

Maximizing “Speed to Market” for Oil & Gas Pumps

WITH THE READY AVAILABILITY AND RELIABLE OPERATION OF ITS 811 ANSI SERIES CENTRIFUGAL PUMPS, GRISWOLD™ IS MEETING STRICT OPERATOR NEEDS AND DEMANDS IN BOTH THE OILFIELD AND THE REFINERY

By Gary L. Israel



811 ANSI Centrifugal Pumps from Griswold™ Pump Company offer a method of manufacture that ensures that the “speed to market” requirements of oil and natural gas producers and refiners are satisfied.

Introduction

The oil and natural gas boom that is taking place in North Dakota as a result of the increased drilling and recovery of the unconventional deposits lying in wait within the Bakken shale formation has had far-reaching effects. The increased oilfield activity has ignited a population boom in the state with the town of Williston resting in the epicenter of all of the new drilling activity. This has created a corresponding housing boom with *The American Oil & Gas Reporter* noting that \$350 million was spent in 2011 on residential and commercial development alone – and even with all that building activity, there are still “guys making \$100,000 a year living in their cars.”

The growing rate of oilfield activity has had a domino effect everywhere you look, with increased demand for restaurants, grocery stores, hotels, motels and RV parks, to name a few. Even businesses you wouldn’t think of in

connection to an oil and gas boom – like rental storage units – have experienced an uptick in the area, with the United States Census Bureau recently determining that Williston has become the country’s fastest-growing “micropolitan” area, i.e. those areas that feature a population ranging from 10,000 to 49,999.

What all of this growth has in common is a desire for speed, defined by the ability to get an operation up and running as quickly as possible, whether its drilling a new oil well, building a new subdivision or opening a new restaurant.

Within actual oilfield activities, speed is a crucial consideration because the quicker the waiting oil and natural gas can be accessed and fed up a well bore, the quicker it can be sold and shipped off to a refinery. When it arrives at the refinery, there are also a number of different operational considerations that must be satisfied. Therefore,

the speed of the entire production, refining and transport process relies on many different components working together. A critical one is the industrial pumps that are used in many oilfield applications. This white paper will focus on one type of pumping technology – ANSI centrifugal – that provides the performance and reliability required for rugged oilfield and refinery operations, as well as meeting the “speed to market” needs of demanding oil and natural gas production companies.

The Challenge

When it comes to optimizing operations in the current oil and natural gas boom, the command is simple: “Get it done as quickly as possible – and getting it done yesterday would be even better.” Since time is so very much of the essence in the oilfield and refinery, production companies need equipment that not only will perform reliably, but will be readily available when needed.

Today, many production companies are completing a new well every other day. This ambitious schedule demands that the necessary equipment be available at a moment’s notice. It also means that pump companies that can have their products ready for shipping at that moment’s notice – along with an available supply of replacement parts on hand should maintenance be required – have many opportunities for growth in the current oilfield-equipment market.

Meeting these speed-to-market demands can be easier said than done unless the pump company has created a manufacturing regime that combines speed and the ability to produce a quality product. These stringent standards require the best in research and development, engineering, design and execution of the manufacturing process, realizing that a pump that is rushed to the market, but doesn’t operate as expected, will have a deleterious effect on the reputation of the manufacturer.



A new Griswold™ 811 Series pump installed in a Lease Asset Custody Transfer (LACT) unit located in the Eagle Ford play in Texas. A LACT unit automatically measures, samples and transfers the oil from a lease location in the oilfield into a pipeline.

Then, when the pump arrives in the field or refinery, it must be able to consistently handle the tasks for which it was created. Horizontal drilling and hydraulic fracturing (fracking) have been the driving forces behind the rapid growth in the recovery of oil and natural gas from unconventional shale deposits. In order to function properly, this technology requires vast amounts of water, oftentimes at rates of thousands of gallons per minute, which are used as a carrier when the fracking chemicals are injected down the well bore.

Once the waiting oil and natural gas are accessed, a number of production by-products come racing up the well bore in tandem with the desired commodities. One of the more voluminous by-products produced is saltwater, which has been trapped for centuries in the formation with the entrained oil and natural gas. When the saltwater reaches the surface, it must be separated from the oil and natural gas before the production company either has it shipped away via truck or, in some cases, pumped via pipeline for disposal or re-injection into the formation.

These saltwater-handling and transfer processes can only be completed successfully if the production company uses pumping equipment that features materials of construction and a sealing medium that is compatible with, and resistant to, the abrasive and corrosive substances that can be contained in saltwater that is produced in the oilfield. In most cases, this means an iron or ductile-iron pump configuration, unless hydrogen sulfide (H₂S) – a colorless, poisonous, flammable gas with the characteristic odor of rotten eggs – is present, at which point a stainless-steel pump with stainless-steel shaft and impeller, as well as a silicon-carbide seal face, should be used with sealing methods dependent on the crude oil’s composition.

Once at the refinery, whether it was delivered by ocean-going tank ship, barge, railcar, tank truck or pipeline, the pumps that are used to transfer the oil and natural gas into and out of liquid-storage terminals, either as a feedstock or as a finished product, require around-the-clock reliability with any downtime having a potentially hugely adverse effect on the terminal’s operation and profitability.

Centrifugal pumps used in these conditions are under constant assault and must be able to perform reliably while handling a number of diverse operating characteristics, such as:

- Changes in ambient temperatures and other weather conditions, such as humidity
- Line shock from piping that is not anchored down properly
- Piping systems that have sharp bends instead of gentle curves



Griswold™ 811 ANSI Centrifugal Pumps possess the operational capabilities necessary to meet the demands of high-volume/high-flow liquid-transfer activities that are prevalent at refineries.

- Changes in the product type being pumped
- Changes in product viscosity
- High volume (unloading a 50,000-gallon tanker) at high flow rates (4,000 gallons per minute)
- Changes in product velocity and force
- Changes in head pressure

The Solution

So, faced with the unique challenges in saltwater-handling and refinery applications that are ever-present in oil and natural gas production and refinement, more and more production companies are discovering the benefits that centrifugal-style pumps can offer their varying operations. More specifically, an increasing number are choosing 811 Series ANSI Centrifugal Pumps from Griswold™ Pump Company, Grand Terrace, CA, USA, for these applications. Griswold 811 centrifugal pumps are ideal for these operations because they are robust enough to pump the thousands of gallons of produced saltwater into trucks or pipelines for disposal or reuse, as well as being able to handle the high-volume/high-flow operations at a refinery.

Griswold's 811 Series pumps, which were among the first to meet the American National Standards Institute (ANSI) centrifugal-pump manufacturing criteria that was established in 1977, have been engineered for operational flexibility, efficiency and durability. They have two times the wear area between the case and impeller when compared to closed-impeller designs, which optimizes the performance of the pump's open impeller. The open-impeller design also minimizes concentrated wear by balancing the hydraulic axial thrust load and reducing the stuffing-box pressure, which maximizes pump performance while simplifying maintenance, extending pump life and reducing repair costs.

The pump's casing can be constructed of a wide choice of materials, including ductile iron, CDM4Cu, alloy 20 and stainless steel, which should be the metal of choice in applications where the produced saltwater has a high level of H₂S. Griswold constructs its 811 Series pumps through an investment and no-bake casting process that ensures smooth, precise, superior finishes and consistent, reliable performance. Griswold also employs metallurgists that strictly supervise all heat-treating operations so that maximum durability for all alloys is achieved.

The 811 Series pumps are available in a full range of sizes, as well as offering a number of options and upgrades that can be tailored to meet virtually any saltwater-handling flow rate, up to and including 4,000 gpm (15,142 L/min). Griswold offers a wide variety of mechanical-seal options, all of which give the 811 pumps the ability to operate in temperatures up to 500°F (260°C). Other standard-setting features of the 811 Series pumps are self-tightening impellers that reduce leaks and failures; the ability to externally adjust the clearance so that peak efficiency is maintained, even after wear-area loss; and standard enhanced power frames that make them an estimated 33% stronger than competitive models.

The simple operation of the 811 Series pumps also means that they will consistently operate at their full capabilities, provided that nothing more than a routine regime of preventive and protective maintenance is followed. This maintenance routine should include the monitoring of bearing and lubricant condition; shaft seal condition; pump vibration; and changes in discharge pressures, all of which can be completed on a simple quarterly or annual maintenance schedule. These maintenance checks should be performed more often if the pump is used in severe-service conditions, such as those commonly found in oil and natural gas field operations and refining activities.



Griswold™ 811 Series ANSI Centrifugal Pumps

All of these operational traits have helped Griswold's 811 ANSI Series Centrifugal Pumps become one of the most well-respected pumps in the oil and natural gas industry, with a recent study showing that less than 1% of Griswold 811s in the field have experienced any breakdown issues. Dimensionally, the Griswold pumps are identical to all ASME B73.1-rated competitive models, meaning they can be dropped in place during replacement without the need to disturb the pumping-system setup.

Griswold has also made a concerted commitment to supplying the industry, which is epitomized by the ramped up production at its manufacturing plant in order to keep up with the increased demand from the oilfield. In addition to one of the fastest turnaround times between order and delivery, Griswold also enhances its "speed to market" reputation by having a ready supply of replacement parts on hand should an 811 Series pump ever need to be repaired.

Conclusion

It can be ironic that a natural resource that took thousands of years of languishing many miles beneath the Earth's surface to transform into a useable energy commodity is now being extracted from the ground at what can seem like the speed of light. In a textbook of example of "time being money," the strength of the modern-day oil and natural gas industry, which is being led by rapid-fire exploration and production in the United States' unconventional shale plays, relies on all types of equipment to be at the ready – and then perform reliably when put into play. Griswold has recognized the challenges within oil and natural gas production and refinement, and has responded with the 811 ANSI Centrifugal Pump, which is ideal for most critical activities along the oil and natural gas production and supply chain, and produced at a rate that satisfies the "I need it yesterday" demands of operators within the industry.

About the Author

Gary L. Israel is the Business Development Manager, Energy-Oil & Gas for Pump Solutions Group (PSG®), Oakbrook Terrace, IL, USA. He can be reached at (616) 475-9348 or gary.israel@psgdover.com. Griswold™ Pump Company is part of PSG and a full-time pump manufacturer with product lines dating back 70 years. Included among its industry-leading pump lines are ANSI, end-suction centrifugal pumps, self-priming pumps and submersible turbines. These pump lines allow Griswold to serve a broad range of chemical process, industrial and municipal applications. PSG is a member of Dover Corporation and comprised of several leading pump companies – Abaque®, Almatec®, Blackmer®, Griswold™, Maag, Mouvex®, Neptune™, Quattroflow® and Wilden®. For more information on Griswold's full line of centrifugal pumps, go to www.griswoldpump.com. For more information on PSG, go to www.psgdover.com.



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