

**The COST \$\$ of Multiplex A614 PUMPS
with Various PULSEGUARD Dampers**

**Multiplex pumps, overlapping displacemen, pressure interception.
System response is high frequency pressure pulsation.
Isolate pump-system, "interception" guarantees smoothness.**



420 rpm, 5 plungers 50mmD 100mmStk. 400L/M 4.5 M/sec. 2" Sch 160 pipe, 190ml pulse Vol. (say 105 USGM) 35 Hz. frequency @ +/- 30 bar on a 200 Bar nominal (say 3000psi) system. With a 5 Litre (1.25 Gal) single flange Accumulator.

2 pcs. 316 2" T sch 160@ \$195
5 pcs. 316 2" 1500# @ \$115
8 Hrs fit-up and welding @ \$62.50/hr.
4.5 hrs. NDE QA & Hydro \$280
300 in3 SS wetted Acc. C/W 2" 1500# face \$1,969

3.) Total \$3,714

Realized a "T" could be save by connecting Pi to the second port of a standard damper, they saved themselves a bunch of money. But Td off line it still didn't dampen. The dead branch leg couldn't respond in 0.014 of a second, & Pi couldn't detect any pulse!

1 "T" & 3 Flgs. \$440
5 hrs fit and weld \$315
Standard twin port all SS Flo-Thru Damper, Flgd.

2.) Total \$2,530

Finally - the disturbance was directed through a one third sized, true flo-thru. 3 ported DAMPER
RESULTS: Pressure pulsation less than 1.5 Bar.
Accumulator volume reduces flow fluctuation, --but dampers intercept system pressure response.

No Ts no Flgs. \$0,000
PipeHugger TW Flgd. C/W P.I. tap \$1,825

Total \$1,825

Fig. 3

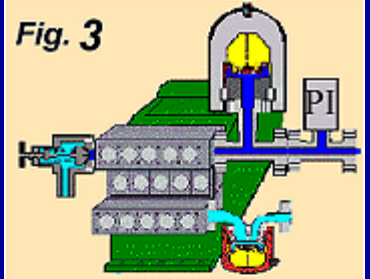


Fig. 2

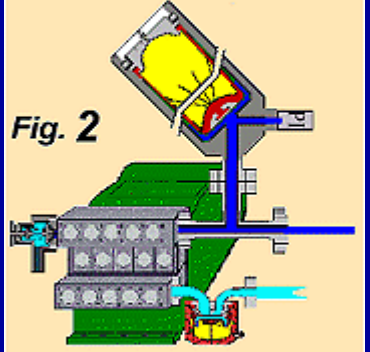
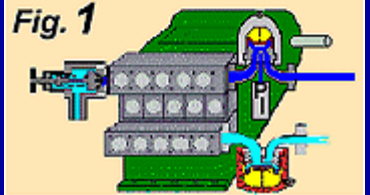
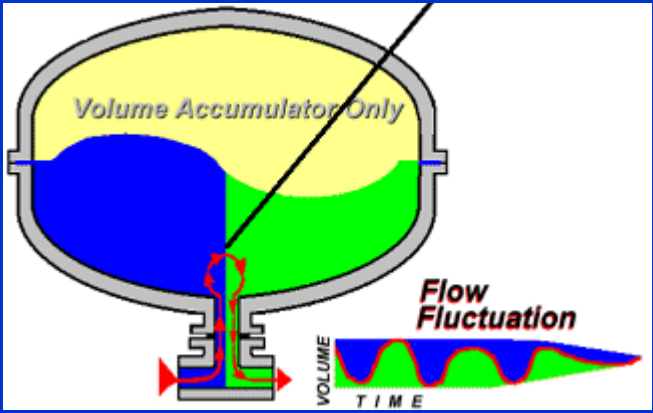


Fig. 1



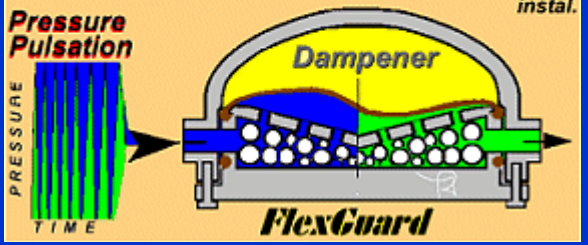
There is always more than one pump cylinder sucking, always 2 blowing, the check valves of each are influenced by the other, high frequency pressure pulsation is the system response. Installing an interceptor damper between pump and system isolates forcing action from the system response, pressure pulsation and flow fluctuation are cured.

Because flow is so slow, there is time to flow up, come to a stop, and flow back down a "T" on the other hand, whatever the residual pressure pulsation level is, it will fly straight past a "T".



Mass of liquid in a pipe is transferred at not above 180 inches/sec or say 460 cm/sec

A Pulsation Dampener intercepts pressure pulsation and smooths flow fluctuations; *is smaller & costs less to instal.*



Pressure in a fluid travels at, Mach 1 (in Air)
In harder substances (liquid) is transferred at up to 4000 MPH, or say 140,000 cm/sec.

CONCLUSION:- With 300% greater efficiency, because flow fluctuations & pressure pulsation are forced to see the inside of PULSEGUARD PULSE DAMPERS, are more compact vessels and DO MORE WORK FOR A LOWER COST. Hence the saying:-

Dampers that do, flow goes through. BUT pressure pulsation is caught