

PUMPS & SYSTEMS®

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THE AFTERMARKET AN INDUSTRY REVIEW

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INSIDE: REENGINEERED SCREW PUMPS

Reengineered Screw Pumps

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Once upon a time, in power plant fuel oil transfer and injection services, it was difficult to justify replacing twin screw timed pumps when maintenance was already familiar with the equipment. Not anymore. Reengineered screw pumps have become drop-in replacements for twin screw timed pumps.

Most power plants were built several decades ago and continue to operate and maintain much of their original equipment to this day. Even though technology has improved substantially since these plants were first built, it is difficult for an operator to justify replacing equipment when their maintenance personnel already know how to repair the original equipment and maintenance does not require modifying baseplates, foundations or piping.

Pumping equipment is no exception to these arguments, especially when it comes to transfer or injection applications.

Traditionally, twin screw timed pumps were used for power plant fuel oil transfer and injection services. The primary reason for this pump selection was the pump's ability to handle a wide range of viscosities, allowing plants to burn everything from kerosene to No. 6 fuel oil. Twin screw timed pumps probably were the best choice 30 to 40 years ago.

Today, however, that same equipment is very expensive to maintain due to typical maintenance intervals of 18 months or less. Periodic maintenance involves replacing timing gears, rotor sets, mechanical seals (up to 4 per pump) and bearings (4 per pump) in twin screw timed pump designs. The cost of overhauling older twin screw timed pumps is substantial, especially when coupled with the amount of downtime while the



A reengineered pump (right) adapts as a perfect-fit replacement for the old pump (left). The reengineered pump consists of the outer casing (second from left) and a standard cartridge (second from right) containing the rotating assembly with liner, end cover, bearing and seal. To adapt the reengineered pump to the old pump installation, the manufacturer takes dimensions from the old pump, does a few calculations, then fabricates an outer casing with the pipe flanges and footprint positioned exactly as they were on the original pump. Only the outer casing is customized to fit the installation. The cartridge is a standard replacement unit.

pump sits on a shop bench.

During the last 20 or so years, three screw pump designs have evolved to the point where they are a much more economical and reliable alternative in traditional power plant transfer and injection applications. Typical three screw pumps consist of three rotors (one power and two driven), one bearing, one mechanical seal, a liner, a casing and a bearing/seal housing.

The power rotor (coupled to driver) transmits torque to the driven rotors by a rolling contact. The pumped fluid creates a barrier between the rotating elements, both sealing the

pumping chambers and preventing metal to metal contact of the rotating elements.

Direct torque transmission via rolling contact eliminates the need for timing gears, as is required in twin screw timed pumps. Most three screw pump designs offer optional internal (product lubricated) or external (grease or oil lubricated) bearing configurations. In a majority of fuel applications, the bearing is mounted externally to the pumped fluid. Since three screw pumps are hydraulically balanced, the bearing simply positions the rotor set within the liner, thus eliminating thrust bearings or wear plates.

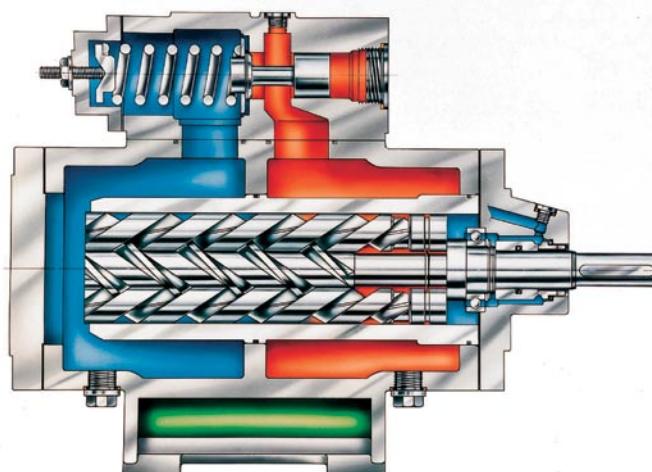
Due to their simplicity, three screw pumps are the ideal base technology behind reengineered screw pumps. Reengineered screw pumps are comprised of a new three screw pump cartridge sized to achieve the same performance requirements of the original pump and a fabricated casing. Three screw pump cartridges contain all the pumping elements: rotors, seal, bearing, liner, and bearing/seal housing. This standard pump cartridge slides into a fabricated casing that has the same flange, shaft and mounting dimensions as the original pump.

In most services, reengineered screw pumps are drop in replacements for twin screw timed pumps. Occasionally, sole plates are required to compensate for the difference in shaft location between twin screw timed pumps and three screw pumps. Depending upon the manufacturer, twin screw timed pump shafts may be offset from the pump centerline versus a three screw pump that positions the shaft on the centerline. In most cases this offset can be compensated for in the fabricated casing design, but if this is not possible, a sole plate will eliminate any alignment issues.

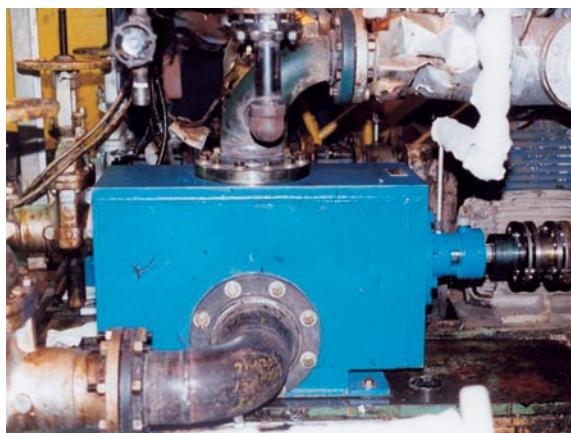
This flexible system of utilizing standard pumping elements with fabricated casings allows for the economical replacement of outdated or misapplied pumps without modifying piping, baseplates or foundations. During routine maintenance, a new cartridge can be installed in the casing without disturbing mounting or piping bolts.

Three screw pumps are simple machines with few moving parts, and almost every power plant already operates this type of pump in lube oil applications elsewhere in the plant. This means maintenance personnel are familiar with its design and can perform maintenance quickly, as the pump does not have to be retimed like a twin screw timed pump.

Since reengineered screw pumps normally cost less than a twin screw timed pump major repair kit, utilize proven pumping technology and require no hot work in the plant, they are an ideal way to improve any plant's bottom line quickly.



Three screw pumps are the ideal base technology behind reengineered screw pumps. This cross-section of a three screw pump shows one power rotor and two driven rotors, one bearing, one mechanical seal, a liner, a casing and a bearing/seal housing.



This reengineered three screw pump replaces a twin screw timed pump in the No. 6 FO (fuel oil) sector of a power plant.



This reengineered three screw pump replaces a twin screw timed pump in a refinery.

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And Headaches**



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We'll select a standard Leistriz pump cartridge that best meets your specs, and fabricate a casing to match your existing mounting, piping and driver interfaces. All you will have to do is remove the old pump and drop in the new.

- No hot work or foundation rework
- Only one mechanical seal and bearing, no timing gears
- Replaceable cartridges for easy maintenance

Leistriz

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Leistriz began the manufacture of screw pumps more than 80 years ago, its first product being a unique, 2-rotor, design screw pump for fuel oil service.

Since then the screw pump family has expanded to 3-rotor, 5-rotor and 2-rotor liquid as well as multiphase pumps. Leistriz' engineered approach means our standard products are molded to the demands of the Chemical Processing, Marine, Oil and Gas, Refining, Power Generation and Machine Tool markets. And all Leistriz pumps are built to recognized quality standards (ISO 9001 Certified) and in compliance with API and ABS standards.

Leistriz engineers design and construct complete turnkey pumping packages, including pumps, motors, base plates, piping, valving, instrumentation, monitoring and control panels and other components needed for reliability, performance and economy.

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