

Making the Most of an AODD Pump's ADS Benefits

KNOWING A SYSTEM'S FULL CAPABILITIES CAN MAKE IT EASIER FOR PLANT OPERATORS TO MAXIMIZE ENERGY EFFICIENCY BY IDENTIFYING THE OPTIMAL FLOW RATE AND AIR CONSUMPTION FOR THEIR AODD PUMPS

By Curtis Dietzsch



Chemical plants contain many transfer points in their operations where air-operated double-diaphragm (AODD) pumps with the latest Air Distribution System technology can be deployed to optimize flow rate and air consumption.

Introduction

More and more, operating a manufacturing plant where fluids of varying viscosities need to be transferred from point to point has become a delicate balancing act. On one hand, production rates must be maintained in order to meet quotas and keep the end-user happy. On the other, energy costs must be kept at a manageable level in order to streamline expenses and maximize the bottom line.

Fortunately for plant managers, over the years pump manufacturers have continued to reassess the performance of their technologies and developed incremental improvements that, if utilized properly, can reliably marry the desired production rate with the requisite energy efficiency. For nearly 60 years, air-operated double-diaphragm (AODD) pump technology has been one that plant managers can steadfastly turn to when confronting the oftentimes conflicting demands of their operations.

AODD pumps are reciprocating, positive-displacement-style pumps that are driven by compressed air. The foundation of an AODD pump's operation is knowing that the proper amount of air is being used to deliver the required flow rate for the fluid being transferred. Therefore, since their invention, most AODD pump designs have included an Air Distribution System (ADS) that governs the amount of air that is delivered to operate the pump effectively, efficiently and to the unique standards of every fluid-transfer operation, whether the media being moved is water or more viscous substances such as slurries or cement.

The question, then, is how do plant operators know that they are utilizing AODD pumps with ADS technology to their utmost benefit? This white paper will take a look at the ways plant operators can ensure that they are finding that "sweet spot" within the pump's performance that helps ensure that energy efficiency and cost-effectiveness are at optimal levels.



In addition to finding the optimum performance level for each pump within a plant, operators can use advanced air distribution systems on air-operated double-diaphragm pumps in order to lower energy costs and boost profitability.

The Challenge

The most basic consideration for plant operators when they look at their pumps is this: Are they working, and can I rely on them to deliver the product flow rates that I require? If the answer to these questions is “Yes,” then the operator becomes comfortable in taking an “out of sight, out of mind” attitude regarding the operation of the plant’s pumps. If this becomes the facility’s de facto position, the operator may be missing out on a vital opportunity to further improve the pump’s operational performance and, by extension, his plant’s energy efficiency and cost effectiveness.

Too many operators will install a new AODD pump that features an ADS without changing the factory settings so that they meet the pumping system’s unique operational parameters. Since each fluid-transfer operation is its own individual entity that depends on a number of variables, this way of thinking will not result in maximized pump operation.

The overarching challenge, then, is to convince plant operators that the time required to determine the best flow rate and the proper amount of air to deliver that flow rate will be well spent. This can be problematic, however, because many plant operators will immediately know what an application’s flow rate is, but they often don’t have a

reliable way to measure air consumption. This means that they will need to conduct air tests in order to determine the amount of air that is being consumed at a specific flow rate. This can be a time-consuming process, but the ultimate payoff will be realized in the reduced cost to operate a more efficient pump.



Wilden’s Pro-Flo X™ air distribution system (ADS) provides top-of-the-line operational flexibility through its patented Efficiency Management System (EMS™) that allows the user to optimize the ADS for any application demands regardless of pump size through the use of a control dial that allows the user to select the flow rate that best suits the application.

The Solution

The earliest ADS systems operated most efficiently when the pump's inlet and discharge pressures were adjusted to meet the flow requirements at the point where the least amount of air was required. Therefore, an optimal system would tune the air pressure and air flow while, at the same time, maintaining the expected fluid flow rate. Again, this means finding the "sweet spot" in the pump's performance curve.

This would mean changing the port dimensions and the corresponding air flow into the pump, in the process governing the amount of air that will be allowed to enter it during operation. Generally, larger air inlet ports maximize fluid flow rates while smaller air inlet ports increase efficiency.

The result is optimized pump performance that delivers both required production rates and cost-effective operation. In addition, mechanical fatigue will be reduced because the pump is operating at its most efficient point more often, and the mean time between repairs will be extended, resulting in cost savings.

An exploded view of the Wilden Pro-Flo X™ ADS.

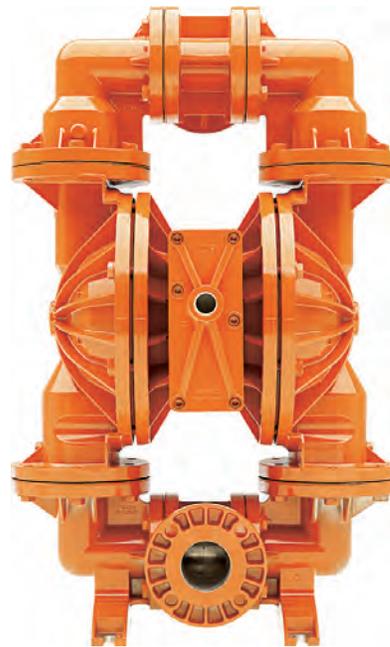


Few pump developers have taken a more proactive approach to the design and performance of the pump's Air Distribution System (ADS) than Wilden. With its Pro-Flo X™ ADS (pictured), Wilden allows operators to set its pumps to the most efficient level for optimum flow and energy efficiency.

Conclusion

In these days of shrinking budgets and under-threat bottom lines, finding the most efficient way to run a manufacturing operation is of the utmost importance. One way that savvy facility managers are doing that is through the use of AODD pumps that feature optimized ADS systems.

But the best system can only operate at its utmost efficiency if the operator is willing to take the time to find the "sweet spot" in its operational curve. With this in mind, the simplest, most effective way for plant operators to find the perfect marriage between optimal flow rate and the most efficient use of air in their AODD pumps is to embrace and utilize the most beneficial features of their ADS technology.



To make it as easy possible for the pump operator to find the proper setting for the application, Wilden has created the See More Green website. Found at www.wildenpump.com/seemoregreen, the website has been designed to let the operator quickly and reliably identify the best EMS settings for his varying fluid-transfer operations.



Most air-operated double-diaphragm (AODD) pump designs have included an Air Distribution System (ADS), such as the Wilden Advanced™ Series Plastic pump, which uses a Pro-Flo X™ ADS (pictured) that has been designed to govern the amount of air that is delivered to operate the pump effectively, efficiently and to the unique standards of every fluid-transfer operation.

A Simple Way to “See More Green”

Wilden® Pump & Engineering, LLC, Grand Terrace, CA, USA, has been a leader in the design and development of air-operated double-diaphragm (AODD) pump technology since 1955 for one simple reason – company founder Jim Wilden invented it. From Wilden's first AODD pump model – which is still being produced today as the Original™ Series – the company has continued to set the standard in AODD operation and performance, driven by a spirit of invention and innovation.

Over the years, few pump developers have taken a more proactive approach to the design and performance of the pump's Air Distribution System (ADS) than Wilden. That commitment to maximizing air usage has advanced Wilden's AODD pump performance to the next level with the creation by Wilden engineers of an Efficiency Management System (EMS™) for the ADS. This is personified in Wilden's standard-setting Pro-Flo X™ ADS.

The Pro-Flo X follows in the footsteps of the Pro-Flo and Pro-Flo V ADS systems. What separates the Pro-Flo X from its competitors is the incorporation of an EMS that allows the user to interactively select, via a variable control dial, the proper flow rate and air volume for the application, in the process optimizing both production and air usage. The dial features settings from 1 to 4 with a maximum flow rate realized at setting 4 and maximum efficiency, i.e. air consumption, found at setting 1.

An ADS with an EMS allows the operator to adjust the amount of air that flows into the pump, with the idea that when the air flow into the pump is collaborated with the required flow rate, the pump will operate consistently at its most efficient point – resulting in that “best of both worlds” condition where both flow and energy use are optimized.

Like all of Wilden's products, the Pro-Flo X has been designed not only with simplicity of operation in mind, but also with an eye toward reduced maintenance costs and their associated headaches. While some competitive ADS models can contain upwards of 45, 56, 69, 73 and even 103 parts, the Pro-Flo X has just 34 parts, making troubleshooting and maintenance a much more streamlined process.

To make it as easy possible for the operator to find the proper setting for his or her pumping applications, Wilden has created the See More Green website. Found at www.wildenpump.com/seemoregreen, the website has been designed

to let the operator quickly and reliably identify the best EMS settings for his varying fluid-transfer operations.

This is done through the See More Green Simulator, which allows the user to identify the most efficient EMS setting for each fluid-transfer operation, all without the need to consult performance curves. The operator simply selects the Wilden pump model that is being used, then enters the maximum inlet pressure available at the air inlet of the pump, discharge pressure and desired flow rate into the See More Green calculator and clicks the “Submit” button. At that time, the See More Green system will take that information and determine the most effective and efficient EMS setting.

For example, a PX4 1.5-inch Original™ Series Metal AODD Pump is being used in a wastewater pumping application with the following parameters:

- Inlet Pressure Available: 100 psig
- Head Pressure: 30 psig
- Flow Rate: 30 gpm

After entering that information into the appropriate See More Green Simulator fields and clicking Submit, the simulator determines that 60 psig inlet air pressure and 15.60 standard cubic feet per minute (scfm) of air will be needed to meet those operational requirements and that the most efficient EMS setting – remember, one that optimizes both flow and air consumption – on the variable control dial will be 1.52.

By using this simple, readily available calculation, the plant operator can be confident that the facility's pumps will be operating at their efficient best, resulting in improved production processes that are kinder to the bottom line.

The simulator can also be used as a way for operators to conduct an air audit that can estimate potential air consumption. This can be accomplished by entering a transfer application's current operational parameters entered into the calculator with the resulting amount (scfm) of air that is being used displayed. That figure can then be used as a baseline when entering new parameters into the calculator to see if adjusting the EMS can result in even more efficient use of air in the application.

About the Author:

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please go to www.wildenpump.com. Wilden is a member of Dover Corporation's Pump Solutions Group (PSG®), Downers Grove, IL, USA, which is comprised of several leading pump companies Almatec®, Blackmer®, EnviroGear®, Griswold™, Maag®, Mouvex®, Neptune™, Quattroflow™, RedScrew™ and Wilden®. You can find more information on PSG at www.pumpspsg.com.



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