TO ENSURE A SMOOTH SYSTEM, YOU NEED TO ASK YOURSELF

As pulses are NOT a pump problem, answering these questions will enable the user to have a smooth trouble free system.

Pipe Parameters that dramatically affect pulsation level:

1. Size 2. Schedule or Wall thickness 3. Length 4. Is an isometric available
5. Material a) Metal b) Plastic c) Hose i. cloth re-enforced ii. metal braid
6. Pipe Connections a) Threaded size type b) Flanged i. size ii. rating

A - when liquid flows straight to a barrel, you do not see pressure pulses, but when it flows in a long pipe, you have pulses, & the larger the pipe the worse the pulse (because there will be no pressure drop to dissipate it.) Using the same pump in either case, it can only be the system that has changed.THEREFORE, the only conclusion is that SYSTEMS CAUSE PULSES, Pumps don't cause pulses. SO – how much pulse has to depend on the system.

B. Liquid Characteristics that cause pressure instability and pulses:

Aerated/gas absorbed, what pad pressure 2. Compressibility 3. Specific Gravity
4. cP viscosity at temperature 5. Temperature 6. Vapor Pressure at temp

B – If a liquid is heavy, "has a high Specific Gravity", a greater weight will need to be accelerated, so SG of the system liquid will affect the level of pulse. If a liquid is thick ("high viscosity"), it will resist flow, so the cP viscosity will affect the pulse level – because of drag against the pipe wall. If the liquid is compressible it will absorb volumetric pulsation, but create shocks because it will store energy and then explode from the pump chamber.

C. Major cause of pressure pulses. Is there a:

1. Back-pressure valve 2. Modulating Pressure Controller 3. Spill Back Line 4. Check Valve

C - Back pressure valves work by opening and closing a little. They do this continually. They are "modulating devices." As they modulate, they cause pressure variations. These repeated pressure changes are "pulses." System check valves spend their time doing the same; so do relief valves & pressure controllers. These are the biggest cause of pulsation. This always happens if flow rate/mass transfer rate is controlled by spilling back part of the flow, instead of controlling flow by varying stroke length or RPM.

D. Is the customer's idea of pulsing:

1. Just what can be seen on a gauge 2. Higher Frequencies as well 3. Acoustic response

D –The human eye can only see up to 30 fluctuations per second – "30 Hz." A gauge without a glycerin fill and no snubber choke in its connection hole will wag about 15 times a second. If the user's idea of "pulsing" is just "what can be seen" – without the use of transducers, oscillographs, and data capture – then large fluctuations at high frequency can probably be tolerated, because the bad ones can't be "seen".

E. Which of these reasons for preventing the SYSTEM from causing your pressure pulses applies?

1. With pulses prevented flow velocity is stabilized, pipe diameters then can be halved, the saving in pipe costs more than covers the cost of the "damper" – smooth flow to within +/- 7.5% of the mean pressure cost less than NOTHING.

Need	Smooth to	Need	Smooth to
2. Increase pump parts' life	+ / - 6%		+ / - 4.5%
4. Pipe shake, hanger tearing	+ / - 4%	5. "Gas Knock" noise Cavitation	+ / - 3.5%
6. Keep dial gauges accurate	+ / - 3%	7. Spray nozzle atomization	+ / - 2.5%
8. Improve "static" mixing	+ / - 2%	9. Make Mag Meters accurate	+ / - 1.5%
10. Paddle wheel meter surging	+ / - 1%	11. Turbine meter "ratcheting"	+ / - 0.7%
12. Vortex & Coriolis Meters	+ / - 0.5%	13. Delta P orifice meters	+ / - 0.5% psi Max

Residual fluctuation % is the theoretical steady state system pressure.

F. These answers may multiply the cost by 15 – or by zero. *Call factory before trying to ballpark price.*

Do these specs apply: API 674, 675, 618, and or ASME VIII "U" stamp ISO9001
Any other specifications or documentary requirements –

NEVER FORGET – "PUMPS MAKE FLOW – SYSTEMS MAKE PRESSURE AND SO IT IS THE SYSTEM THAT MAKE PRESSURE PULSES"

HOME