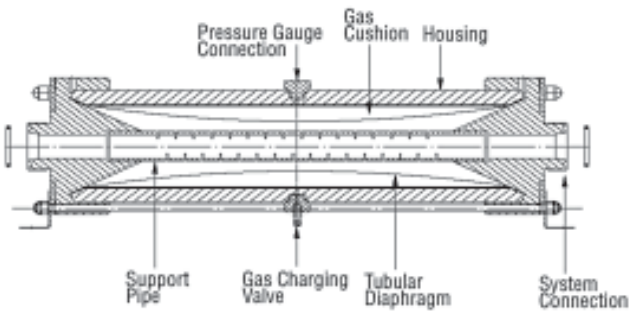
What is it?

Lutz-JESCO America Corporation's Pulsation Dampener Series (PDS) is a very unique in-line accumulator. The PDS is designed to absorb pressure pulsations in piping systems created by metering pumps with operating pressures up to 150 psig. It incorporates a tubular diaphragm that separates process liquid from a gas cushion. The PDS also includes a charging valve, pressure gauge, system connections, and mounting bracket.

Why do you need one?

Metering pumps are reciprocating mechanisms that produce intermittent / non-continuous flow patterns, which cause pressure pulsations. This type of flow pattern causes instantaneous liquid velocities exceeding 3-5 times the velocities of continuous flow. The intermittent flow also causes high liquid accelerations and inertial forces, that can result in excessive pressure losses and damaging water hammer. A properly sized PDS can alleviate these conditions by dampening out the pressure pulsations and creating a more continuous flow.

Pulsation Dampeners are used to reduce wear and tear on all system components including the pump. They also reduce problems in systems that have under sized piping or long piping runs. A PDS can be installed on the suction side of a pump, thus improving $NPSH_A$ conditions. Pulsation Dampeners are needed in applications that require the accuracy of a metering pump, but cannot tolerate intermittent flow, such as filling, mixing and spraying applications.



What is it made of?

The Pulsation Dampeners are made from corrosion resistant materials. The machined housing is available in PVC or Polypropylene. The elastomeric diaphragm and seals are Hypalon®, Viton® or EPDM.

How does it work?

The space between the diaphragm and the housing is charged with compressed air or nitrogen gas to approximately 60% of the expected system pressure. This gas cushion is compressed when exposed to each pump stroke. As process liquid enters the PDS, the liquid is distributed via perforations in the support pipe. This liquid contacts the diaphragm and compresses the gas cushion, thereby storing a portion of the liquid. As the flow from the pump decreases, the liquid that is stored in the PDS is then delivered to the system creating a more continuous type flow.

Where does it go?

The PDS is unique, in that it can be installed in-line with the piping. This installation is most effective, because the entire volume from each pump stroke passes through the Pulsation Dampener. It is also possible to install the PDS in a more conventional way by using a 'T' fitting. If a 'T' installation is chosen, a dummy plug must be used to seal off one connection. The PDS should be installed as close to the pump as possible. Discharge side: the Pulsation Dampener will create continuous flow from the Dampener to the injection point. Suction side: the Pulsation Dampener will create continuous flow from the chemical supply tank to the Dampener.

Sizing the Pulsation Dampener

Pulsation Dampener sizing is based on pump volume per stroke and the level of dampening required. In most cases, it is sufficient to dampen the pulsations to approximately 10% of the average system pressure. To determine the pump volume per stroke use the formula below:

A / B x 3.85 = C

A = Pump Flow Rate (gallon per Hour) *
B = Pump Speed (Strokes per Minute) *
C = Pump Volume per Stroke (Cubic Inches per Stroke)

*NOTE: Values can be found in the *Pump Technical Data*

Selection Table

Size**	Stroke Volume		Max. Operating Pressure (psig)
	in³/stroke	cm³/stroke	
PDS 80	0.8	13	150
PDS 250	2.4	40	150
PDS 750	7.3	120	150
PDS 2500	24.0	400	150

**Based on 10% fluctuation of the system pressure in the case of a singlehead pump.

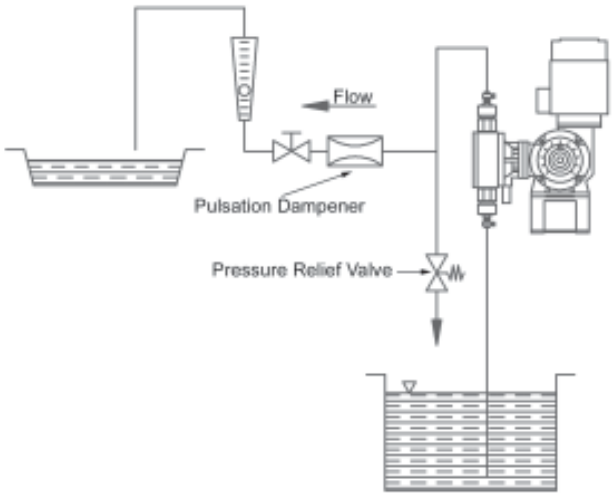
Maximum Charge Pressure: 60% of max operating pressure

Maximum Temperature: 122°F/50°C

Refer to the PDS Sizing Diagram below if the application requires additional dampening

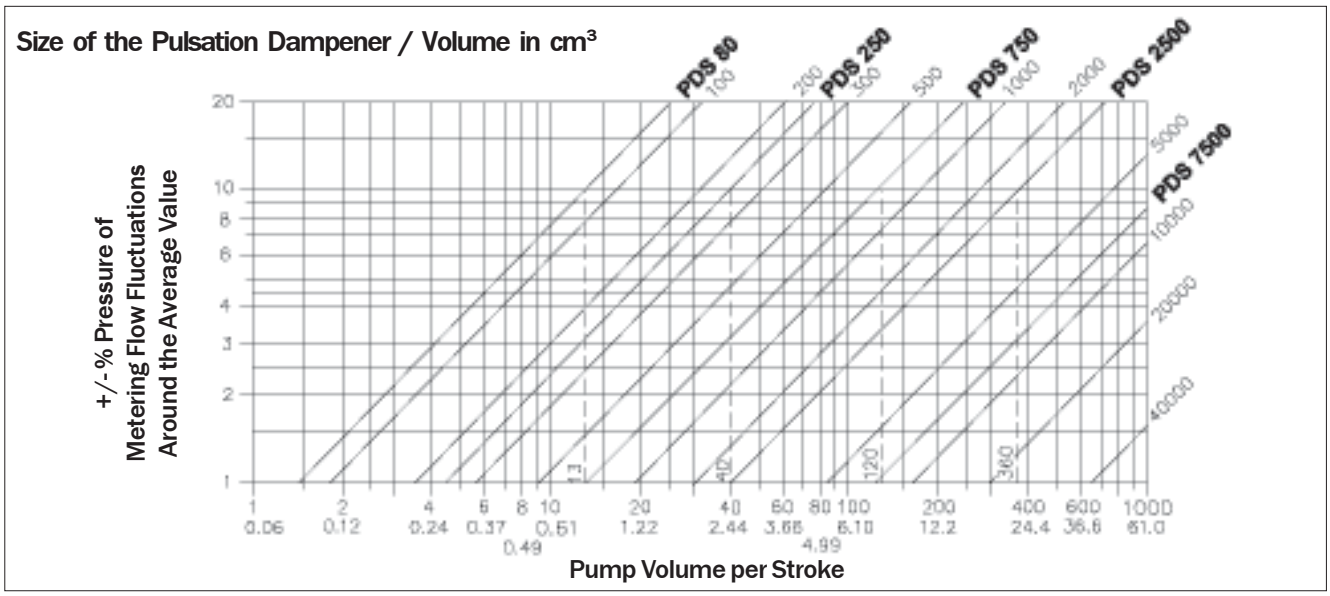
Dampening for Flow Meters

If the Pulsation Dampener is used to ensure constant flow for a flow meter, it might be necessary to install an orifice plate or a throttling valve after the Pulsation Dampener. In cases where short discharge lines or atmospheric discharge result in insufficient back pressure, such a device is required to store the liquid smoothly in the pulsation dampener. The following installation is recommended.



PDS Sizing Diagram

This diagram helps to determine: first, the size of the Pulsation Dampener in relation to the stroke volume of the pump, and second, the required smoothing level of the metering flow or pressure fluctuations. The actual dampening capacity, however, is influenced by numerous parameters, which can be neither precisely defined nor foreseen. In some cases, it might become necessary to change the system design or add supplementary fittings in order to solve a dampening problem.



Stroke Volume Examples:

Pump capacity is 20cm³/stroke and a max 10% fluctuation. Choose a PDS 250 with 5% fluctuation.
Pump capacity is 20cm³/stroke and a max 3% fluctuation. Choose a PDS 750 with 1.5% fluctuation.

Note: 1 in³ x 16.39 = 1cm³ and 1 ml = 1 cm³

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