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EPG CONNECTION

Your Resource For Environmental & Industrial Solutions

The Cost of Trapped Pipeline Air

Air lock, line surges, low or no liquid flow, sudden and rapid changes in velocity, rapid flow reversal, water hammer, corrosion, and equipment failure – these are just a few possible problems found in liquid pipeline systems when air accumulates. If not removed, the effects of trapped air can lead to equipment damage and increased operating costs.

If air is trapped in your pipeline, your pumps are working harder to overcome air pockets and move the liquid. For example, if your system accumulated air last year that increased head pressure by 15%, your pumps were forced to work 15% harder (extended pumping cycles) drawing 15% more electricity. If you spent $250,000 on electricity to power your pumps, you could have saved $37,500 on electricity alone by just eliminating the air in the system.

Before we focus on how to eliminate trapped air in liquid pipeline systems, let us outline some ways air enters the system and what happens when it does.

Air can enter the pipeline through:

- Pipeline leaks
- Pump seal leaks
- Damaged joint seals
- Leaking valve packings
- Loose or leaking flange connections
- Pressure or vacuum changes
- Vortex actions of pumps
- Velocity changes
- Poorly controlled or unexpected negative pressure events
- Turbulence or eddy effects at bends, valves or fittings
- Equipment maintenance or installations
- Chemical reactions
- Temperature changes

When air enters the system, it accumulates into air pockets. Without preventative measures, these air pockets create air lock, line surges and other adverse conditions leading to increased maintenance, repair and/or excessive operating expenses.

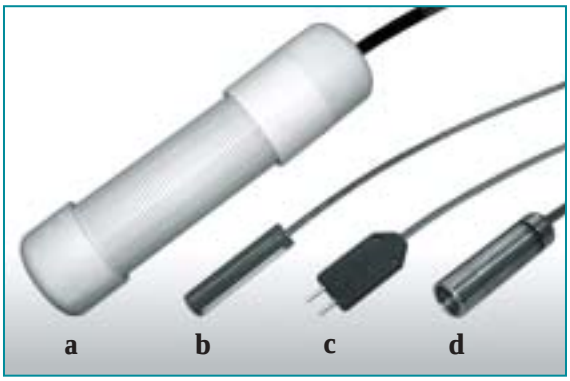
(continued on page 3)

New Sensors for Bioreactors

New Landfill Sensors Need No Field Calibration!

Research has shown that municipal solid waste can be rapidly degraded and made less hazardous by monitoring and controlling the moisture content within bioreactor landfills under aerobic and/or anaerobic conditions.

To help enhance that process, EPG has developed new sensors designed specifically to monitor and detect the moisture (a) content as well as the temperature (b), leaks (c) and pressure (d) in bioreactor landfills. These sensors are easy to install, and unlike other sensors on the market, require no field calibration. EPG bioreactor landfill sensors - just another reason why EPG has, for over 20 years, been the solutions provider for thousands of landfill professionals.



INSIDE

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Variable Frequency Drives

You're driving in your car. After about five minutes, you notice smoke billowing from your tires and a peculiar burning odor. Suddenly you exclaim, "I've been driving with my parking brake on!"

You may be thinking, that's ridiculous! Why would anyone use such excessive energy while creating such a punishing condition for the mechanical equipment involved? And yet, when it comes to liquid pumping systems, this scenario is very similar to how some pump motors operate.

The energy required to start a pump motor can be from 5 to 10 times greater than what is required to run it under normal load. Depending on the size of the system, single-speed, full-voltage pump motors suffer a great deal of heat and wear due to high torque and pressure surge during start up. When multiplied over time, motor or pump damage will occur and repairs or replacements may become necessary. If pre-mature wear or excessive energy consumption is suspected or you have a system that requires liquid level or flow control, you should consider using variable frequency motor drives.

A variable frequency drive (VFD) is an electronic controller that provides motor speed control via frequency adjustment. Standard frequency is between 30 and 60 Hz giving an operator the ability to match motor speed to fluctuating workload demand. Not only will the VFD equip the system with a "soft start" (gradually ramping up a motor to operating speed), but it will also reduce energy consumption by allowing pumps to run at lower speeds to match lower demands, drawing less energy while maintaining pumping requirements. If you want to make positive, significant changes to system efficiency and secure long-term savings, consider installing variable frequency drives for the following reasons:

- Increases equipment life and reduces motor stress
- Reduces energy, maintenance and repair costs
- Improves level and system pressure control
- Improves system utilization

Do you want to increase system efficiency and extend motor, pump and equipment life? Then contact EPG. We can help.

Note: Filters or reactors on drive output are required if voltage is 380 or greater and cable from drive to motor is more than 50 feet. A low-pass filter is preferable. Filters or reactors should be selected in conjunction with the drive manufacturer and must be specifically designed for VFD operation.

Note: Start and Stop - One second maximum ramp-up and ramp-down times between stopped and 30 Hz. Stopping by coast-down is preferable. Drive carrier frequency should be at its lowest possible setting.

EPG Sales Representative Highlights

Pumps Plus, Inc., founded in October 1988, represents EPG Companies in Michigan's lower peninsula and Indiana.

To further support this successful relationship, Pumps Plus has announced the addition of Jack Komarek (pictured) who will be representing EPG in the western areas of Michigan.

Jack Komarek joined Pumps Plus on November 1, 2004. He will call on end users and contractors. Jack has over 25 years of experience in the wastewater industry having been the Mechanical Maintenance Supervisor for the City of Holland. His knowledge and experience will be fully appreciated as he works specifically with customer applications. For more information, call the Pumps Plus office at 248-888-9000 or contact Jack directly at 616-510-0829 or jkomarek@hotmail.com.

If interested in becoming an EPG sales rep, please call us at 1-800-443-7426.

The Cost of Trapped Pipeline Air: continued

Air/Vapor Lock:

One of the most frustrating and sometimes hard-to-identify problems within the liquid pipeline system is air/vapor lock. This phenomenon occurs when a large air pocket is present in the pipeline. The liquid pressure produced by the pump will compress the air pocket, but if the pressure required to compress both the air and move the weight of the liquid in the system is greater than the pump's capacity, no flow will occur.

Water Hammer and Line Surges:

Air pockets can also create liquid flow and velocity changes within pipelines. If the pump pressure is adequate, the compressed air pocket will release, creating a sudden and rapid increase in line surges, pressure spikes and flow reversals. These are the destructive water-hammer/shock effects that over time, damage pumps, fittings, joints, and valves. If not eliminated, air in your system will increase head pressure, extend pumping cycles, increase operating expenses and eventually damage equipment.

How to Eliminate Pipeline System Air:

Sometimes air is removed from pipelines with a manual vent during startup but this method does not provide the continual air release needed during operation. The air pockets will eventually migrate to high points within an operating pipeline system. Air valves should be placed at these points to vent accumulated air and admit air to prevent vacuum conditions and/or air related surges. The three basic types of air valves that can be used include:

- Air Release Valve
- Air/Vacuum Valve
- Combination Air Valve

The Air Release Valve has a float and linkage mechanism that senses and releases air under pressure but it is usually limited to the amount of air it can admit and exhaust. Pipelines equipped with this type of valve usually require additional air release. This can be accomplished by using Air/Vacuum Valves.

The Air/Vacuum Valve exhausts air during pipeline filling/start-up via a float that rises with liquid level. In addition, if a pressure loss or vacuum condition occurs, the float will drop and air will be admitted into the pipeline. This float can also be used to aid pipeline draining but under normal operation, this float is held closed by pipeline pressure and will not relieve trapped air.

The Combination Air Valve combines the function of both the Air Release and the Air/Vacuum valve. We recommend using this air valve because it contains an air release orifice and a vacuum port in one assembly and, unlike the other valves, it can be used at high points and at any point in the pipeline system, providing added air release and protection. On smaller units, the float and release mechanism is designed as one compact assembly. On larger units, a dual-body design, consisting of an air release valve piped into an air vacuum valve is used. This dual-body design provides the convenience of isolating one valve for maintenance while the other valve continues to operate and it gives designers the freedom to specify different size valves to accommodate almost any size application.

In Review:

If you operate a liquid pipeline system with improper or no air release protection, trapped air is robbing system efficiency and increasing operating expenses. Without preventative measures, the affects of accumulated air can damage your system. If you are experiencing or suspect low system efficiency, air/vacuum lock, line surges, low flow or have equipment problems, we can help. Call EPG and ask for a pump system specialist.

EPG People...

"Good morning, EPG Companies," greets Sarah as she faithfully starts another day as EPG's receptionist. Not only does Sarah Iverson promptly direct each call to its appropriate destination, but she also compliments the office staff with her ability to competently provide O&M, filing, invoicing and job status support.

Sarah has been with us for over two years. She has enjoyed serving in the variety of busy tasks assigned to her and she is always happy with the opportunity to learn new office and computer related support services.

So when you call EPG Companies, say "Hi" to Sarah and let her know that she is greatly appreciated for all her diligent service.

In her free time, Sarah enjoys reading, quilting, camping and just spending time with her husband.

Sarah Iverson

Product Highlights

Combination Air Release Valve

The EPG Model 4415 Combination Air Release Valve is an air/vacuum valve and an air release valve combined in one compact unit. The Model 4415 releases large volumes of air from a filling pipeline, closes when the pipeline is filled, and reopens to admit large volumes of air should pipeline pressure drop. It features a unique kinetic shield that isolates the kinetic float from the air flow to prevent it from being blown closed. The inverted "U" kinetic float, however, is modified to include a small orifice and then works together with the automatic float to release the accumulated air pockets in pressurised operating systems.

Portable Liquid Level Monitoring

The new EPG portable LevelMaster™ Stand Alone (LMSA) 500 Liquid Level Monitoring System is designed for sites that require only occasional monitoring and displaying of liquid levels in sideslope risers, wells, tanks, sumps, reservoirs, and settling ponds. The LMSA 500 can be conveniently carried in the cab of a vehicle and operate from 12 Volt DC power. The system includes: LevelMaster Liquid Level Meter, NEMA 4X weatherproof, non-metallic enclosure, on/off switch, fuse, weather-tight signal cable receptacle, removable five foot power cord with heavy duty lighter plug and ample room for power cable storage.

EPG Upcoming Events

LANDFILL GAS SYMPOSIUM '05	EPG TRAINING '05	EPG TRAINING '05
March 7-10	Pumps & Controls Service School	Advanced Field Service School
San Diego, California	March 14-16 & April 4-6	March 16-18, April 6-8
	Maple Grove, Minnesota	Maple Grove, Minnesota