

## FOOD &amp; BEVERAGE PROCESSING

# Magnetically Driven Pumps Improve Performance in Sanitary Applications

With no mechanical seals to replace or maintain, these pumps provide a cost-effective option for hygienic applications.

BY JEFF SPORER  
SPX

**M**agnetically driven pumps are not a new technology, but for process applications requiring sanitary pumps to transfer low-viscosity fluids, the pump of choice has been a traditional direct drive centrifugal pump.

However, one manufacturer is beginning to develop magnetically driven centrifugal pumps designed specifically to address modern challenges in hygienic applications in industries such as food and beverage, dairy, and pharmaceutical. This type of pump could be used in a dairy plant for a pasteurizer or ultra-high temperature (UHT) system, in a juice or beverage plant for supply or transfer, or in a clean-in-place (CIP) system as a CIP supply pump.

As they strive to improve operational efficiency and reduce capital expenditure, process plant managers must minimize downtime due to maintenance—whether planned or unplanned. At the same time, these individuals must implement technologies that enhance operational performance in these challenging applications. As a result, many in the industry are looking with considerable interest to magnetically driven pumps.

## Advantages of Magnetically Driven Pumps

To help minimize the risk of seal failure in magnetically driven pumps, all the rotating seals—which are typically the primary wear items on a centrifugal pump—have been eliminated. These pumps only have static seals connecting to the outside atmosphere.



Image 1. This magnetically driven centrifugal pump is designed specifically to address modern challenges in hygienic applications. (Courtesy of SPX)

The static seal typically bears a limited load, so its life expectancy is longer than anything that moves, rotates and creates wear. Because the static seals are only in compression, they do not experience wear like traditional mechanical seals, leading to longer running time between maintenance. This streamlined design reduces maintenance requirements, enhances cleanliness and reduces emissions.

This pump design also eliminates the need for water flushing, so the pumps do not need the pipes, valves, instrumentation and control systems required to manage the flushing process. This results in lower installation costs.

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Although used throughout the industrial sector, one concern that has been associated with industrial magnetically driven pumps is heat generation. These pumps, however, have been engineered to eliminate heat buildup. The surface through which the magnetic field runs is composed of silicon carbide material, which allows the magnetism transfer to occur without any interference that creates heat. Unlike industrial magnetic pumps that have the magnets running on the outside, this design's magnets are on the inside of the shaft and impeller, much like those in traditional sanitary centrifugal pumps.

### Seal Flushing

Not every seal requires a water flush; some single mechanical seals have a rotating seal face against a stationary seal face that creates a seal along the shaft as it turns the pump. A certain percentage of seals, however, do require a flush because of the harsh conditions in which they are used. This is particularly true in applications involving sugars that crystallize when exposed to air, dry on seal faces and become abrasive. Other situations that require water flushing include pharmaceutical applications where the medium is pure with no lubrication and applications where the pumped fluid is abrasive or hot, requiring water to cool the seals.

Because magnetically driven pumps lack rotating mechanical seals and do not require seal flushing, end users avoid costs associated with extra runtime required to drain the flush water, higher utility and drainage fees, more frequent maintenance, and complex installation of pipes, valves and instrumentation involved in flushing.

### Sturdier by Design

This pump design has also been engineered to provide increased efficiency, reliability and safety in traditional hygienic centrifugal pump applications through the use of high-powered drive magnets and efficient impellers.

With no seals to replace or maintain, the pump further increases process health and safety by preventing flush water from entering the product zone and eliminating product leakage that could cause operators to slip or fall.

The pump uses heavy-duty forged and machined wetted components to ensure durability in demanding process environments.

The heavy-duty drive shaft maximizes rigidity to increase reliability and reduce vibration and noise. The one-piece machined stainless steel impeller provides an open-eye area that optimizes pumping efficiency and lowers net positive suction head (NSPH) requirements. A forged, volute design casing further ensures efficiency across a wide range of applications.

Plant operators never intend to create water hammer or pressure pulsations in their processes, but almost every plant will experience those types of conditions at some point.

The heavy-duty construction of this design accommodates these unplanned occurrences. With heavier walls, the parts maintain their position throughout the operation of the pump. In processes that have pressure fluctuations, the pump is built to withstand those variations. ■

Jeff Sporer is global product sales manager – pumps and valves at SPX. He may be reached at [jeffrey.sporer@spxflow.com](mailto:jeffrey.sporer@spxflow.com). For more information, visit [spxflow.com](http://spxflow.com).

