Shift Your Perception of AODD Pumps

Examining air distribution’s critical role in pump efficiency

By Chris Distasio, Wilden Pump and Engineering

Over a varied assortment of industries—from chemical production and mining to water and wastewater and hygienic applications, pumps play a crucial role in industrial operations. In fact, they are the second-most widely used machines in the world. The U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy (EERE) reports pumping systems account for roughly 30 percent of the total electricity consumed in the nation’s industrial sector.

The impetus is on today’s pump manufacturers to realize the importance their products play in industry. And those OEMs who have answered the call and devoted untold hours and resources in designing and developing equipment that meets the growing need for energy efficiency and lowered operating costs.

Wilden Pump and Engineering, a division of Pump Solutions Group (PSG), has developed a revolutionary new line of air-operated double-diaphragm (AODD) pumps that feature a unique air-distribution system (ADS) called the Pro-Flo SHIFT. Wilden’s testing shows that the Pro-Flo SHIFT ADS can help minimize air consumption and improve overall efficiency of reciprocating positive displacement AODD pump technology that is used in many of the world’s industrial liquid-handling applications.

SEEKING THE NEXT GENERATION OF AIR DISTRIBUTION

In many traditional AODD pumps, the ADS technology allows the air chamber to overfill during the time period from the end of each stroke to the

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completed shift of the valve without any corresponding displacement of fluid. This overfilling is nothing more than wasted compressed air that results in higher costs for the operator. Suggested solutions to the problem of overfilling, however, have been mixed.

One of the more recent attempts to optimize ADS performance in regards to air consumption is an electronic “learning” system, which means that the component must “think” instead of simply “react.” Each time the pump is in operation, the electronic system requires anywhere from 30 seconds to almost a full minute to monitor the pump’s performance before it can “think” about when to interrupt the air supply before the end of the stroke. The approximately 40 seconds of wasted air results in unreliable and varying flow rates, a disadvantage that grows exponentially in operations requiring repeated on-off cycles.

Undeniably, AODD pump operation has progressed in its performance and economical use of air consumption; however, when plant operators or engineers affix their testing equipment to today’s AODD pump offerings,
The Wilden Pro-Flo SHIFT air control spool revolutionizes the air distribution efficiency of Wilden’s new line of AODD pumps.
the results can be disheartening. Air is still being squandered in pumps throughout varied industries, which makes seeking an improved ADS the holy grail for AODD pump designers.

A GIANT LEAP FORWARD
Although the basic operation of an AODD pump has remained essentially unchanged for more than half a century, the pump’s ADS presents the critical avenue for improvements in both performance and energy efficiency. An AODD pump’s rate of air consumption in relation to the product flow rate reveals how much air is wasted during the pumping cycle—and wasted air means additional power required and increased operations costs for the pumps’ users. Wilden’s Pro-Flo SHIFT ADS approaches air distribution in a simple but innovative fashion.

“The Pro-Flo SHIFT represents a giant leap forward in the energy efficiency and performance of AODD pumps. The simple design of the ADS doesn’t require any additional bolted-on equipment or bulky electronics, allowing operators to keep the same compact footprint,” says Carl Glauber, designer of the Pro-Flo SHIFT.

The Wilden Pro-Flo SHIFT is available in 1 ½ inch (38 millimeter), 2 inch (51 millimeter), and 3 inch (76 millimeter) sizes and features maximum discharge pressures to 125 psig (8.6 bar), maximum flows to 243 gallons (923 liters) per minute and maximum solid-handling size to ½ inch (13 millimeter). The Pro-Flo SHIFT is available with maximum suction lifts to 23.8 feet (7.2 meter) dry and 30.6 feet (9.6 meter) wet.

A NEW TOOL FOR THE JOB
The secret of the Pro-Flo SHIFT air distribution system is the addition of an air control spool, which automatically meters the air and staves off overfilling without reducing performance. By comparison, this method is far more efficient than outdated ADS designs. In the old system, the AODD pump sends pressurized air from one chamber to the other and is in constant risk of overfilling. The excess air is wasted as it releases out of the chambers.

The Pro-Flo SHIFT takes overfilling head on by limiting air flow into the chamber near the end of each pump stroke. Therefore, only air sufficient to keep the pumping process going is introduced. The result is lowered air consumption that still produces maximum operational efficiency and flow rates.

EFFICIENCY MEANS POWER
No matter what industry AODD pump users are in—mining, dewatering, water and wastewater, chemical processing—more efficient use of their pumps equates to more power and lowered operational costs. Furthermore, by reducing the dependence on traditional electronic controls to measure out and decide when to fill an AODD pump’s air chambers, plant managers need not be held hostage by a monitor shorting out or operating in error. By eliminating the wasted air in each pump operation, Wilden’s Pro-Flo SHIFT ADS adds to a pump user’s bottom line one stroke at a time.