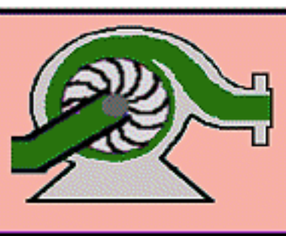
P3 FOR SHOCK, "WATER" HAMMER, BACKFLOW CAVITY IMPLOSION ETC. IT IS NOT POSSIBLE TO PRE-SELECT THE SOLUTION. Please provide information.

Choosing Shock Stop Bottles, Check List :-

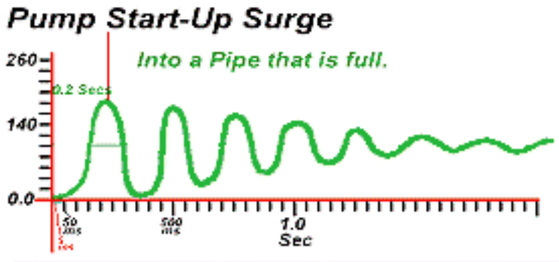
"Water Hammer Alleviator Work Sheet"

Meeting the Safe Use Requirements of the EC Pressure Equipment Directive.

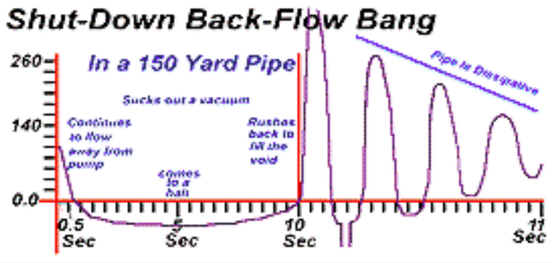


Pg 3

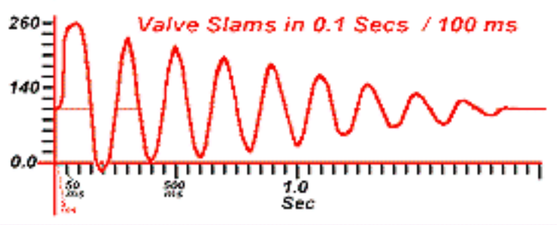
Pump Start-Up Surge



Shut-Down Back-Flow Bang



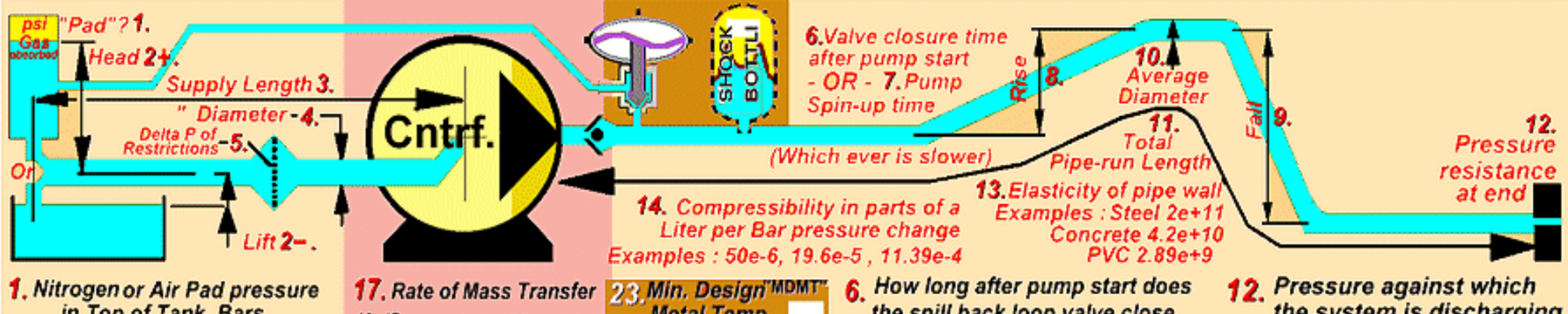
Rapid Valve Closure Hammer



"Pump Start-Up Surge"

Acceleration head to overcome the mass in the pipe system after the pump.

Please at the least review 17, 6, 7, 10, 11, 15, 16, + 24, & 25. and answer:-



1. Nitrogen or Air Pad pressure in Top of Tank, Bars
2. ✚ Positive suction Head
2. ➖ Negative suction Head
3. The Length of the suction line
4. Diameter of the suction line
5. Pressure Losses, filters etc.

17. Rate of Mass Transfer Kg/Sec or SG & GPM
18. Viscosity cP.
19. R.P.M.
20. Impeller Diameter
21. Metal

23. Min. Design "MDMT" Metal Temp.
24. Design Temp. @
25. Design Pres.
26. Max Diam.
27. Max. Height
28. Connection Type

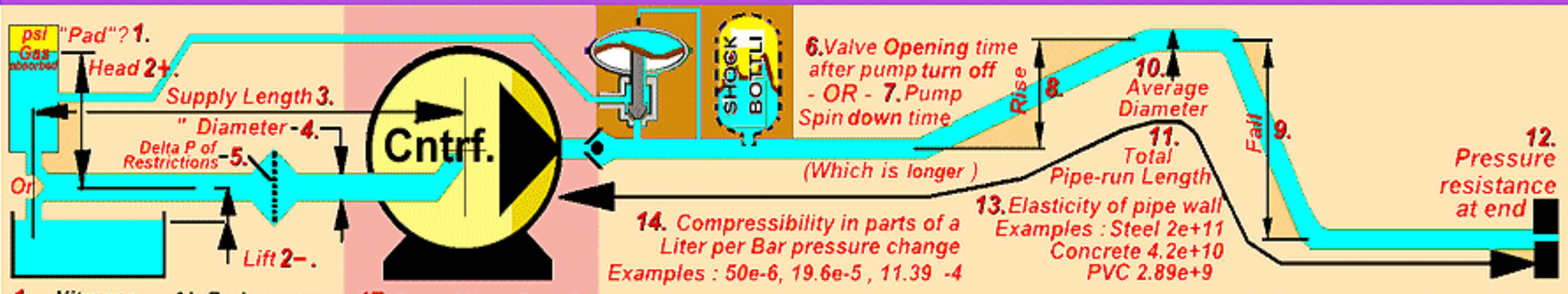
6. How long after pump start does the spill back loop valve close.
7. Time taken for pump start
8. Any increase in elevation
9. Any decrease in elevation
10. Average discharge pipe diameter
11. Length of discharge pipe

12. Pressure against which the system is discharging
13. Pipe wall dilatability (wall elasticity kills shock)
14. Liquid Compressibility (more system cushioning)
15. Any compatible elastomers
16. Compatible metals

Pump Shut-Down "Back Flow Bang"

The mass and velocity of return, filling the void that was cause by continuing to flow away from the pump after it was stopped.

Please at the least review 17, 6, 7, 10, 11, 15, 16, + 24, & 25. and answer:-



1. Nitrogen or Air Pad pressure in Top of Tank, Bars
2. ✚ Positive suction Head
2. ➖ Negative suction Head
3. The Length of the suction line
4. Diameter of the suction line
5. Pressure Losses, filters etc.
5. Pressure Losses, filters etc.

17. Rate of Mass Transfer when pump ran. Kg/Sec or SG & GPM
18. Viscosity cP.
19. R.P.M.
20. Impeller Diameter
21. Metal
21. Metal

23. Min. Design "MDMT" Metal Temp.
24. Design Temp. @
25. Design Pres.
26. Max Diam.
27. Max. Height
28. Connection Type

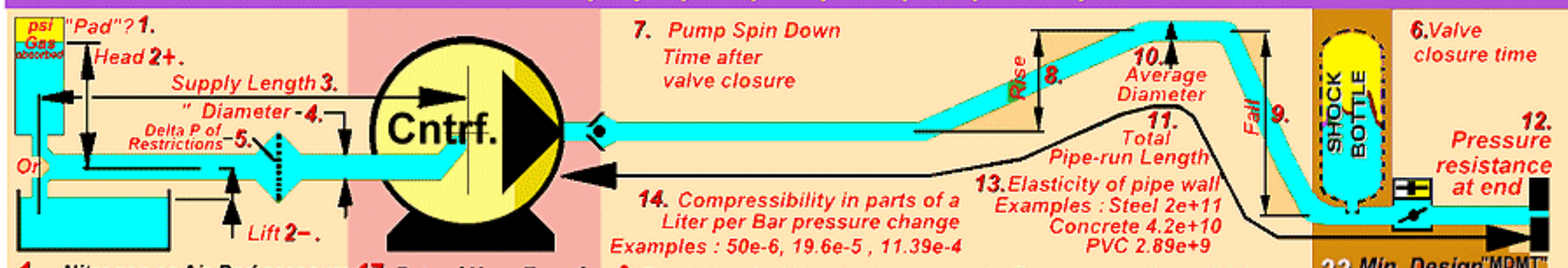
6. Time for valve to open after pump is turned off
7. Tme taken for pump to spin down
8. Any increase in elevation
9. Any decrease in elevation
10. Average discharge pipe diameter
11. Length of discharge pipe

12. Pressure against which the system is discharging
13. Pipe wall dilatability (wall elasticity kills shock)
14. Liquid Compressibility (more system cushioning)
15. Any compatible elastomers
16. Compatible metals

Fast Valve Closure - "Valve Slam Hammer"

Deceleration of the mass of liquid in the pipe in a small amount of time.

Please at the least review 17, 6, 7, 10, 11, 15, 16, + 24, & 25. and answer:-



1. Nitrogen or Air Pad pressure in Top of Tank, Bars
2. ✚ Positive suction Head
2. ➖ Negative suction Head
3. The Length of the suction line
4. Diameter of the suction line
5. Pressure Losses, filters etc.

17. Rate of Mass Transfer Kg/Sec or SG & GPM
18. Viscosity cP.
19. R.P.M.
20. Impeller Diameter
21. Metal

6. Time taken for Valve to close
7. Time taken for pump to spin down
8. Any increase in elevation
9. Any decrease in elevation
10. Average discharge pipe diameter
11. Length of discharge pipe

12. Pressure against which the system is discharging
13. Pipe wall dilatability (wall elasticity kills shock)
14. Liquid Compressibility (more system cushioning)
15. Any compatible elastomers
16. Compatible metals

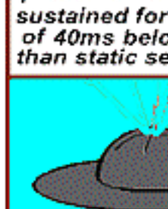
23. Min. Design "MDMT" Metal Temp.
24. Design Temp. @
25. Design Pres.
26. Max Diam.
27. Max. Height
28. Connection Type

Equipment recommendations we make for you, can not be better than the information you give to us.

Check Mark As Required

✱ Establish the allowable residual pressure amplitude:-

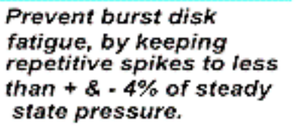
(Shock rebound or "resonsnce" is sometimes referred to as "Pulsation")



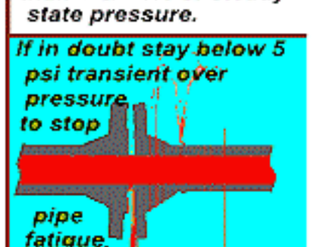
Pressure Normung "PN" 10 Bar & ANSI B16.5 150 #

Depending on materials and design temperature approx. 275 psi 19 Bar. Shock pressure max.

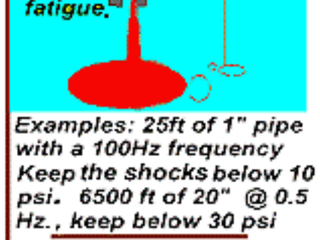
Stop Drive belt break-up, keep instant load changes less than 14%



To stop tooth chatter wear, depending on machine inertia, keep pressure transients less than 12%

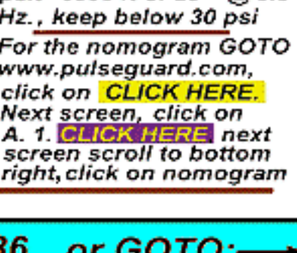


To Stop premature Lift & "weeping", keep all pressure waves that are sustained for in excess of 40ms below 9% less than static set pressure.



Prevent burst disk fatigue, by keeping repetitive spikes to less than + & - 4% of steady state pressure.

If in doubt stay below 5 psi transient over pressure to stop pipe fatigue.



Examples: 25ft of 1" pipe with a 100Hz frequency Keep the shocks below 10 psi. 6500 ft of 20" @ 0.5 Hz., keep below 30 psi

For the nomogram GOTO www.pulseguard.com, click on CLICK HERE. Next screen, click on A. 1. CLICK HERE next screen scroll to bottom right, click on nomogram

http://www.pulseguard.com/pulsation_dampening/select_smooth_percentage/how_smooth_percentage.htm

For a Quotation:-

Please fax a copy of this work sheet to USA 011 910-270-2739 or UK 01144-(0)161-443-1486 or GOTO:→ ✱

PUMPS make FLOW, SYSTEMS cause PRESSURE, pressure HAMMER is a system response, AND a system responsibility NOT a pump manufacturers liability. E&OE

Suitability for purpose recommendations made on the basis of data & calculations above are with with the following normal responsibilities of the parties :- System Design S.D. to consider. Pump Vendor. Bottle Peddler.