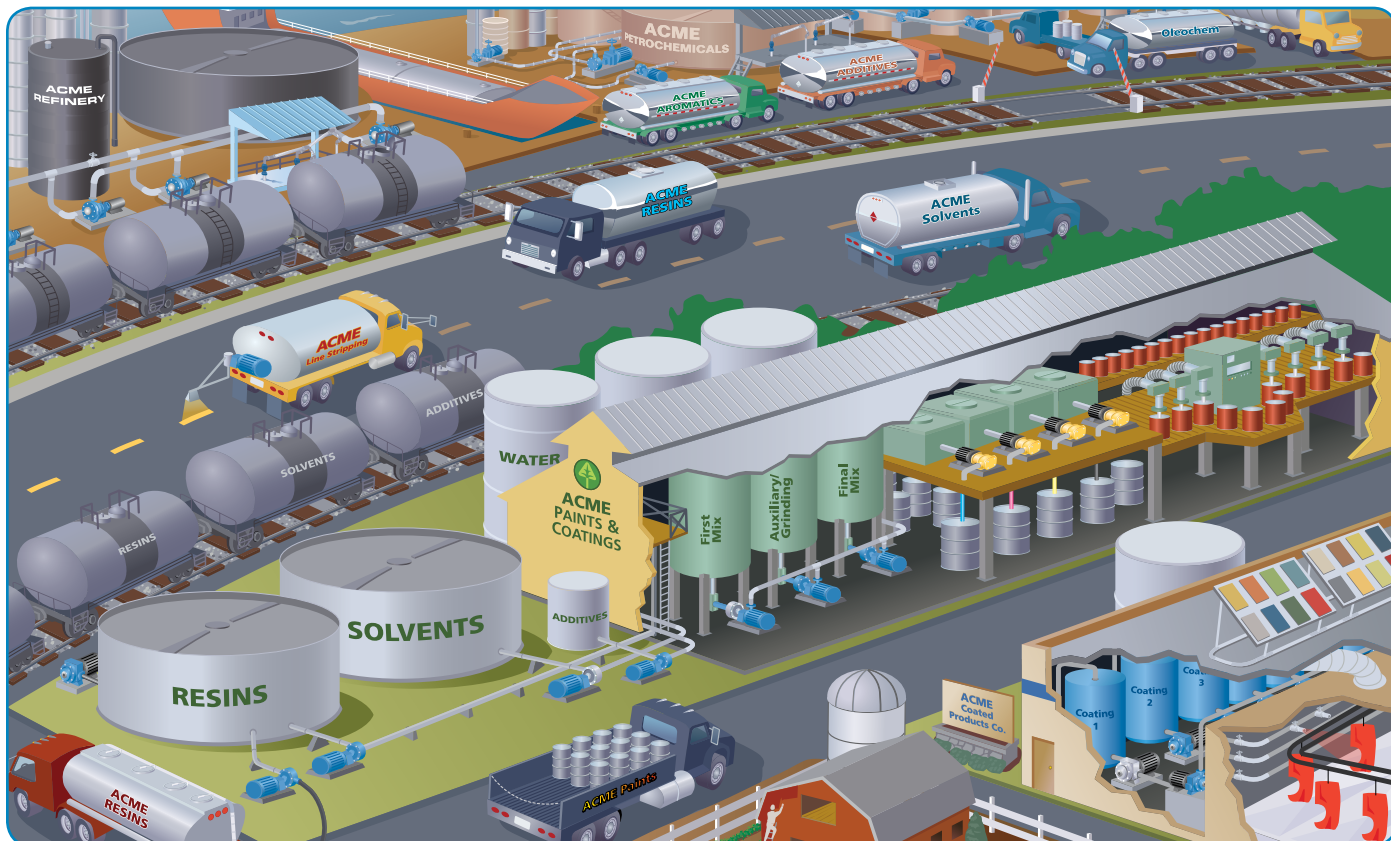


Energy-Saving Pumps in Paint & Coatings Applications

THE ENERGY-EFFICIENT DESIGN OF BLACKMER® SLIDING VANE PUMPS
ENABLES MANUFACTURERS TO OPTIMIZE COST-SAVINGS

By Thomas L. Stone



Blackmer sliding vane pumps play a critical role throughout the paint & coatings process.

Introduction

Paint and coatings are designed to add an aesthetic appeal to products, but they are also equally important in their role as the only thing standing between wear-and-tear inducing elements and the product. The importance of the paint & coatings industry to consumers is highlighted by the prediction of the American Coatings Association (ACA) that the market will approach an annual value of \$24 billion (£18 billion) in 2015 in the United States alone. Globally, according to the Freedonia Group's *World Paint & Coatings Market* report, demand will rise a forecasted 5.4% per year, bringing the estimated value to \$142 billion in 2015. Regions that will see the highest amount of growth are Asia Pacific (8%-10% growth per year), China (8%-10%), Eastern Europe (6%) and Latin America (6%).

The pressure of satisfying both the performance demands of customers, as well as the demand created by growth in the industry, is compounded by implementation of regulatory

strategies aimed toward creating more energy-efficient manufacturing processes.

As the most effective method for optimizing energy efficiency in paint and coatings operations is debated worldwide, manufacturers must find ways to respond to this challenge. Manufacturers in the closely related chemical industry, for example, have done so in ways that are both energy-efficient and successful in lowering manufacturing costs. According to the American Chemistry Council (ACC) and International Council of Chemical Association (ICCA), increased energy efficiency is actually one of the most prominent and cost-efficient tools in the quest to increase operational cost savings.

This white paper will highlight how a specific type of pumping technology—positive displacement sliding vane—can play a critical role in meeting the demands in the more energy-conscious paint and coatings manufacturing processes.

The Challenge

With worldwide energy consumption expected to increase by 42% over the next 24 years, as reported by the U.S. Energy Information Administration, more stringent energy conservation policies have been, or are being, enacted as a response. As an example, China's "Medium and Long Term Plan for Energy Conservation," in conjunction with The State Council Decision on Strengthening Energy Conservation, represent policies implemented by the country's National People's Congress and National Development and Reform Commission (NDRC) to be applied across a wide range of manufacturing industries. These policies, as well as the "Revision of the Energy and Conservation Law of 2007," aim to reduce energy consumption in China by ramping up supervision and inspection, tightening lawful management and requiring manufacturing companies to publicize energy-consumption data.

Also included, and specifically targeted, are energy-efficiency performance standards for industrial energy-consuming equipment, as well as the promotion of energy-saving technologies. The Asia-Pacific region is responsible for nearly half of the world's production of paint and coatings, and stricter energy-conservation regulations have become the driving force behind the adoption of new production technologies.



Paint & coatings manufacturers are implementing new technologies to meet stricter energy-conservation regulations.

In the United States, as researched by McKinsey & Company in its *A Compelling Global Resource (Energy Efficiency)* report, annual energy consumption has the potential to be reduced by up to 23% from a business-as-usual baseline projection if newer energy-efficient manufacturing processes are implemented. As indicated, and as targeted by policy-makers globally, manufacturers must focus on the increase of operational reliability by emphasizing the use of energy-efficient technologies. In the end, reducing energy consumption will allow manufacturers to realize a healthier bottom line.

The source of energy consumption in a manufacturing system therefore becomes important. Research conducted by The Hydraulic Institute (HI), and presented in *Improving Pumping System Performance: A Sourcebook for Industry*, concludes that 27% of the electricity consumed in an industrial system is used to operate pumps.

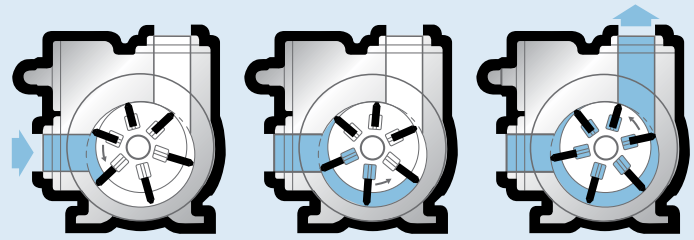
To improve this statistic, HI has created a video training program designed to help the viewer identify ways to achieve energy savings across multiple industries. Among HI's energy-saving suggestions are:

- **Design systems with lower capacity and total head requirements.** Reducing flow capacity through the use of lower velocity in the heat exchanger and the elimination of open bypass lines will lower energy consumption, as will a reduction in total head requirements through a decrease in pressure and elevation changes, along with the use of larger pipes and low-loss fittings.
- **Don't allow for an excessive margin of error in capacity or total head.** Energy savings can be as high as 20% if pumps are sized based on reasonable system head and capacity requirements.
- **Select the most efficient pump type and size from the onset.** Ultimately, the choice of pump depends on the service needed from the pump. However, additional consideration must be given to flow, pump speed, inlet pressure and net positive suction head (NPSH), as well as the type of liquid to be pumped. Selecting the proper pump for the job at the start—rather than emphasizing initial cost—will result in additional energy savings in the long run.
- **Use two or more smaller pumps instead of one larger pump to optimize capacity.** Two pumps can be operated in parallel during peak-demand periods with one pump operating by itself during periods of lower demand. In this setup, energy savings result from running each pump at a more efficient operating point while

The Principle of Sliding Vane Pumps

Blackmer 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 pumping chambers. As the rotor revolves, fluid flows into the area between the vanes (pumping chambers) 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. Sliding vane pumps provide:

- Superior mechanical performance
- Greater energy savings
- 24% more efficient than gear pumps



How Blackmer's Sliding Vane Pump Action Works

avoiding the need to throttle back a larger pump during low-demand periods.

- **Maintain pumps and component in virtually new condition.** Simply put, wear is a significant cause of decreased pump efficiency. To avoid excessive wear, pump bearings must be properly lubricated and replaced before they fail. Shaft seals also require constant maintenance to avoid premature mechanical failure. In the end, properly maintaining pumps will not only optimize the quality of the products that they are charged with producing, but will also maximize energy usage.

Finding a way to implement the above suggestions will result in an increase of efficiency and decrease in energy consumption for industrial systems, resulting in a healthier bottom line.

The Solution

Blackmer®, Grand Rapids, MI, USA, a leading global provider of positive displacement sliding vane pumps for use in industrial applications, and a member of the Dover Corporation's Pump Solutions Group (PSG®), Oakbrook, Terrace, IL, USA, is well aware of the new energy challenges now facing the paint and coatings manufacturer.

Blackmer has made its sliding vane pump technology, which was perfected by company founder Robert Blackmer in 1899, a foundation of its Smart Energy® Flow Solutions program. Blackmer has designed its Smart Energy products to help paint and coatings manufacturers gain a competitive edge through the deployment of energy-saving sliding vane pump technology, utilizing the following features:

- **Sliding Vane Operating Principle** imparts a low rate of shear to the material being handled and provides a smooth, almost pulsation-less flow.
- **"Self-adjusting" Sliding Vane Pumps** compensate for normal wear, providing like-new pump performance over the life of the product.
- **Replaceable liners and end discs** can be rebuilt with minimal effort.
- **Symmetrical bearing support** assures even loading, extended bearing life and requires less horsepower than other PD pumps.

Blackmer also provides engineering consultants, OEMs, distributors and end-users with helpful tools and knowledge of the energy-saving value and performance-



In order to improve energy efficiency in paint & coatings facilities, operators are utilizing energy optimization programs, such as Blackmer's Smart Energy Flow Solutions.

Smart Energy®



Blackmer® has designed its Smart Energy® Flow Solutions products to help manufacturers gain a competitive edge through the deployment of energy-saving sliding vane pump technology.



enhancing advantages of positive displacement sliding vane pumps for manufacturing operation as part of its Smart Energy Flow Solutions. For additional information, visit www.blackmersmartenergy.com.

Energy optimization is a key concern of Blackmer, resulting in a steadfast commitment to Smart Energy Management. Having pioneered new technologies and processes that allow for the promotion of sustainability, Blackmer has naturally expanded upon this commitment.

The pumps of Blackmer's Smart Energy Flow Solutions line feature a mechanically efficient design, suited to offer manufacturers immediate, high-value solutions for every energy-saving challenge. Smart Energy Management allows manufacturers to reduce power consumption without compromising output performance, reduce vulnerability to energy-price volatility, increase financial performance by driving productivity improvements, and increase operational reliability through an emphasis on mechanical efficiency.

Conclusion

The demands on paint and coatings manufacturers to optimize energy efficiency without compromising the quality of their products are critical to success. These

demands can only be met if the pumping equipment utilized in the manufacturing process is versatile enough to simultaneously deliver the best in product quality, along with the most efficient performance.

Blackmer has recognized these challenges and made a commitment to energy efficiency with its Smart Energy Flow Solutions program. Blackmer's commitment to energy optimization in paint and coatings manufacturing furthers that legacy and continues to make sliding vane pumps the top choice for the many unique operational challenges found in the global paint and coatings manufacturing industry.

Thomas L. Stone is the PSG® Director of Marketing for Blackmer®, based in Grand Rapids, MI, USA. He can be reached at tom.stone@psgdover.com or (616) 248-9252. For more information on Blackmer's full line of pumps and compressors, please go to www.blackmer.com or call (616) 241-1611. Blackmer is a member of Dover Corporation's Pump Solutions Group (PSG®), Oakbrook Terrace, IL, USA, which is comprised of several leading pump companies – Abaque®, Almatec®, Blackmer®, Griswold™, Maag, Mouvex®, Neptune™, Quattroflow™ and Wilden®. You can find more information on PSG at www.psgdover.com.



www.blackmer.com

World Headquarters

1809 Century Avenue SW
Grand Rapids, MI 49503-1530 USA

T: (616) 241-1611

F: (616) 241-3752

