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Sealless Pump Offers
Reliable Service for
Oil & Gas Production

John Wanner, *Wanner Engineering*

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Sealless Pump Offers Reliable Service for Oil & Gas Production

The technology offers a lower cost of ownership, reduced maintenance needs and a longer service life than some conventional plunger pumps.

By **John Wanner**
Wanner Engineering

In the oil and gas exploration business—as with most every other industry—downtime is money down the drain. When a company is routinely pumping thousands of gallons of oil in a remote oil field, an unplanned break in production can be costly.

Saltwater is a natural byproduct of oil exploration, and it must be properly disposed of once it is separated from the oil. Typically, it is pumped back into the ground by way of disposal wells, using plunger pumps requiring 500 to 700 pounds per square inch (psi) of pressure. But saltwater and the contaminants it contains are corrosive and, when carried through pipes at high pressure, can erode seals, causing them to leak, clog or fail.

High Cost of Breakdowns

Silver Oak Energy, an oil and gas exploration and production company based in Silsbee, Texas, has dealt with issues typical to its industry.

In this case, it involves legacy pumps that frequently experience

problems because of reliability issues, most notably plungers with packing that can dry out, crack, clog or leak, particularly if the pipes run dry.

“Most complex pumps have an open plunger, so whatever you’re sending through, such as saltwater, will leak through the packing,” said Robert Clark, production foreman at Silver Oak.

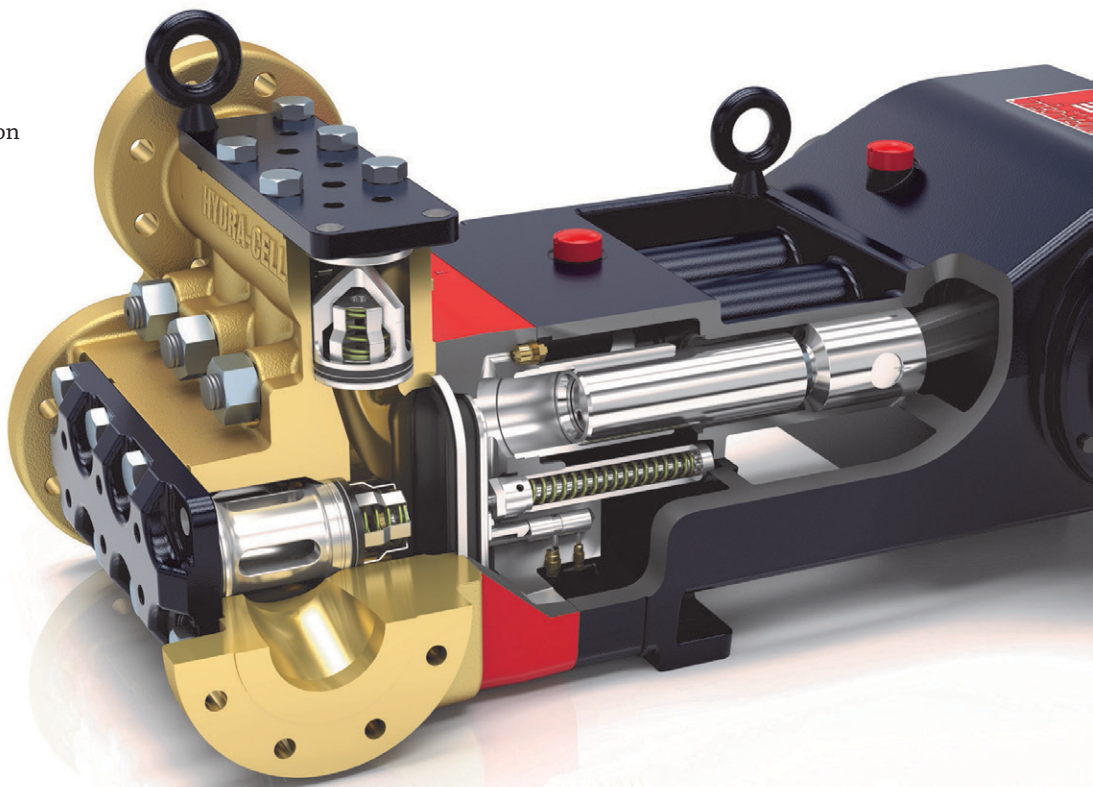


Image 1. The sealless design of this positive displacement pump separates the hydraulic (power) end from the fluid (process) end. There are no dynamic seals, cups or packing to leak, wear or replace, and volatile organic compounds are fully contained. (Images courtesy of Wanner Engineering)

“We experience breakdowns, on average, every six weeks. We spend thousands of dollars each year sending mechanics out to the sites to fix the pumps—and that doesn’t include the money lost due to the slowdown or shutdown.”



Image 2. With a maximum flow capacity of 96 gpm (366 l/min) at operating pressures up to 1,500 psi (103 bar), this 100-hp pump is capable of handling saltwater disposal or injection as well as oil and gas applications.

J-W Operating Company, an exploration and production company based in Dallas, Texas, has experienced similar issues at its more than 400 natural gas and 13 injection wells. “With the standard metal rod pumps, there’s a lot of metal-on-metal grating, which causes wear and tear to occur fairly quickly,” said James Barber, production foreman for J-W Operating, which is a subsidiary of J-W Energy.

“They break frequently, meaning we have to stop production, find the problem and fix it. That gets costly and, of course, slows down production.”

Both companies were asked to test a new product: a sealless pump. With flow rates up to 96 gallons per minute (3,300 barrels per day, 366.1 liters per minute) at pressures up to 1,500 psi (103 bar), the pump model could be ideal for a variety of applications, including saltwater disposal or injection, bulk transfer, hydraulic lift, and steam generation.

Sealless Vs. Plunger Pumps

This particular sealless pump differs from plunger pumps in several ways.

The selected pump features a unique, patented technology that utilizes a sealless multiple-diaphragm design that keeps the pumped liquid 100 percent contained, eliminating leakages, cleanup and disposal costs commonly associated with packed plunger pumps.

The innovative design also eliminates the need for external lubrication and maintenance, as well as plunger wear problems associated with packing.

The pump is also packing-free and designed to replace horizontal centrifugal pumps and packed plunger pumps in oil and gas applications. Benefits of the pump include:

- zero leakage because the sealless design separates the power end from the process end
- elimination of hazardous volatile organic compounds (VOC) emissions
- reduced cleanup and disposal costs associated with packed-pump leakage
- hydraulically balanced diaphragms handling high pressure with low stress
- virtually pulse-free, linear flow with the multiple-diaphragm design
- operation with a closed or blocked suction line and the ability to run dry indefinitely without damage to the pump
- abrasives handling capabilities—particles up to 800 microns in size can pass through the pump

Because the pump is sealless and does not leak, it keeps greenhouse gases contained, allowing companies to meet or exceed government regulations for emissions.

- no requirement for positive inlet pressure because low net positive suction head requirements allow for operation with a vacuum condition on the suction
- reduced energy costs compared with other types of pumps
- compact design and a double-ended shaft providing a variety of installation options
- rugged construction contributing to a long service life with minimal maintenance

These performance features offer a low cost of ownership, reduced maintenance and a long service life. Because the pump

is sealless and does not leak, it keeps greenhouse gases contained, allowing companies to meet or exceed government regulations for emissions.

The technology also can be used in the refining, pipeline transfer, artificial lift and food processing industries, where it is ideal for high-pressure cleaning and washing applications.

“I jumped at the chance to test this product,” Silver Oak’s

Clark said. “We were not disappointed. This new pump is designed better, so it runs more smoothly—meaning higher productivity—and it’s very cost-effective. It’s been a huge time-saver for us.”

J-W Operating’s Barber agreed, saying the company has used the pump “for almost two years with no problems whatsoever. It’s saved us a tremendous amount of time and money.” ■

John Wanner is vice president of new product development—high horsepower for Wanner Engineering, a company founded by his father in 1973 and headquartered in Minneapolis, Minnesota. Wanner received his bachelor’s degree in mechanical engineering from the University of Minnesota, Twin Cities, and his MBA from Northwestern University’s Kellogg School of Management. For more information, call 612-332-5681 or email sales@wannereng.com.

Hydra-Cell[®]
Seal-less Pumps

Wanner Engineering, Inc.

World Headquarters & Manufacturing
Wanner Engineering, Inc.
1204 Chestnut Avenue
Minneapolis, MN 55403 USA
Phone: 612-332-5681
Email: sales@wannereng.com
www.Hydra-Cell.com

Regional Office
Wichita Falls, Texas USA
Toll-Free: 800-234-1384
Email: sales@wannereng.com

Latin American Office
São Paulo - Brazil
Phone: +55 (11) 4081-7098
Email: mmagoni@wannereng.com

Wanner International Ltd.

Hampshire - United Kingdom
Phone: +44 (0) 1252 816847
Email: sales@wannerint.com
www.Hydra-Cell.eu

Wanner Pumps Ltd.

Kowloon - Hong Kong
Phone: +852-3428 6534
Email: sales@wannerpumps.com
www.WannerPumps.com

Shanghai - China
Phone: +86-21-6876 3700

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