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Pulsation Damping Liquid Dynamics 4-Hot and Cold No Moving Parts Bag Bladder tube Flexflon PTFE Product code 15498:9834 28767348 -222 Gas bag Hp with hazard Select pipe method Low pressure Calc Damper volume LP Flow through ect Bla Ltd Pressure Pulse Suction System Add

PULSATION_DAMPING
Flow Fluctuation Reduction
--- OR ---
Flow Fluctuation & Pressure Pulsation Interception

Liquid-Dynamics.com
Analysis, Diagnostics, System models

Accumulators-Hydr
FluidPowerAccs.com

Shock-Guard
SurgeGuards.com

4_Hot_Cold
CW jacket for heating or cooling fluids
All metal bellows for extreme services.

4_Waste_Water
chemical dosing, effluent transfer, Pipeline water hammer

4_Food_Drug, beverage
Flush In Place, Clean In Place, Sterilize In Place, Crevice free.

PULSE_DAMPER_TYPES
Flow-Thru for pressure pulse interception & flush in place before service, & constant temperature. Twin connection of which you may use only one for flow stabilization.

SELECT_SMOOTH_%
Level of residual fluctuation

SELECT_PUMP_APLICAT.
Pipe Response to Pump Flow Profile sets level of system pulsation

NO_MOVING_PARTS "Solid State"
For Frequencies Above 100 per second "100 Hz <"

BAG_BLADE_R_TUBE
Elastomers / Synthetic rubber, Nitrile, EPDM, Fluoro. Butyle etc

FLEXFLON_PTFE_DIAPHRAGM
Virgin PTFE, or impervious modified TFE. HP units secondary sealing.

? Flow Fluctuation or Pressure Pulsation UNDERSTANDING

FIND_PUMP_F
"F" = Factor for each type of pump system.

CALC_DAMPER_VOLUME
Three Methods
1 Predict pulse level by length & frequency & how much to reduce.
2 Completely ignore the system, but assume $P1.T1.V1=P2.T2.V2$
3 Build a system model in the computer, and go "what-if".

SELECT_PIPE_METHOD
Performance depends on correct installation
GOTO A or B

$\frac{rpm}{60} \times \text{Nbr. of displacers} = \text{Base frequency in Hz. "Hertz"}$

LIQUID_IN_BLADE_R
The N_2 is in the shell drive bonnet, liquid wetted pts any corrosion resistant mtl. Large chamber diameter ratio to connection size dissipates pressure pulsation

Gas_in_Bag
Small Diameter Long Shells are low cost, but do not make a high frequency damper. The liquid entry is against the least responsive part of the bag.

Flex_Tube
"CLEARFLOW" direct flow path, end to end, suits slurry and suction systems

Low Pressure
150 thru. 1500 psi designs. Four fold life improved diaphragms, at half the cost of prior design. Most cost effective solution for chemical systems.

HP_WITH_HAZARD_ALERT
Optional: Double layer diaphragm with telltale from between, & 2ndry. containment seal. Large chamber diameter ratio to connection size dissipates pressure pulsation

LP_FLOW_THRU
Intercepts the negative spike from suction velocity jump, that breaks the supply column.

HP_FLOW_THRU
Intercepts the Joukowski discharge shock & decompression spike and isolates system response from pump.

HP_ALL_SS
Stores excess flow and back to system when the velocity falls. An HP flow fluctuation stabilizer

LP_ALL_SS
Typically a suction acceleration head remover. Requires no "T" to attach to system, in place flush.

ALL_PLASTIC
Costlier than LP SS, for use at LP where metals are not compatible - Water dosing. PVC & PP are inventory.

Z Y X W V U T S
Dimensions - Weights - Prices - Exploded Views - Cross Sectional Dimension Views, B&W printout Pricelists, Cross Section color drawings,

etc.
Print Catalogz
Make CD

$\frac{\text{Flow per Sec}}{\text{Hz.}} = \text{Pulse Pulse/Square of displacers} = \text{Fluctuation}$

High Hz. & low Fluctuation Vol. goto Solid state Dmprs. otherwise goto N Vol Dampers & goto 4

Flow Smoothing and Pressure Pulsation Damping Application reports, Installation methods
Pumps with dampers application photographs, Problems solved,

CENTRIFUGAL
needs protection against pipe system frequency response & for start-up surge GOTO ShockGuard

MULTIPLX_A614
Triplex, Quintuplex, or Septuplex compressibility damps flow fluctuations - stop pressure / amplification

VANE_GEAR_LOBE
Low pres. high frequency
Nbr of displacers x RPM/60 = Hz

PACKD_PLUNGR
Virtually no velocity jump
most efficient of pumps

PRESUR_PULSE
Interaction prevention stopping resonance by pulsation interception

INJECTION_TEST
intensifiers & multi-stage systems through 30,000psi

SUCTION_SYS
removing suction acceleration head losses

AODD_VLP
Air Operated Double end Diaphragm waste & effluent

HOSE_PUMPS
peristaltic
4_sludge_&_slurry up to 10 bar/150psi

LP_DOSING_PTFE
cam_solenoid_lost-motion_etc. and suction of "pulseless" discharge pumps

HP_METRNG_A615
4_carcinogens_toxics pyroforors_&_other_hazards

To Pump Installatins