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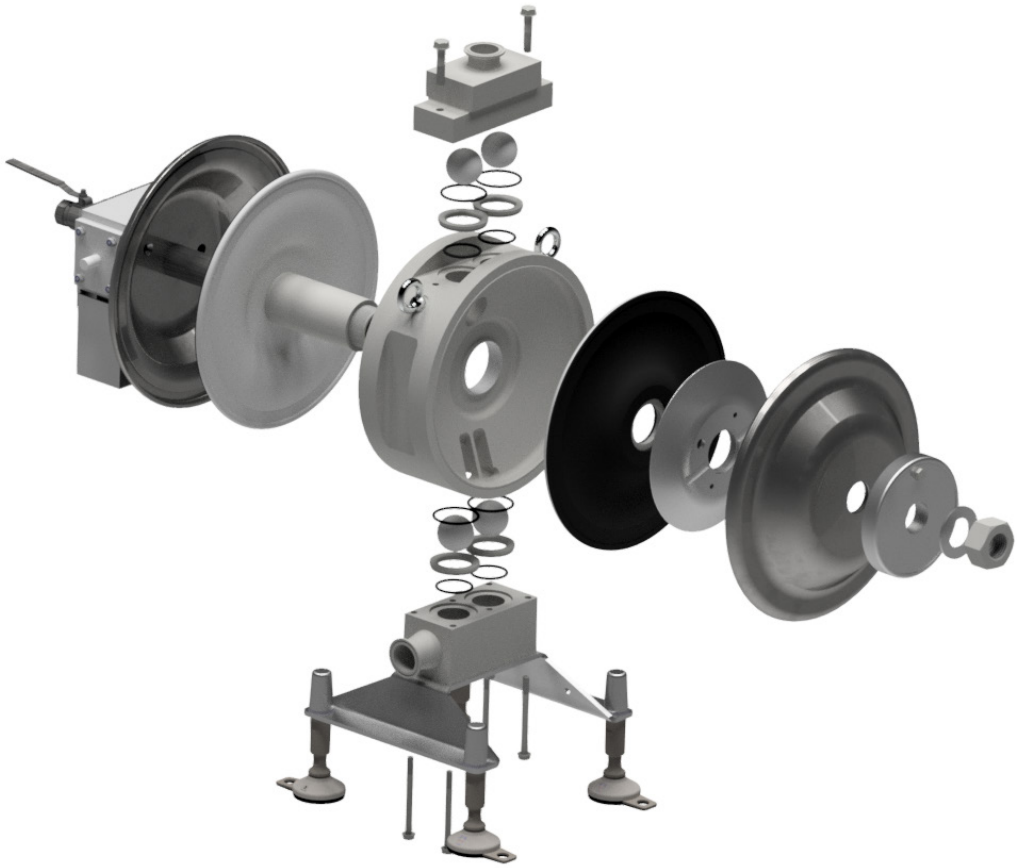
Using AODD Pumps With High-Viscosity Materials



Understand basics of these pumps before selecting the right style and size.

By Leighton Jones, Unibloc

Air-operated double diaphragm (AODD) pumps are found in up to 90% of the manufacturing and operating facilities in the United States, according to some estimates. Industries including pharmaceuticals, food and beverage, mining, pulp and paper, paints and coatings and wastewater, rely on AODD pumps to safely and effectively move liquids of varying viscosities, such as dangerous or potentially hazardous fluids.

With numerous pump styles that serve various purposes, selecting the right style and size of pump can improve production efficiencies, increase plant safety and reduce unnecessary downtime. Examining the AODD pump and its features/benefits can help determine if this style best suits application parameters.

Mechanics Driving an AODD Pump

An AODD pump is a type of positive displacement pump. These can maintain a consistent flow rate even under pressure variations. A positive displacement pump continually cycles in and then discharges a set volume of material/fluids from its inlet to its discharge valve.

Within an AODD pump, two flexible diaphragms, powered either by gas or compressed air, alternately fill and then discharge two chambers. The air pressure within the pump drives the pair of diaphragms in a repeated back-and-forth motion to create positive and negative pressures in the wet pump. Negative pressure pulls liquid to one side and the positive pressure forces it out of the discharge. Known for its gentle movement, AODD pumps work well with shear-sensitive liquids. It also supplies effective transfer of high-viscosity sludges and slurries or fluids with abrasive materials.

AODD Pump Common Features

An AODD pump is a type of positive displacement pump without a seal, supplying it with a set of features including:

- can be run dry and "dead-headed"
- self-priming and low shear
- can manage solids and pump high-viscosity products
- can be easily cleaned-in-place (CIP)/sanitized
- easy to install
- portable
- easy to control
- no electricity required to operate
- low total cost of ownership (TCO)
- can be fully certified

A pump that can run dry

AODD pumps can run dry without damage to internal parts, a feature common to only three pump styles—diaphragm, piston and peristaltic. Running dry can shorten a pump's service life if not engineered for that capability. This feature proves beneficial during pump priming or for any transfer applications where dry run is possible.

Dead-heading

Certain types of pumps must be protected against dead-heading to avoid damage or breakage and an expensive replacement. Other pump technologies can incorporate special controls or circulation loops to enable dead heading the pump.

Dead heading can occur when, for example, a discharge valve in a centrifugal pump is closed or blocked, causing the flow of liquids to cease or the same fluids to recirculate. This continual recirculation raises the temperature and can damage and reduce pump life.

In an AODD pump, a valve fitted into the delivery line can stop the flow of liquid. The pump will stop when the liquid pressure in the delivery line reaches the same pressure as the driving air fueling the pump's action. Opening the valve causes a pressure drop in the delivery line for the pump to resume operating. The fact that AODD pumps can be dead-headed is handy when transferring product to filling heads.

AODD pumps are self-priming

AODD pumps do not require positive inlet pressure to prime, such as flooding or a dry suction lift. Typically, a dry suction lift of up to four meters is possible and can get up to 8.2 meters when the pump is being used in a flooded application. This feature is the reason for AODD pump's capabilities to pump high-viscosity products.

Handles solids

When pumping fluids containing solids, operators can avoid clogging or a cycle of starting/stopping, which helps maintain consistent production schedules, prevents downtime and spares maintenance time and cost. AODD pumps typically feature large internal clearances, easily handling solids. Clearance size is dependent on the model or type selected.

Transfers highly viscous fluids

AODD pumps transfer liquids from water to highly viscous fluids of up to 300,000 centipoise (cP) with a stand-alone pump or viscosities exceeding 500,000 cP when aligned with a drum unloading system.

Operations are electricity-free

AODD pumps do not require electricity to operate. This pump style can be safely grounded if designated for use in an explosive area or when pumping highly flammable products. This makes AODD pumps capable of operating in enclosed spaces or underground for safe and reliable operation in explosive environments when built to those standards.

AODD pumps are easy to install by simply connecting them to an air supply. No alignments or footplates are required and the standard footprint for an AODD pump is smaller than for other positive displacement pumps.

Selecting the right AODD pump for rigorous applications requires taking a long view for total cost of ownership over the lifetime of the pump, seeking out the quality and durability that will supply a measurable return on the initial investment. Consider all factors from operations to maintenance and labor when making a choice or ask to consult with the engineering staff at the pump supplier.

Leighton Jones is the director of sales for AODD pumps for Unibloc Hygienic Technologies. Jones has more than 20 years of experience working with applications using pumps within the pharmaceutical, cosmetics, food and beverage, and chemical industries. For more information, visit unibloctech.com

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