

# Suction and Discharge Stabilizers

## TECHNICAL BRIEF

### Introduction

Why reciprocating pumps require pulsation stabilizer:

- Early failure of plungers, valves, seats, springs, and packing
- Piping and connection fatigue
- Loss of pump efficiency
- Excessive downtime

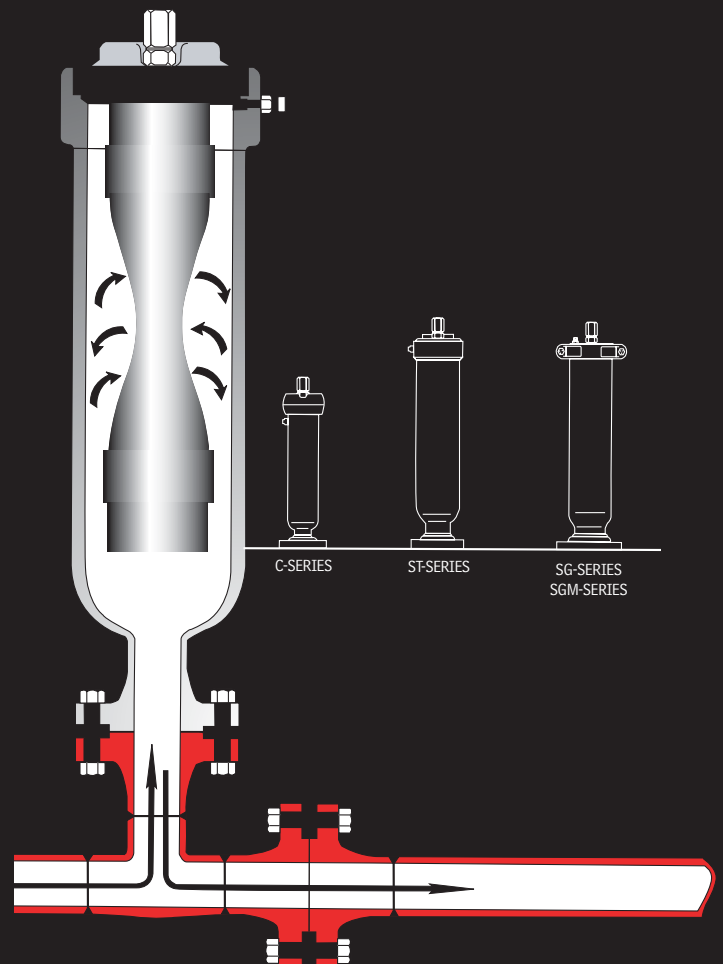
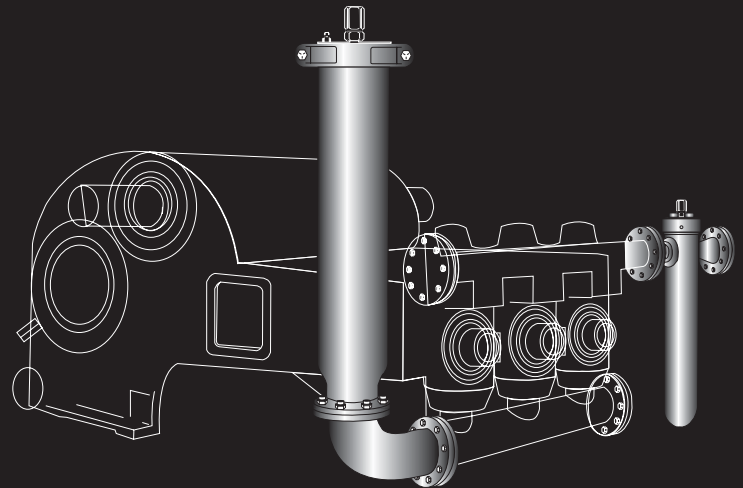
These are the more common problems in the fluid ends and piping systems of reciprocating pumps that result in unnecessarily high maintenance costs as well as unsafe conditions. The cause? Pulsation.

### What is Pulsation?

A pulsation (or pressure surge) is a variation in pressure within pumping systems caused by the inertia of the fluid column being accelerated and decelerated. The magnitude of these pressure surges depends upon the characteristic of each particular pumping system. The number of plungers (pistons), bore and stroke length, crank angle, and piping configuration are generally the more important factors to consider. Multiple pumps with common suction and/or discharge headers tend to experience additional problems with overlapping pressure surges and harmonic interference. Regardless of the magnitude, most positive displacement pumps used in the industry today encounter pulsation.

### Suction

The majority of pulsation problems can be prevented by first correcting the suction side of the pump. In order for the pump to operate smoothly, it must have a consistent, even flow of liquid into the suction. In other words, the fluid must remain in contact with the face of the plunger at all times. The very nature of the action of a plunger is





semiconductor



thermal



mechanical



wear



fluid



electronic

### (Suction cont'd)

detrimental to complete cylinder fill and that, coupled with the inertia of a fluid column, results in incomplete cylinder fill (or cavitation). Acceleration head is the pressure required to overcome inertia effect and accelerate fluid as the pump suction demands. With a high acceleration head that is not compensated for, the fluid breaks contact with the plunger and a vacuum exists within the cylinder. This occurs just before mid-stroke. As the plunger decelerates, the fluid rushes in, filling the void and building a high pressure on the plunger face. Upon the reversal of the plunger, higher pressure causes abnormal valve action that can be detected throughout the system. These pulsations exist even when the suction is pressurized to a higher level.

The installation and proper tuning of a CoorsTek® suction stabilizer will help to create steady, non-varying flow conditions into the fluid end of the pump – thus steadying the system pressure as well. The CoorsTek cartridge immediately absorbs the flow surge that occurs after midstroke and again when the plunger reverses direction. The energy is processed by compressing the nitrogen-charged rubber cartridge in the CoorsTek unit. Not to be confused with the less efficient “surge accumulator” models, the CoorsTek cartridge actually compensates for each pressure variation as it occurs. This allows the unit to stabilize the flow of fluid into the fluid end and to overcome acceleration head with maximum efficiency—resulting in a complete cylinder fill.

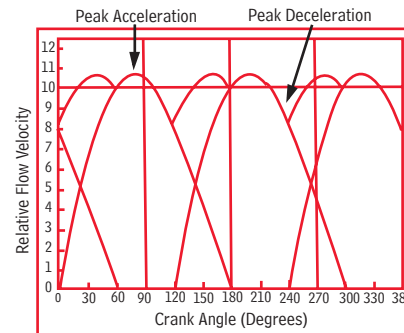
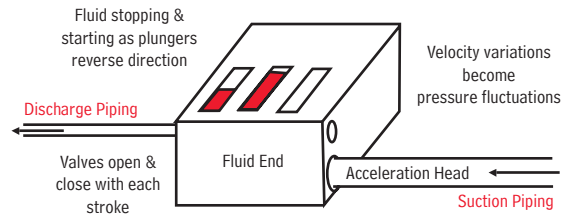
### Discharge

Difficult piping configurations on the discharge side, especially multiple pumps with a common header, usually result in severe pulsations in the piping system. This also affects downstream components such as meters,

gauges, valves, and the flowline itself. The CoorsTek discharge stabilizer absorbs and evens the flow from the pump with the same type of cartridge function as the suction stabilizer. It also helps to eliminate harmonic interference in multiple pump/common discharge installations.

### Solution

In addition to lower maintenance costs and reduced downtime due to system failure, the stabilized pumping system permits increased pump speeds and yields higher volumetric efficiencies. To achieve desired results in your pumping systems, we provide a full line of CoorsTek pulsation stabilizers.



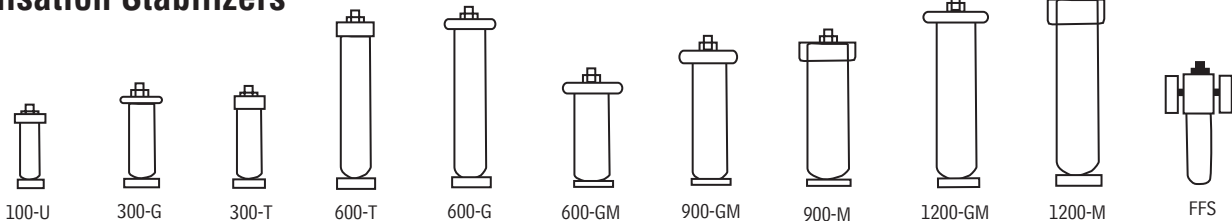
Triplex, single acting. (throws set at 120° produce an overlap of 60°) 6 pulses per crankshaft revolution at 300 rpm produces 30 pulses per second.

Maximum Relative Fluid Acceleration : 107%

Maximum Relative Fluid Deceleration 82%

A Flow Variation of Approximately 25% exists.

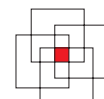
## Pulsation Stabilizers



**CoorsTek, Inc.**  
7700 South Bryant Street  
Oklahoma City, OK 73149 USA

800.572.5791 toll free  
405.601.4371 tel  
405.208.4510 fax

oilgas@coorstek.com  
www.coorstek.com



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