

# Blackmer



Where Innovation Flows

## MAGNES Solves | INFLEXIBLE OPERATING RANGE

Systems operate across a wide range of operating points, not at a single design point. Operating ranges are often devastating to magnetic drive centrifugal pumps.

Centrifugal pumps are the most commonly applied technology in liquid transfer and process applications. When engineers specify centrifugal pumps, they typically truncate a wide operating range into a single design point. The variance between the specified design point and operating range is detrimental to centrifugal pumps, because of issues relating to a centrifugal pump's Best Efficiency Point (BEP).

Centrifugal pumps have a BEP, or a single operating point where a pump is most efficient. A centrifugal pump experiences amplified loads when it operates off from its BEP, loads that exceed the service factor of individual components, which are economically optimized for a narrow variance from BEP. The resulting excess stress on bearings and shaft leads to deflection, rubbing contact, premature wear, leak-path development and compromised product containment. This is especially true for magnetic drive centrifugal pumps, which have bushings instead of external bearings, resulting in even narrower BEP flexibility. As such, maintaining operation near BEP is critical for a centrifugal pump's reliability.

**A permanent solution:** Systems require pumps with full curve & system performance capabilities. Positive displacement sliding vane pumps accommodate wide ranging operating conditions within liquid-transfer and process applications, in contrast to centrifugal pumps. Sliding vane pumps sustain efficiency across the entire performance range without limitations from a single "Best Efficiency Point." As such, sliding vane pumps bring unmatched operational flexibility to critical systems. Furthermore, sliding vane pumps offer inherent functionality: self-priming, suction lift, line



stripping, dry run, solids handling, vapor handling, viscosity flexibility, and pressure flexibility.

The Blackmer® **MAGNES Series Sliding Vane Magnetic Drive Pumps** are a breakthrough for systems with wide operating ranges. MAGNES pumps accommodate extreme system pressure and head fluctuations, 0 – 200 psi (0 – 13.8 bar); 0 – 460 ftH<sub>2</sub>O (0 – 140 mH<sub>2</sub>O); as well as simultaneous flow rate fluctuations, 0 – 500 gpm (0 – 114 m<sup>3</sup>/hr). In short, MAGNES provides unmatched reliability when compared to magnetic drive centrifugal pumps that fail when applied across wide operating ranges.

The MAGNES Series is available in 3- and 4-inch models in either ductile-iron or stainless-steel construction with flow rates up to 520 gpm (1,968 L/min). While operating at a speed of just 400 rpm, MAGNES generates the same pressures and flow rates of other pumps that operate at 3,600 rpm, with no excessive heat buildup or component wear. As a true self-priming pump, MAGNES will never require pre-flooding at startup and is well-suited for continuous-duty operation. Since the pump also has no cumulative dry-run time limit, it provides confidence that any type of dry-run event will not result in catastrophic pump failure. MAGNES boasts full curve & system performance capabilities unlike any other magnetic-drive pump available. Solve all pumping system issues due to inflexible operating ranges, while staying leak-free with the full curve & system performance capabilities of MAGNES, the Sliding Vane Magnetic Drive Pump.

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## COMPETITION

### • Centrifugal Pumps

Designed to operate within a small range of a single BEP, often within 85% to 110%. Components are cost optimized for reduced loads and fail prematurely when a pump operates outside of its BEP range. Efficiencies can be as low as 15% in low-flow, high-head operating conditions. Centrifugal pumps struggle with low NPSH applications and they lack functionality for self-prime, line-strip, product recovery, dry run, and solids handling.

### • Gear Pumps

With less displacement than other PD pumps, gear pumps require one or two port sizes larger to achieve the same flow rates, increasing overall system and operating costs. While gear pumps accommodate wide pressure ranges, gear pumps have poor reliability with thin viscosity liquids due to component galling and wear.

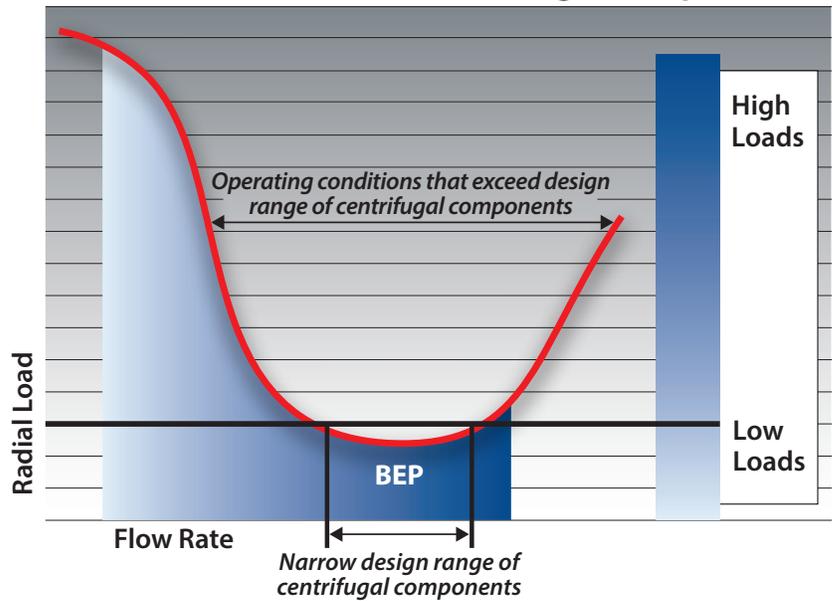
## GLOSSARY

**Magnetic-Drive Pump** - a pump that uses a balanced magnetic field to transmit torque from the prime mover to the pump, in lieu of a continuous shaft

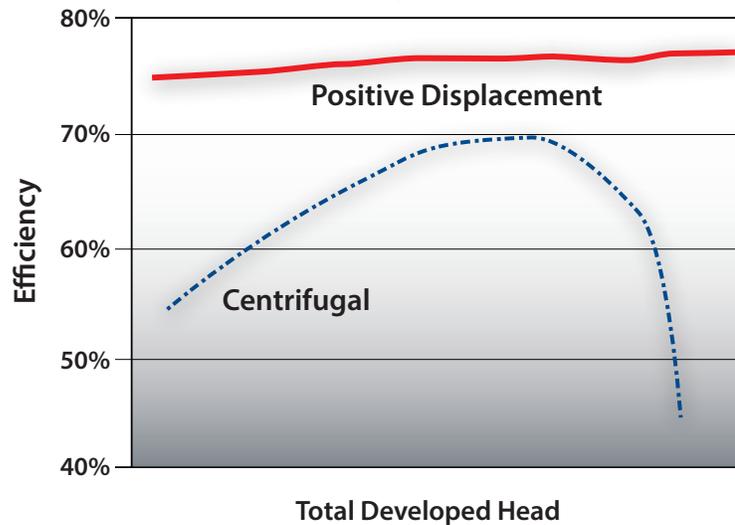
### Best Efficiency Point (BEP) -

In centrifugal pumps, a single operating point at which a pump design is optimized (hydraulic performance and component service factor)

## Radial Load on Centrifugal Pumps



## Efficiency vs. Pressure



To learn more, visit us at [blackmer.com/MAGNES-FullCurve](http://blackmer.com/MAGNES-FullCurve).



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