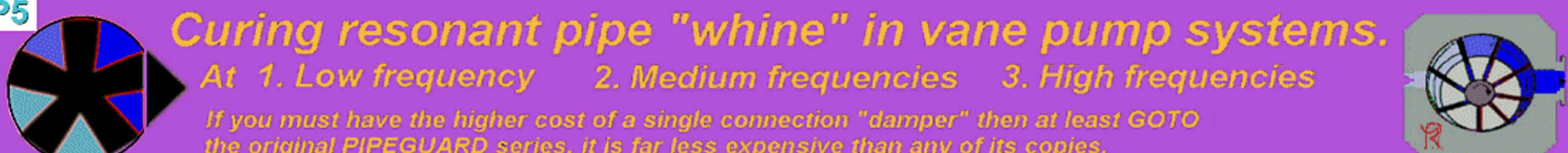


BELOW: How to ensure lowest in place cost and most performance by standard installation methods.

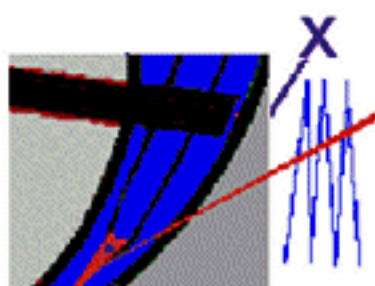
P5 **Curing resonant pipe "whine" in vane pump systems.** At 1. Low frequency 2. Medium frequencies 3. High frequencies

If you must have the higher cost of a single connection "damper" then at least GOTO the original PIPEGUARD series, it is far less expensive than any of its copies.



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

The source of the disturbance, that is magnified into audible pulsation by the pipe system is from "X".

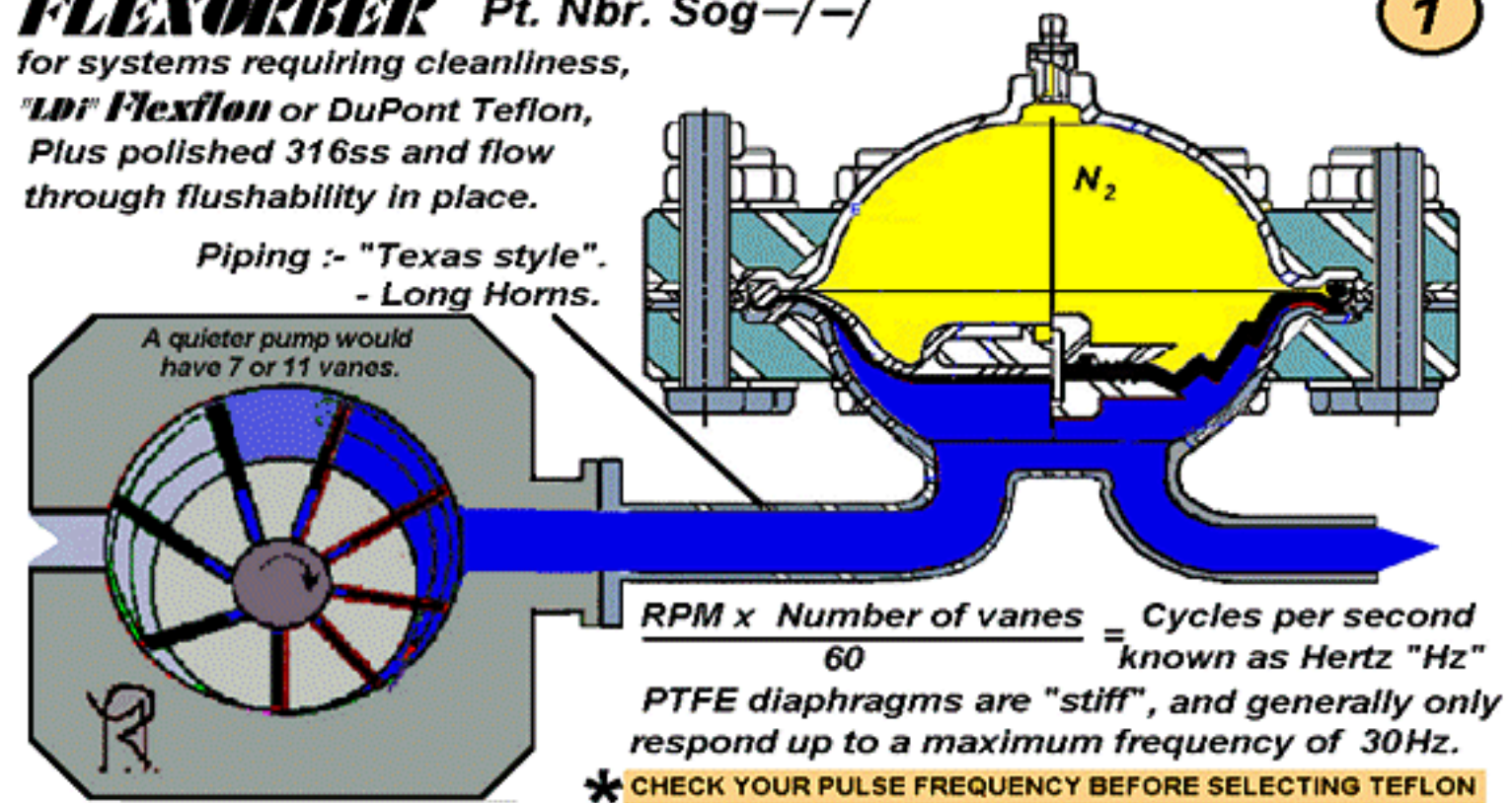


As the vane passes over the end of the port slot, there is a pressure peak from liquid trying to escape.

FLEXORBER Pt. Nbr. Sog--/--
for systems requiring cleanliness,
"LD" Flexflon or DuPont Teflon,
Plus polished 316ss and flow
through flushability in place.

Piping :- "Texas style".
- Long Horns.

A quieter pump would have 7 or 11 vanes.



1

$$\frac{\text{RPM} \times \text{Number of vanes}}{60} = \text{Cycles per second known as Hertz "Hz"}$$

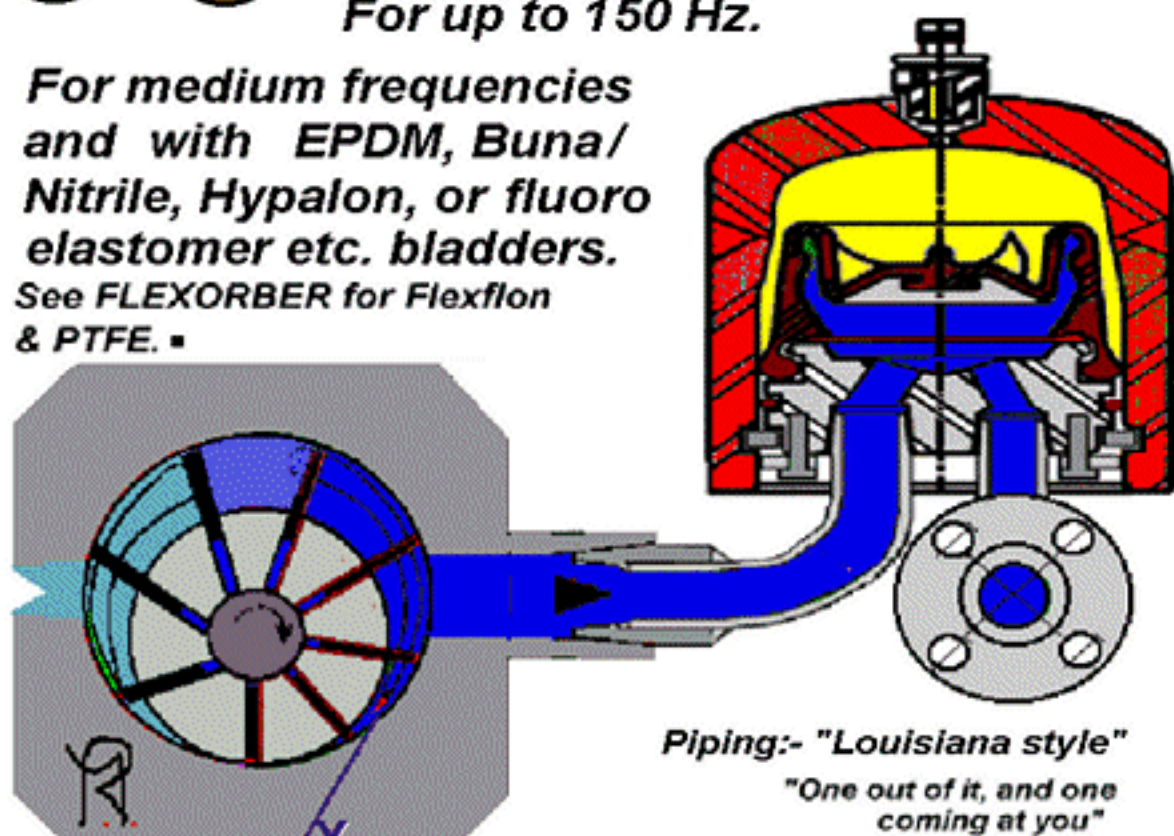
PTFE diaphragms are "stiff", and generally only respond up to a maximum frequency of 30Hz.

* CHECK YOUR PULSE FREQUENCY BEFORE SELECTING TEFLON

Unlike "Volumetric flow fluctuation" accumulation, or protection from "acceleration head loss or acceleration head generation" on the discharge of a reciprocating machine, preventing the pressure response of a system from feeding back to a pump and amplifying the input signal, requires the interception of pressure waves. Pressure travels at thousands of MPH, so an in line flow through device is a bare minimum requirement.

2 & 1 * **PIPEHUGGER** Pt. Nbr. PHr--/--
For up to 150 Hz.

For medium frequencies and with EPDM, Buna/ Nitrile, Hypalon, or fluoro elastomer etc. bladders. See FLEXORBER for Flexflon & PTFE. *



Piping:- "Louisiana style"
"One out of it, and one coming at you"

The higher the frequency, the less important the volume of Nitrogen or air cushion becomes. Conversely, the more important it is that :-

- A). There is a good volume of liquid to deaden the pressure activity.
- B). there is nothing close to the inlet, for a transient pressure spike to bounce back from.
- C). As a pressure spike explodes through an orifice into a large chamber, it dies away exponentially with distance travelled, so the diameter of the vessel is of prime importance, and should be preferably 8+ times the diameter of the exit hole.

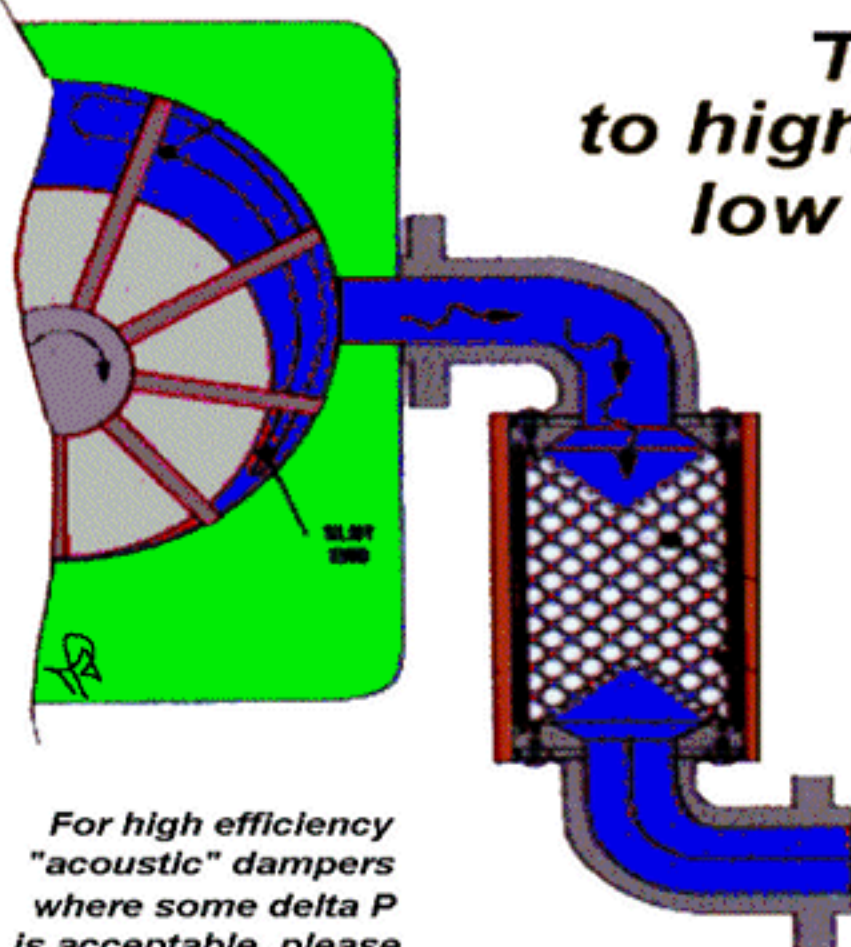
For all the above reasons, our original 1965 gas bag accumulator, The PipeGuard, copied by so many, is totally unsuitable in its single connection form. * * *

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

Pulsation dampeners with no moving parts, and no foam to degrade or clog. "Maintenance free dampers" An admission that pulsation is acoustic not volumetric.

3, 2 & 1 * **WAVEGUARD** Pt. Nbr. Wag/Cer/--
For high, medium & low frequency pressure pulsation

The answer, to high frequency low volumetric pulsation, for clean liquids.



Note: A dominant frequency of say 300 Hz, may mean nothing more than, that there is a major pipe node that is 15 ft. long. IE Frequency depends on distance.

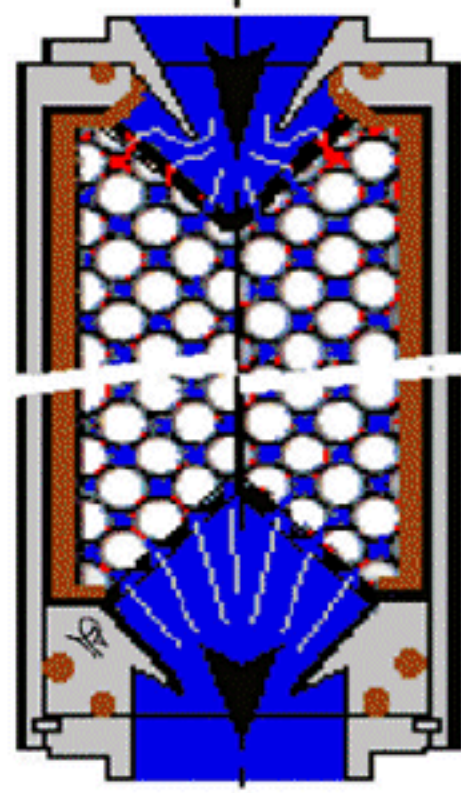
Please see the other WAVEGUARD ranges types designed for contaminated systems

For high efficiency "acoustic" dampers where some delta P is acceptable, please refer to Wag/HO/- series

The WAVEGUARD Ball path
Guards against pressure wave propagation **Disperser**

By causing the pressure waves to travel down many paths of different lengths, through the ball pack, the instant at which they emerge from the other end of the waveguard, is spread over time.

Spreading the time base, decreases the pressure height of the pulsation.



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

Dampers that do. Flow goes through. **BUT** Pressure Pulsation does not.

In USA Toll Free, 1-888-DAMPERS (326-7377)
For the Americas --01(1)910-270-2737
BW & Color Fax, --01(1)910-270-0320
Color fax is 10 times faster than email attach, and there are no viruses.



PULSEGUARD Inc. Guard against Pulsation