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DIAPHRAGM PUMP SAFETY

WHEN POWERED BY NATURAL GAS

SANDPIPER® G SERIES

AIR GAS DUAL POWER

SAFETY

USING DIAPHRAGM PUMPS POWERED BY NATURAL GAS

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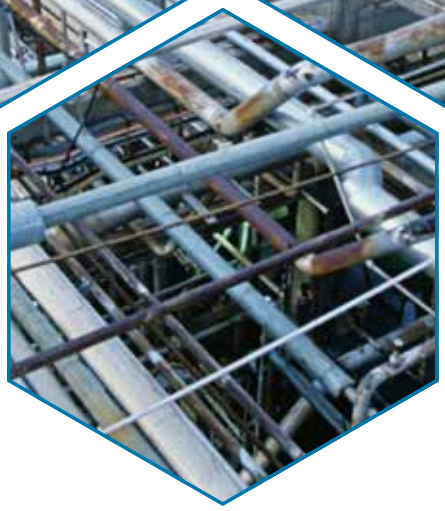
"The application of AODD pumps driven by natural gas creates a unique set of safety requirements"



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1. Introduction

For more than 30 years oil field operators and production well pump users have utilized Air Operated Double Diaphragm (AODD) pumps for a variety of applications. From drillers mud in the rig cellars to tank bottom recirculation of oil and paraffin wax, AODD pumps have played an important role in the oil and gas industry.

Over the years, natural gas has increasingly been used to power equipment due to the unavailability of electricity in many remote locations. Traditional AODD pumps are designed for use with air only. The industry's preference to use produced natural gas to drive traditional AODD pumps solves the problem of not having electricity on site and has proven to be an effective, low-cost solution. However, the application of AODD pumps driven by natural gas creates a unique set of safety requirements. Pumps used in these applications need to be able to withstand non-typical hydrostatic pressure, provide chemical compatibility with seals and elastomers, and must properly contain emissions.

Safety is of the utmost importance in the upstream, midstream and downstream processing of oil and gas. Therefore, the use of natural gas operated pneumatic pumps must be done so in accordance with certified safe operating and design parameters.

2. What is AODD versus GODD?

The first commercially available AODD pump was developed for construction dewatering in 1955.

Powered by compressed air, the AODD pump quickly became known as the best choice for portability, reliability, dry running capability, solids handling and ease of maintenance. As the years progressed, the uses for AODD pumps grew well beyond the construction industry. Today they are used in every industry where fluid transfer is required.

The oil and gas industry recognized the capabilities of AODD pumps and found uses for them in a wide range of pumping applications on drilling rigs, fracking sites, compression sites, production well pads, petrochemical facilities and refineries.

As use of AODD pumps became standard, the desire to power the pump by natural gas developed. Doing so helped lower energy costs and air compressor equipment costs. With that use came the necessity to develop safety and reliability standards for AODD pumps powered by natural gas, also known as GODD (Gas Operated Double Diaphragm) pumps. Since these standards did not exist, Warren Rupp, Inc. sought the help of the Canadian Standards Association (CSA®) to develop a safety certification.

After stringent testing, the CSA Blue Star (ANSI LC6)/Blue Flame (Canadian Technical Letter R-14)[1] standard for GODD pumps powered by natural gas was developed. CSA Certified GODD pumps are designed and tested to be powered by natural gas when installed according to the certification and local requirements.

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3. ATEX, CSA & NACE

[2]Commonly known as ATEX, Directive 94/9/EC – Equipment and Protective systems intended for use in Potentially Explosive Atmospheres (ATEX), sets out the responsibilities and requirements of the manufacturer for equipment allowed in areas where a potentially explosive atmosphere may be present. Directive 1999/92/EC sets out the responsibilities of employers and deals with the minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres. As of July 2003, organizations in the EU must follow these directives to protect employees in areas where a potentially explosive atmosphere may exist.

While ATEX is widely accepted for AODD pumps in explosive atmospheres, powering GODD pumps with natural gas requires additional safety attributes. Both ATEX and CSA Blue Star/Blue Flame standards require that pumps must be constructed to prevent the accumulation of static electric charge and fully groundable to ensure static electricity dissipation. The CSA Blue Star/ Blue Flame standard requires the following additional safety attributes for Certified GODD pumps:

- GODD pumps must withstand a hydrostatic strength test pressure of 500 PSI (five times the maximum rated operating pressure of 100 PSI).
- The elastomeric seals in GODD pumps must be tested for compatibility with the various chemicals normally expected to be found in both sweet and sour gas.
- Natural gas emissions must be contained. GODD pumps must have exhausted natural gas piped to safe locations (flare, slop pit, heater treater, etc.) per local code or CAN/ CGA B149. No emissions are allowed to leak from the gas distribution system up to 150 PSI, or 1.5 times the maximum rated operating pressure of the pump.

Because CSA Certified GODD pumps are specifically designed for use in oil and gas applications, they must also comply with NACE Standard MR0175/ISO15156 for corrosion resistance.

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4. Summary

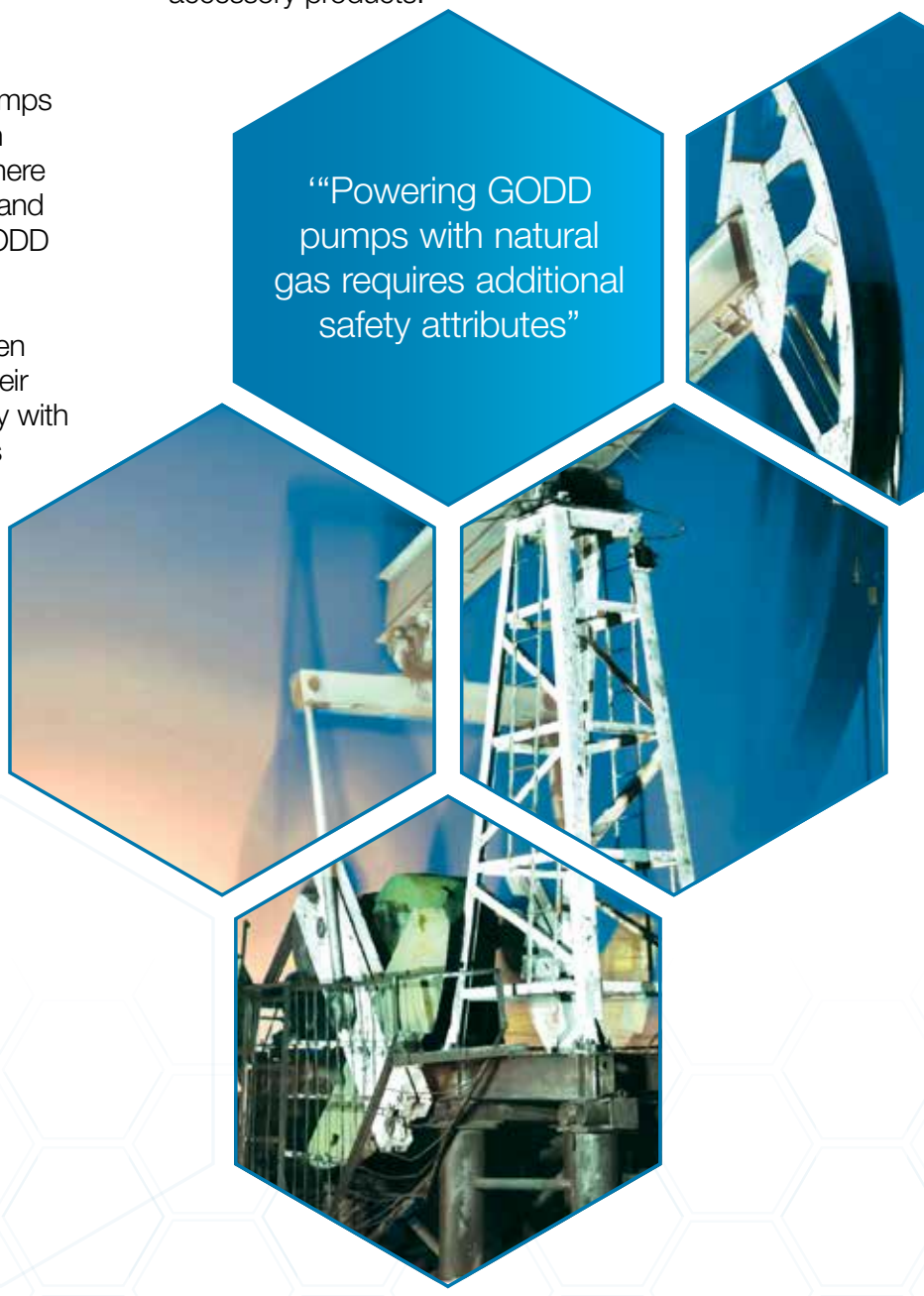
Safety is unquestionably the highest priority in extracting, producing and refining petroleum based products and natural gas. The emphasis on safe and reliable pumping technology has never been more prevalent. Powering the pumping equipment with the clean and abundant natural gas resource improves operating costs by offering alternatives to costly, electrically powered positive displacement pumps.

Warren Rupp, Inc. recognized the need to develop standards for the use of GODD pumps and led the development of a standard with CSA to define safe GODD pump design. There is now an option that eliminates the liability and risks associated with powering standard AODD pumps with natural gas.

Most AODD pump manufacturers have taken effective measures to provide updates to their latest designs and have models that comply with ATEX. However, most do not offer products certified to the CSA Blue Star (ANSI LC6)/ Blue Flame (Canadian Technical Letter R-14) standard for powering by natural gas. Warren Rupp, Inc. is the only GODD pump manufacturer that offers a full range of CSA Certified pumps. The SANDPIPER G-Series pump line is available in sizes from 1/2" to 3".

Oil & Gas operators and engineers can help accelerate the use of properly designed, safe, reliable, natural gas powered double diaphragm pumping technology by seeking out manufacturers offering CSA Certified GODD pumps and accessory products.

"Powering GODD pumps with natural gas requires additional safety attributes"



5. References

[1] CSA Certifications
http://www.csagroup.org/us/en/about-csa-group/certification-marks-labels/north-american-marks-labels

[2] ATEX
http://ec.europa.eu/enterprise/sectors/mechanical/atex/index_en.htm

Scan here to obtain your risk free trial of the CSA Certified SANDPIPER G-Series *Dual Power* pump:

Headquartered in Mansfield, OH, Warren Rupp, Inc. leads the global market with innovative, quality, and reliable Air and Gas Operated Double Diaphragm Pumps.

Warren Rupp, Inc. maintains relationships with hundreds of channel partners located across the globe. These value added partners offer expertise in a wide array of markets offering localized service.

Warren Rupp was recognized by Industry Week Magazine as one of the 6 best manufacturing companies in the country. Scan here to watch...

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