

# The Value of Pre-Engineered Metering Pump Systems

By: David Ruff

Pre-Engineered chemical metering pump systems provide outstanding benefits and value to the system design engineer, the installing contractor and the end user of the equipment. This article addresses the reasons why you should consider using a pre-engineered system for your next metering pump application.

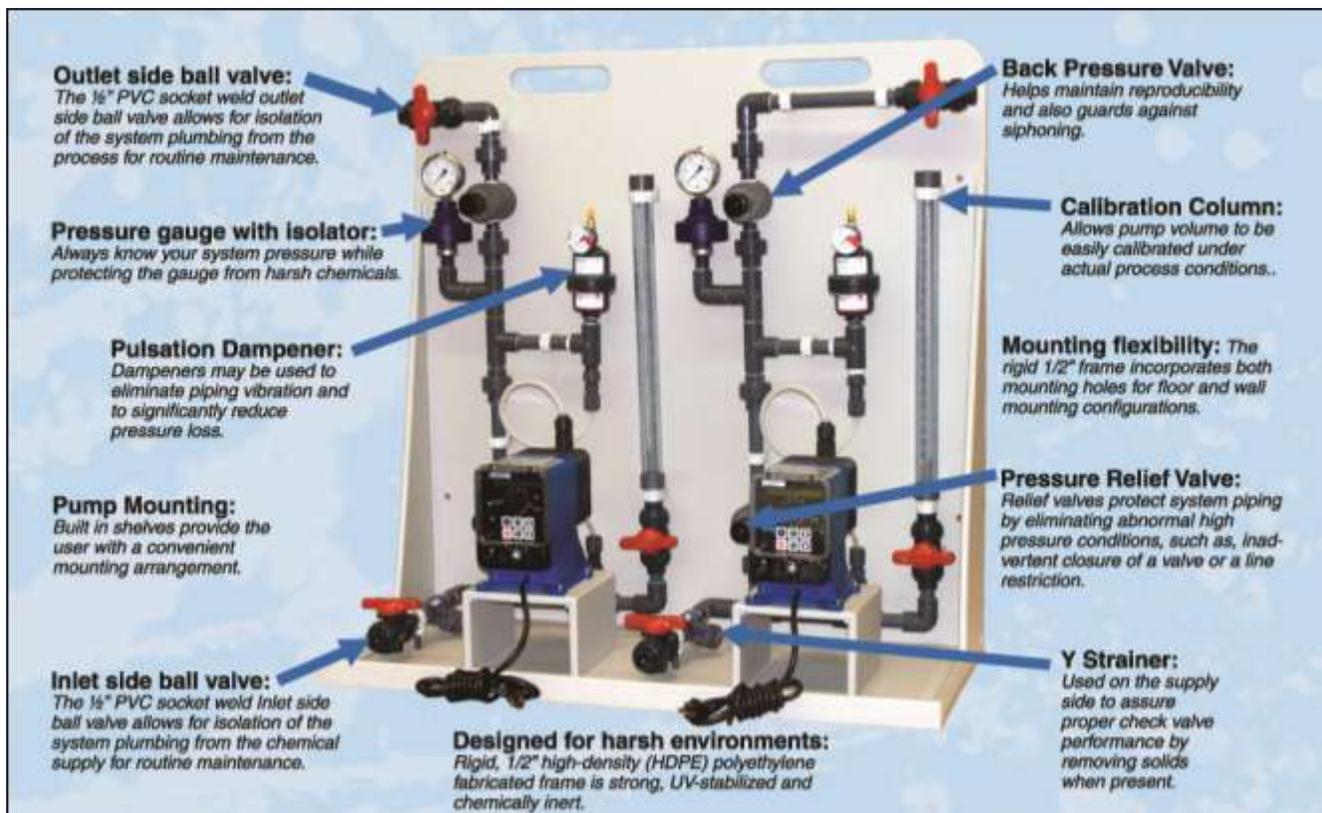


The fact is that chemical injection pumps, like a solenoid metering pump, require a few other common pieces of equipment to round out a robust injection system. Pre-Engineered systems provide a variety of enhancements for chemical metering installations, including:

- Reduced pressure pulsations and piping vibration
- Good back pressure for reliable pump performance
- Protection against chemical siphoning
- Calibrated injection rate against actual system pressure
- Protecting the pump and piping against over-pressurization
- Knowing the pressure developed by the metering pump
- Preventing foreign materials from plugging the pump or injector
- A drip basin to collect any chemical that does find its way out
- Providing a safe, rigid place to mount and protect this equipment

We all know that it is common practice to set a metering pump on the top of a drum of chemical, drop the suction line through the bung, and install the discharge line directly to the process. Well, although this may be acceptable for many 'simple' systems, this type of installation does not meet the needs of systems that require accurate and adjustable dosing, and it's a safety concern. How can you defend this installation the day after a system failure and chemical spill that may have resulted from any of the items in the list above?

These packaged systems have been *Pre-Engineered*, meaning that you do not need to specify or customize every item; simply select the flow & pressure requirements, piping material and single or multiple pumps; the manufacturer will do the rest. Many manufacturers can supply single pump systems, right through multiplex systems for multiple chemicals or lead/standby redundancy. Let's move on to the equipment and what it does to ensure a robust and safe system, and then we'll talk economics.



**Rigid Piping with Unions:** Available in a variety of materials like PVC, CPVC, PVDF and Stainless, you benefit from pressure tested joints, rigid mounting points, and union connections which allow for easy component maintenance for long service life.

**Inlet & Outlet Ball Valves:** Allow for easy connection to the rest of your system, easy change over from lead to standby, and quick isolation of the pump and equipment when the unexpected happens.

**Suction Y-Strainer:** Keeps debris from fouling the pump valves or the injector. A fouled injector is one of the leading causes of over pressurization, causing pump failure at best and in the worst case, a ruptured high pressure chemical line; remember that safety concern?

**Calibration Column:** A metering pump has a different flow rate based upon the pressure of the system that it is injecting into. There is absolutely no way of knowing the actual rate of chemical delivery unless you calibrate the pump flow at system pressure. The calibration column is a permanent part of the system so that you can re-adjust the pump any time a system parameter change occurs, or after servicing the pump or other equipment.

**Pressure Relief Valve:** Remember the plugged injector situation? The PRV diverts the high pressure pump flow back to the suction side if the discharge side pressure rises above the set point. When coupled with a flow verification device on the pump, there will be an alarm signal indicating that no chemical is being delivered, even if everything appears normal.

**Back Pressure Valve:** This device maintains a consistent pressure against the pump, providing good reproducibility of the metered flow. It also prevents siphoning of chemical through the pump should the elevation of the installation or the pressure of the chemical on the suction side surpasses the level or pressure on the discharge side of the pump.

**Pulsation Dampener:** This device absorbs the pressure pulsation generated by the pump during the discharge stroke, and returns that flow & pressure to the system during the pumps suction stroke, resulting in uniform chemical flow. The dampener also greatly reduces vibration in the piping, preventing pipe joint fatigue and failure down the road.

**Pressure Gauge with Chemical Isolator:** A visual indication of the pressure developed by the injection system at all times. The isolator keeps the chemical out of the gauge for long service life.

**Rigid Mounting Skid with Drip Basin:** Designed for floor or wall mounting, all components are secured from damage and arranged for intuitive understanding of the process flow, as well as quick service later on. The drip basin collects any accidental discharge of chemical, from routine component maintenance or piping failure.

The economic considerations are far more complex than a simple comparison of the price list of components vs. the purchase price of the system. Even in this direct comparison, in most cases you will find that the value of the pre-engineered system is obvious. When considering the cost of each component, the interconnecting piping, the assembly layout, pipe cutting, gluing, testing, leak repair, and compare that to the other things that you could be doing to add value to your business during that time, the benefits of Pre-Engineered systems becomes very clear. For the specifying engineer, these easy to select systems ensure that the end user is provided with the proper components for a trouble free installation; removing uncertainty and time consuming oversights.

Not only do these systems look great, they provide a safe and reliable platform for chemical injection. Miscommunication (or simple misunderstanding) is far too common between system engineers, installing contractors and end users on these vitally important chemical injection systems. It does not matter which function you perform in this business; specifying a pre-engineered skid in place of a laundry list of components, will go a long way to protect against an improperly functioning system.