

**P23** Halving the cost, and tripling the performance of pulsation dampening multiplex power pumps

*PUMPS make FLOW, SYSTEMS cause PRESSURE, pressure pulsation is a system response, AND a system responsibility NOT a pump manufacturers liability.*



**Triplex, Quintuplex, Septuplex "power pumps" And Pumps supplied to API 674 with PULSEGUARD® "pulsation suppression devices"**

For long life of system components, Ex RO membranes and a multiplex pump always specify a no moving parts **WaveGuard** Wag/Cer.

**WaveGuard** ② Ceramic balls. Vertical self draining

**PumpGuard** ① Negative head lift. Foam

When pipe length natural shake rate = pump RPM, the result is pulsation

**BEFORE** Cavitation Pipe response Pipe line, high pressure response pulsation and resonance.

**AFTER** SUCTION | DISCHARGE Pump flow induced fluctuation only.

The before and after oscillograph traces were taken from a deep hole boring machine, the pumpage was cutting oil. The problem was that the pressure pulsation caused cutting tool "chatter" and showed up as bad surface finish & less than 20% life of the ceramic/carbide cutting tool tips.

Discharge pulsation often comes from poor suction conditions.

**PipeHugger** ④ upto 3" pipe. The ultimate in high frequency negative transient prevention stops suction side bubble generation.

**PULSEGUARD IS DISSIPATED BY LARGE RATIO OF CONNECTION DIAMETER TO DAMPER DIAMETER**

BOTH AT ONE END SAVES SPACE

Liquid side up stops bubbles collecting

**WaveGuard** ② Guards against pressure wave generation. For pipe systems 3" diameter through 12".

**WaveGuards** have no moving parts, and no foam to clog and degrade.

The **WAVEGUARD** disperses pressure transients over a longer time base, and reduces their amplitude. WaveGuards are not flow fluctuation accumulators

**PumpGuard** ① Guards against pump suction cavitation. For pipes 3" diameter through 12" diameter.

**PumpGuards** have no N<sub>2</sub> (nitrogen) or air pre-fill or "pre-charge" requirement. Where ever possible use a bend with radius not less than 5 pipe diameters. "A 5 D bend"

The **PUMPGUARD** is a method of providing for pump instantaneous suction needs in large supply pipes without acceleration head loss. \*\*

\*\* LOSSES OCCUR FROM ATTEMPTS TO CAUSE INSTANTANEOUS FLOW REVERSALS IN A SINGLE CONNECTION \*

When you see a damper or a pump of particular interest, please request literature dedicated to that subject.

**TALL AND SLIM PipeGuards, A LOW COST METHOD FOR EXTERNALLY CORROSIVE ENVIRONMENTS since '65**

**PipeGuard** ③ Type- Pig/HP-TW Guards against pipeline fatigue.

\* Pressure pulsation, travels through out a system at near 4000 mile per hour, say 300 faster than flow velocity. Catching pressure waves travelling faster than the fastest bullet, requires intercepting them.

**PulseGuard® PIPEGUARD Pig/TW series** "flow-through" dampers have intercepted pressure pulsation since 1965, and are proven 300% more efficient than copies with only one connection. And 250% better than copies with add on false flow through bottoms. Ex stock - 1/2" thru. 2.5", 500psi - 15,000psi all stainless.

A "Septuplex" reciprocating 7 plunger pump, with each 180 degrees of displacement being overlapped by 128 degrees, has "no" flow fluctuation, but lots of VALVE INTERACTION.

System response to Valve interaction is a major cause of high frequency pressure pulsation. \*

\* How many one connection silencer mufflers, filters, capacitors, have you seen ?