency over time, sliding vane pumps eliminate slip, capacity loss, and downtime for clearance adjustments. The self-adjusting vanes offer exceptional suction and dry priming capabilities while being able to run dry for short periods of time. Advanced sliding vane technologies include pumps with a hydrodynamic journal bearing &#151 a unique fluid boundary forming principal &#151 that eliminates shaft-to-bearing contact. The shaft hydroplanes above the bearing surface on a cushion of liquid. In this hydrodynamic condition, there is no metal-to-metal contact or wear, and bearing life can be indefinite. These pumps are engineered to achieve hydrodynamic mode (full film operation &#151 the point offering the lowest bearing friction and least

wear) faster than any other pump in its class to preserve bearing life. They also maintain optimum bearing characteristics even under a wide range of operating conditions. Reduced shaft/bearing contact minimizes friction and results in higher mechanical efficiency and smart energy cost savings. Advanced sliding vane pump technology today includes cavitation/noise suppression liners that control the effects of cavitation and reduce noise levels up to 15 dbA. This liner is replaceable, giving the pump added protection and extended service life. In addition, the advanced pumps include one mechanical seal and sealed-for-life bearings, which significantly reduces the chance of leaks and product loss potential of expensive raw materials, concentrated dyes, and fragrances. In addition, an advanced shaft and rotor configuration, which incorporates a heavy-duty shaft and rotor, offers high fatigue and bending strength, minimizing shaft and vane stress. Sliding vane pumps can be completely rebuilt with piping attached, allowing for quick and easy maintenance. If a vane becomes damaged, replacing it can be accomplished by simply removing the outboard head assembly, sliding out the old vanes, inserting the new ones, and re-installing the head. In a matter of minutes, the pump can be back in operation. Simple vane replacement requires no special tools. An optional relief valve is available to help protect the pump in a high-pressure buildup situation. Capable of holding pressure under variable flow and pressure conditions, the valve offers an additional level of protection for pump operation. For soap and detergent applications from high-purity chemicals to concentrated dyes and perfumes, sliding vane technology is being used worldwide to solve everything from seal, suction, product shear, and volumetric efficiency problems to offering unique benefits such as leak-free assurance, line stripping capabilities, metering, and non-pulsating

flow. Its sliding vane principle offers efficiency at low flow rates and allows for higher operating speeds and pressures on low viscosity fluids compared to other types of positive displacement pumps. These pumps are capable of low-flow, high-head applications on low-viscosity fluids where centrifugal pumps can't run. In addition, sliding vane pumps offer superior priming and suction capabilities for clearing tanks, stripping lines, and pump chambers when making in-line soap and detergent material changes. Designed without a gear reducer, advanced sliding vane pumps offer upfront equipment, installation, and energy cost savings as well as a smaller footprint than that of a conventional pumping unit. ***Wayne Harris is the market segment manager at Blackmer in Grand Rapids, MI, a leader in the design and manufacture of high-quality flow technologies including rotary vane, eccentric disc, and peristaltic hose positive displacement pumps, centrifugal pumps, screw compressors, air elimination systems, and sliding vane and reciprocating compressors for the transfer of liquid and gas products. Questions can be addressed to Blackmer at 616-241-1611 or harris@blackmer.com. More information is available at www.blackmer.com.***

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