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Optimizing Metering Pump Application Accessories Save \$\$\$\$

by Dave Walker, General Manager, Primary Fluid Systems Inc

During these times of economic constraint and increasingly stringent environmental and occupational health and safety regulations, it becomes imperative that applications requiring the dispensing and metering of expensive and hazardous chemicals be accomplished with the utmost accuracy, care and control.

For typical applications, when excess chemical is dispensed into the service, addition of another chemical is required to offset this action, resulting in increased expense. Conversely, if enough chemical is not dispensed into the process, the batch may be unsatisfactory for use and discarded and the processing repeated at further expense. Environmental and safety concerns are also important considerations.

The following is a general outline covering typical metering pump applications, and the accessory items that have been developed to help enhance the performance of your metering pump, for the optimum control of chemical being used.

Electronic & Motor Driven Metering Pumps

Whether diaphragm or piston style, these pumps generally incorporate check valves as the mechanical source to isolate the flow of the chemical, at each stroke of the diaphragm or piston. The response time of the check valve assemblies, enabling them to reseal at the end and beginning of each stroke is essential to the performance and continuous accuracy of the metering pump.

Back Pressure Control Valves

Many metering pump applications dispense to atmospheric conditions or into a process with less than 20 psig pressure and more typically, into a process with erratic system pressure. These applications require back pressure to ensure a constant pressure for the discharge check assembly on the metering pump to work properly. It is crucial that a back pressure control valve such as **TOP VALVE** be installed in the discharge piping

of the pump to ensure a constant pressure for the discharge check assembly to work under. This allows for the repeatability of a constant fluid discharge per stroke, and accuracy desired. Additionally, **TOP VALVE** back pressure valves automatically provide *anti-siphon* protection and are available in a variety of sizes and materials.

Calibration of Metering Pumps

Typically, metering pumps are used without proper calibration. The manufacturer provides a performance curve detailing the general discharge capacities of the pump. These curves are normally derived under controlled conditions, using water as the testing fluid. Given the large variety of chemicals available, with varying viscosities and specific gravities, and the wide differences in suction conditions on the pump and discharge piping, it is only reasonable that each application needs to be calibrated individually. Calibration must be repeated from time to time due to wear and vibration in the system.

ACCUDRAW calibration cylinders are available in PVC or polypropylene construction in standard sizes from 100 ml to 20,000ml. The standard polypropylene cylinder meets ISO requirements and is priced comparably to general plastic lab cylinders. They provide an excellent way to periodically check the performance and accuracy of your metering pump.

Pulsation Dampeners

Pulsation is another problem that is typical with most metering pumps, and in some cases cannot be tolerated by the application. **ACCU-PULSE** pulsation dampeners are available in a variety of sizes and material for such situations and help remove a high degree of pulsing and surging in the line. They only work if installed properly, in the right order in the line, and with the right pressure bladder to offset the incoming pulsing. It is important that the directions supplied by the manufacturer regarding recommended set pressure and location of the dampener be adhered to.

Strainers

A strainer on the suction feed line is another item generally overlooked and can contribute to the proper operation, life and accuracy of the components down stream.

Small bits of debris often find their way into supply tanks and will foul the function of the check assemblies, imbed themselves in the diaphragm or score the piston and cause premature failure of the pump. If the pump allows this debris further down stream, you may see failure of the back pressure valve or pulsation dampener or even more typically, the injection valve will get fouled and fail.

The strainer should always be installed, periodically checked and cleaned. This will give a large pay back by ensuring the uninterrupted service and longer life of vital and more expensive components downstream.

Inline Pressure Relief Valves

When using motor driven pumps or solenoid pumps capable of higher pressures than your line is designed for (i.e 150 psig), an inline pressure relief valve such as **TOP VALVE** must be installed to protect the line from overpressure and possible splitting which could cause uncontrolled discharge of hazardous chemical into the area. Always install the pressure relief valve in the line closest to the discharge of the pump and ensure that there are no isolation valves or components capable of closing the discharge line off prior to the relief valve. **TOP VALVE** is available in a wide range of materials and sizes with adjustable pressure settings.

Safe Line Maintenance

When installing a metering pump system, it is always imperative that you install as many unions in the line as possible to allow for ease of maintenance and repair of the various components used. Typically, this can easily be accomplished with the use of true union valves, which also serve the purpose of isolating valves.

When handling very hazardous chemicals and indeed any chemicals, always remember to design your piping system with a way to drain off the chemical and vent any built up pressure before service begins. This will prevent most of the spillage and reduce potential hazard in the workplace.

Tee off the discharge of the pump at the lowest point back to tank or install an inline pressure relief valve such as **TOP VALVE** that has the ability of venting back to the feed tank or calibration cylinder when set at "0" psig.

Foot Valves

When drawing from a chemical feed tank using suction lift to the pump , always install a foot valve on the end of the suction line and ensure it is kept a minimum of 3 to 6 inches from the bottom of the supply tank. This will reduce the possibilities of picking up any solids from the feed tank that may foul your system. Try to keep the suction lift to a minimum and follow the instructions regarding suction lift supplied by the pump manufacturer.

Injection Valves

A check valve, normally spring loaded is used for the purpose of isolating your discharge chemical line from your process line. Most metering pump manufacturers supply a standard injection valve with their pump. This valve should be utilized and installed at the point of injection and have an isolation valve in close proximity. There are all types of injection valves available to accommodate the various requirements of injection needed, dependent on the process pipe line size and volume. PFS Injection Quills ensure that the chemical is fully dispersed into the centre of the process line and provide for a more homogenous mix in the pipeline. A built-in check prevents back siphoning.

Conclusion

Properly designed, installed and maintained metering pump applications should provide dependable and accurate service with minimal downtime. In order to minimize maintenance and system problems, and optimize the efficient use of chemicals, a modest investment in the suggested accessories is recommended.

If you have any questions regarding application installation or applications that are a problem and/or continuous expense, please contact our office for some free and friendly consultation.

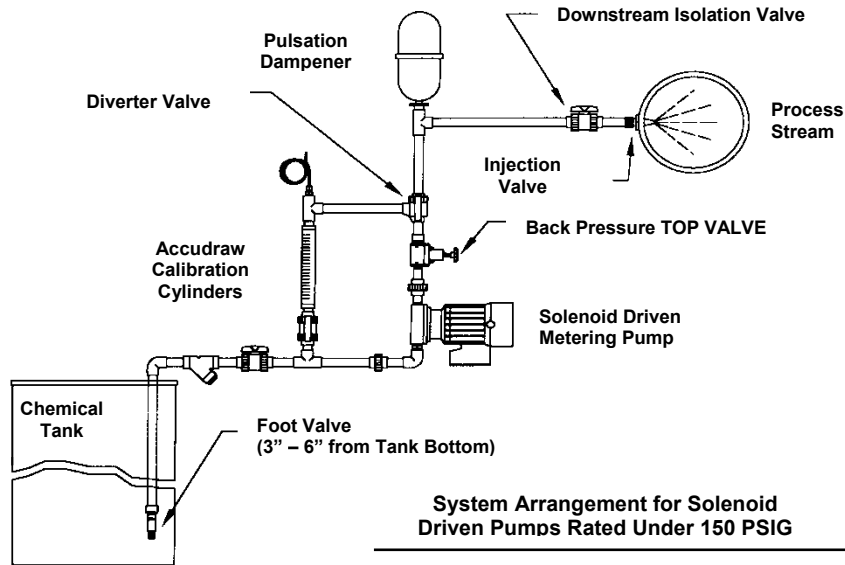
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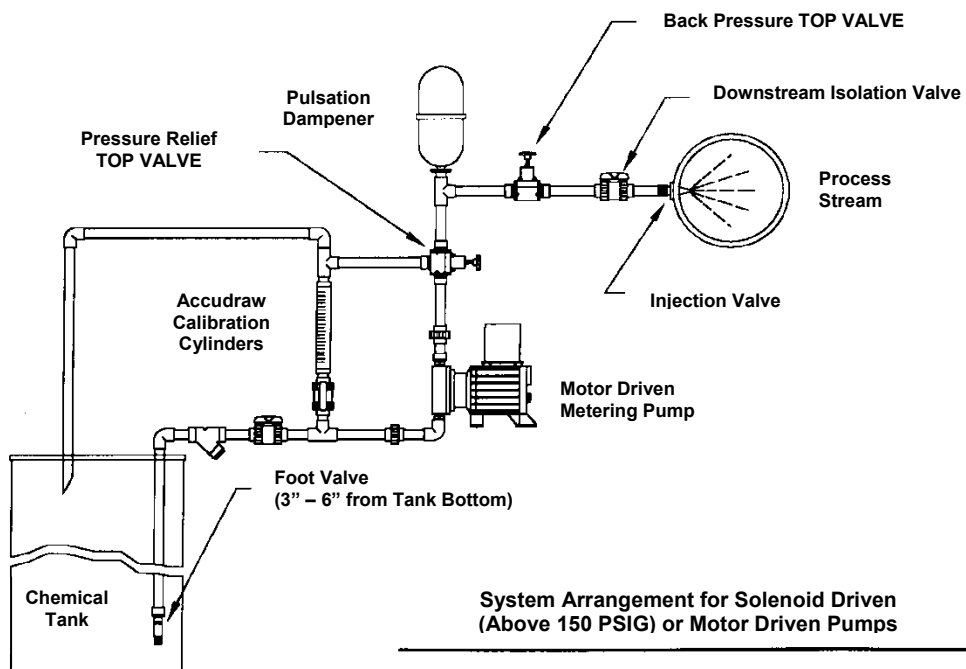
Typical Installations

The installations below are typical installation examples only. Consult your engineering department for the appropriate installation of your application or call Primary Fluid Systems Inc. for advice

Example A: Solenoid Driven Pumps Rated Under 150 psig



Example B: System arrangement for solenoid driven (above 150 psig) or motor driven pumps

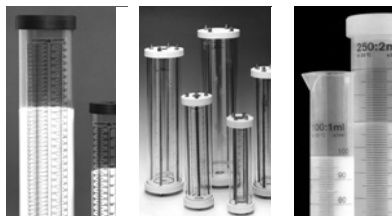


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Metering Pump Accessories Save \$\$\$\$

Prevent unsafe and inefficient systems by design.

ACCUDRAW Calibration Cylinders



PVC Glass Poly

- PVC, glass, polypropylene
- translucent, chemical resistant
- coloured graduations and lettering
- threaded or socket connections
- standard sizes 100 ml to 20,000 ml

Custom built in other sizes and materials.

TOP VALVE Back Pressure/Pressure Relief



Designed to enhance the accuracy and safety of your metering pumps.

- long life diaphragm
- range of 0 – 150 PSIG
- air release, optional gauge port
- PVC, CPVC, PVDF, Teflon, polypropylene, stainless, Alloy 20 and Hastelloy C
- 7 sizes 1/4" – 2" NPT
- color coded handles indicate size
- higher pressure & temperature available

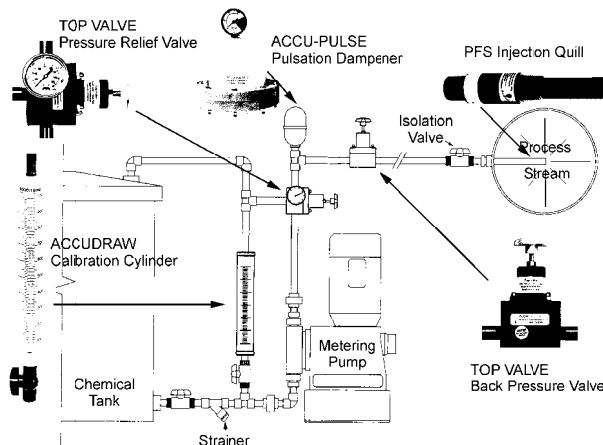
ACCU-PULSE Pulsation Dampeners



Designed to remove pulsating flows from positive displacement pumps.

- increase system efficiency and pump life
- decrease maintenance and costs
- protect pipes, meters, valves and instrumentation from pulsation and vibration
- ensure meter accuracy, longevity and repeatability
- prevent foaming and splashing
- extensive range of materials and sizes
- lightweight, compact design

Typical Metering Pump System



AutoCad drawings available from our web site.
Visit www.primaryfluid.com

*PAT 5,857,486/5,944,050

PFS Injection Quills



Designed to inject chemical into the center stream of process.

- provides for a more homogenous mix in the pipeline
- built-in checks to prevent back siphoning
- 2 sizes 6" and 8" length
- PVC, CPVC, PVDF, polypropylene, stainless and Hastelloy C
- pressure to 3000 PSIG
- temperature to 260°C (500°F)

Custom built in other sizes and materials.

Accu-Vent



Designed to automatically vent gases and vapours.

- vents gases and vapors released from Sodium Hypochlorite, Sulfuric Acid & Hydrogen Peroxide
- CPVC (Corzan) and Viton corrosion resistant wetted materials of construction
- specially designed float material automatically vents built up gases on system start up and under working pressure
- standard 1/2" or 3/4" NPT threaded connections or optional socket weld
- available in other materials

PFS Corporation Stops



Designed to inject chemical into the center stream of process.

- isolation valve allows for ease of maintenance
- available in 6 materials of construction
- wetted components have comparable or greater chemical resistance than quill construction material
- standard and custom lengths available
- connection in NPT, metric or flanged

Custom built in other sizes & materials.



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