

Pulsation Dampener Selection Specification

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A. THE MINIMUM ESSENTIALS APPROACH:

Example. Pumps make flow. To select a pump you say how much flow you need.

Dampers cause smoothness. To select one, say how smooth your system is to become.

System liquid mass, flow friction, resistance at the end, makes pressure.

Dampers are classed as "Vessels". To select one, state a suitable pressure.

Liquid may corrode metals and attack elastomer seals, gaskets or membranes.

For suitable dampener vessels, please state liquid compatible materials.

To be able to connect to a system, state connection type, size, & flow rate.

For suitable dampening of pulsation, say what the pulsation is caused by.

We will now guess which damper to offer from 35 years of experience.

- OR -

B. FOR THE SATISFACTION OF THE END USER, PLEASE PROVIDE SPECIFICS:

Customer data input for vessel selection by calculation.

1.0 CUSTOMER REQUIRED SMOOTHNESS

1.1 For flow fluctuation stabilization only.

1.2 As 1.1 above, plus pressure pulsation dampening (inventory items).

2.0 CUSTOMER LEAD TIME REQUIREMENT - Select from:

2.1 Ready hydrotest certified, 24 hour. (Please see 1.2 and 3.1)

2.2 From 1000 off the shelf inventory items. Test and ship within 3 days.

2.3 To have an exact connection type. Wait for new batch 15 to 60 days .

3.0 CUSTOMER QUALITY PROCEDURE REQUIREMENTS

3.1 As inventory. In accordance with ASME VIII Div 1. but not stamped.

(Assumes 200 Degree F design temp, and minus 20 Degrees F MDMT, please refer to lines 5.5 and 5.6 below)

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G=A Guess, the basis of the
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- 3.2 As 3.1 above, submit uncontrolled ISO 9001 manual part 1 for appro.
- 3.3 ASME VIII Div 1 "U" stamp, U1 cert. (add \$800 + 21 days per batch).
- 3.4 As 3.3 above, + copies of material test reports & stress calculations
- 3.5 Other - please state. (see also line 5.7 below)

4.0 **CUSTOMER BASIC SELECTION CRITERIA**

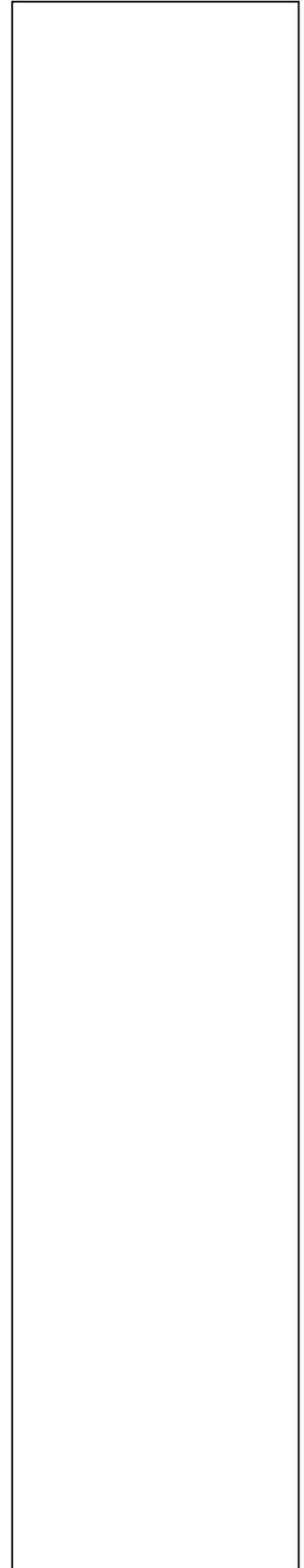
- 4.1 Reasons for a system smoothness requirement at all :
 - 4.1.1 Protect pipe, valves, fittings, pump, from stress fluctuation fatigue
 - 4.1.2 Stabilize rate of mass transfer / flow rate, for the process.
 - 4.1.3 To enable instrumentation and control of a system.
 - 4.1.3.1 Please state control loop method and sampling frequency.
 - 4.1.3.2 Please state sampling meter type.
 - 4.1.3.3 Known suitable allowable level of residual fluctuation %

4.2 **FLOW PATH CONNECTIONS:**

- 4.2.1 Need extra connection for system - gage, relief valve, drain.
- 4.2.2 In place flush through before service, between batched, to prevent sedimentation, keep liquid at constant temperature. need first in first out, controlled residence time.
- 4.2.3 Avoid purchasing an extra "T" and 5 matching fittings.
- 4.2.4 Prevent pressure fluctuation caused by the need for instant mass reciprocation up and down a single branch line.
- 4.2.5 Minimum dampener size required, maximum efficiency and most compact space utilization.
- 4.2.6 To intercept pressure transients traveling at 3500 mph, and or to address fluctuations above 10 Hz.
- 4.2.7 Have an extra "T". Will install branched off line.
No requirement for items 4.2.1 through 4.2.6.
Dampener to address acceleration head loss on suction and or acceleration head generation on discharge. Not to provide better than plus & minus 2.5% residual fluctuation smoothness.

5.0 **CUSTOMER PRESSURE SAFETY REQUIREMENTS** Please state:

- 5.1 Choice of corrosion allowance,
0 example for stainless, 0.0625" - 1.5mm for general use,
for saline or chemical industry environment 0.125" - 3mm.
- 5.2 System maximum working pressure **- OR state -**



- 5.3 Relief valve set pressure (normally 110% of line 5.2 above)
- 5.4 Relief valve accumulation over pressure, to allow for full opening (normally 115% of line 5.3 above) - **OR state** -
- 5.5 **DESIGN PRESSURE** of pulsation dampener vessel, normally as line 5.4 or greater,
State design temperature for the selection of allowable working stress,
- 5.6 For all items to 3.2 through 3.5 above state "MDMT". MDMT = Minimum Design Metal Temperature (for brittle fracture consideration).

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***NOTE.** The design pressure, which is tabulated in all our part numbers followed by the letter "p" when psi, or "Br" when stated in Bar, is normally System Maximum Working pressure times 1.27
The pressure stated in the part number times 0.79 gives the max working pressure that has a 4.4:1 safety factor. It is a customer option whether this is adequate or greater than required.*

- 5.7 If line 3.5 is checked, then you may specify another method for establishing "DESIGN PRESSURE", to the vessel fabricator. This may result in considerable cost saving. What we inventory as a 12,000 psi item, may become a 17,000 psi item. What an non ISO 9001 & non ASME VIII stamp holder company or importer may say is called a 1450psi (100 Bar) item, may only be a 900psi Vessel by law in 48 US states.
- 5.7.1 **Alternate methods**, for example only, and not for use in 48 out of 50 states of the union:
 - By safety factor - Asia rule of thumb, 4 times max wkg pressure (Our Dampeners generally become uprated by 12%).
 - EU " " " 2.7 times RV set pressure (Our Dampeners may become uprated by 30%).
 - Old Soviet Union 2.3 times max wkg. (Our Dampeners may be uprated by 42%).
 - The allowable working stress for given materials at a given temperature, varies from nation to nation.

5.7.2 By associated fittings -

The max allowable working pressure at temperature for the specified material of a ANSI B16.5 flange specified for the system .

At ambient temperature, very roughly indeed, 150# is for 275psi, 300# , 600# , 900# , 1500# , Etc. You can then state one of these figures as the design pressure.

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6.0 **PULSATION DAMPENER VESSEL FABRICATOR, ESTABLISHES VOLUME FLUCTUATION** from the following.

Please state:

- 6.1 Pump type
- 6.2 Flow rate
- 6.3 Displacements per cycle
- 6.4 Cycles per time

7.0 **SYSTEM DETAILS**

- 7.1 Minimum pressure / head at point of input to suction supply pipe
- 7.2 Supply pipe: Length , Diameter ,
Number of Direction Changes: 5D , 3D , Hard 90s ,
- 7.3 Discharge pipe: Length , Diameter ,
Number of Direction Changes: 5D , 3D , Hard 90s ,

8.0 **THE LIQUID**

- 8.1 Temperature at pump inlet , Vapor pressure at temp ,
- 8.2 Temperature at pump outlet ,
- 8.3 Compressibility at average pumping temperature
- 8.4 Specific gravity at pumping temperature
- 8.5 Viscosity at pumping temperature cP ,

9.0 **CUSTOMER PREFERRED MATERIALS OF CONSTRUCTION**

- 9.1 For liquid wetted parts a). Metals , Plastics ,
b). Seals and membranes ,
- 9.2 For drive ends, housings, mountings, externals ,

Data collected by _____ Date_____