Blackmer
A DOVER COMPANY

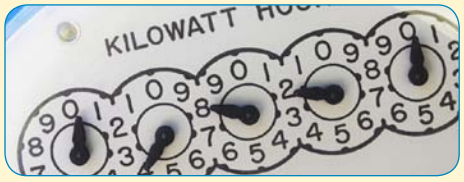
A Smart Energy™ Solution by Blackmer

Energy-Efficient Flow Solutions By Design

Positive Displacement Sliding Vane Pump Technology Delivers Superior Energy-Saving Advantages in Process Applications

Process | Energy | Military & Marine

When Efficiency is Measured in Kilowatts...



...It's Time To Put Some Energy Into Learning About Sliding Vane Positive Displacement Pumps

Today, high energy costs impose a significant profit-robbing threat to every manufacturing operation. In order to prevent profit and performance erosion, smart companies are employing smart "energy management" practices, which are helping them to:

- Control energy expenses by reducing power consumption without compromising output performance
- Increase operational reliability by emphasizing the use of energy-efficient technologies that support enhanced mechanical efficiency
- Reduce vulnerability to energy price volatility
- Drive productivity improvements that increase financial performance

By virtue of their inherent energy and mechanically-efficient design, Blackmer's positive displacement sliding vane pumps are uniquely suited to offer manufacturers immediate, high-value advantages and solutions in fulfilling their energy-saving initiatives.

Blackmer Smart Energy™ Flow Solutions Mission

At Blackmer, our mission is to enable pump users to gain a competitive business advantage through the deployment of energy-saving positive displacement sliding vane pump technology.

Blackmer started its Smart Energy™ Flow Solutions initiative to help educate companies on how they can reduce energy consumption through the use of positive displacement sliding vane pump technologies.

Saving Energy (and Money) with Proper Pump Selection

Although the operating principles of positive displacement and centrifugal pumps differ widely, both types of pumps can be used to serve many of the same applications. In these instances, certain positive displacement pumps may offer substantial opportunities to improve processes and productivity as well as maintenance and energy cost savings. Positive displacement pumps generally require less NPSHA* than centrifugal pumps, and they offer more flexibility relative to dealing with varying changes in pressure and flow requirements of continuous-type processes.

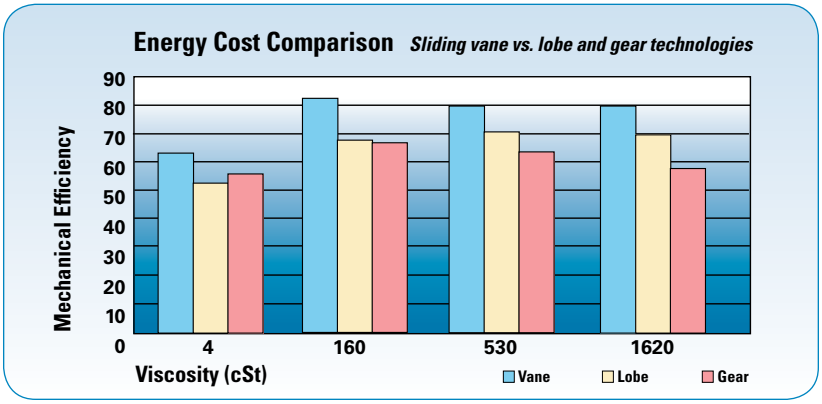
Also, positive displacement pumps maintain higher efficiencies throughout the viscosity range. Therefore, in the overlap where both types of pumps can operate, a positive displacement pump's high mechanical efficiency can offer improved energy efficiency.

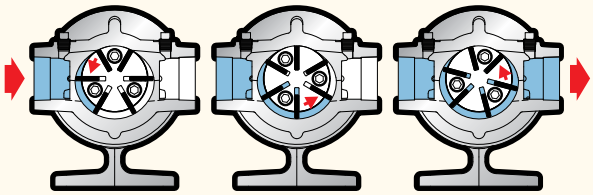
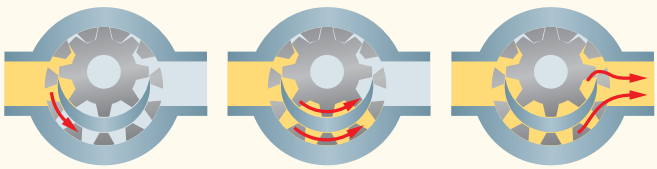
* Net Positive Suction Head Available

Comparing Centrifugal Pumps To Positive Displacement Pumps	
If The System Calls For:	**The Best Pump To Use Is:**
Pressurized network of piping with a constant pressure requiring constant flow rate	Centrifugal
Constant flow at various pressures	Positive Displacement
Constant flow at various viscosities	Positive Displacement
Constant flow at high viscosities (particularly above 850 cSt)	Positive Displacement
Line stripping	Positive Displacement
Dry running – short duration	Positive Displacement
Priming	Positive Displacement
Shear sensitive	Positive Displacement
Entrained gases	Positive Displacement
High flow / low head	Centrifugal
Low flow / high head	Positive Displacement

Positive Displacement Pumps Are Not Created Equal

Positive displacement pumps are not created equal. There are significant differences between PD pump types. Improper pump selection can cost money in downtime, lost production, maintenance costs and energy consumption. Of the leading PD technologies, sliding vane pumps are generally the most energy efficient.



Comparison of Sliding Vane Pumps Vs. Internal Gear Pumps	
Sliding Vane Pumps	**Internal Gear Pumps**
■ **Superior mechanical performance** ■ **Provides greater energy savings** ■ **24% More efficient than gear pumps**	■ **Less mechanically efficient** ■ **Consume more energy than vane pumps**
	
■ Sliding vane pumps have a number of non-metallic vanes that slide into and 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 pumping chambers ■ This fluid is passed around the pump casing to the discharge port ■ Each revolution displaces a constant volume of fluid ■ Variances in pressure have minimal effect ■ The sliding vanes automatically adjust to maintain near perfect clearances throughout operating life ■ Energy-wasting turbulence and slippage are minimized and high volumetric efficiency and low energy consumption are maintained	■ Internal gear pumps utilize an outer gear called a rotor that is used to drive an inner gear called the idler ■ The gears create a void as they come out of mesh - the volumes are reduced and liquid is forced out the discharge port ■ Each revolution displaces a constant volume of fluid ■ Variances in pressure has minimal effect ■ The metallic gears wear over time resulting in wider clearances; this increases energy-robbing slippage and significantly decreases volumetric efficiency ■ In order to compensate for performance degradation, pump speed is increased which requires greater energy consumption

"A dollar saved on energy, maintenance or production ***is equivalent to $17 in sales income*** *(assuming a 6% gross profit margin)"*

– Northwest Energy Efficiency Alliance

Annual Energy Cost Savings: Sliding Vane vs. Internal Gear Pumps										
Liquid Viscosity	Pump	GPM	PSI	BHP	WHP (Water)	Efficiency		KW Input	Annual Power Cost (2)	Annual Savings with Sliding Vane Pumps
						Pump	Motor (1)			
Pump Sized for Stated Flow										
Thin 1.1 cSt	Sliding Vane	310	75	20.1	13.6	68%	88%	17.0	$3,828	$552
	Internal Gear			23.0		59%	88%	19.5	$4,380	
Viscous 5,250 cSt	Sliding Vane	180	75	12.2	7.9	65%	88%	10.3	$2,323	$1,485
	Internal Gear			20.0		39%	88%	17.0	$3,809	
Pump Sized for Wear Factor Allowance										
Thin 1.1 cSt	Sliding Vane	310	75	20.1	13.6	68%	88%	17.0	$3,828	$1,333
	Internal Gear			27.1		50%	88%	23.0	$5,161	
Viscous 5,250 cSt	Sliding Vane	180	75	12.2	7.9	65%	88%	10.3	$2,323	$1,771
	Internal Gear			21.5		37%	88%	18.2	$4,094	

1) Typical

2) Assumes 8 hours/day, 6 days/week, 52 weeks/year Duty Cycle and $0.09 KWh. Power cost may be directly ratioed for other electric rates or duty cycles

Selecting The Proper Pump

Many pump users do not know how to properly select and apply pumps to a system, so pump system operating costs are inadvertently increased as a result. Using pump selection software programs such as Blackmer's blackOPS® pump configurator helps our customers to optimize pump selection and reduce energy consumption.

BLACKMER OPTIMUM PUMP SOLUTIONS

blackOPS® – Blackmer Optimum Pump Solutions

Allows users to select pump data and pump curves so they can select the proper positive displacement or centrifugal pumps for their application.

Learn more at www.BlackmerSmartEnergy.com

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Blackmer's energy-efficient flow solutions are evidence of its commitment to environmental sustainability. This website was designed to be a functional and informative resource when evaluating positive displacement pumps, specifically, how the sliding vane pump can reduce energy costs and improve system performance.

Distributed by:

BLACKMER MEMBER OF PSG PUMP SOLUTIONS GROUP A DOVER COMPANY

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