



**Pressure Relief Valves, Back Pressure Valves  
& Calibration Cylinders**  
Operating Manual

# Installation and Operation Manual



## Pressure Relief Valves Back Pressure Valves Calibration Cylinders

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## 1.0 Introduction

Sigmamotor Inc. diaphragm back pressure valves are used to enhance the performance of chemical feed pumps and systems by providing a constant discharge head pressure. These valves also function as an anti-siphon valve. The diaphragm is held against the seat by the internal spring. Back pressure is adjustable from 10 - 150 psi via the adjustment screw. When the inlet pressure exceeds the preset pressure the diaphragm lifts off the seat and the chemical flows to the injection point. After each discharge stroke of the pump, as the pressure drops, the diaphragm reseats itself.

Sigmamotor Inc. diaphragm pressure relief valves are designed to protect chemical feed pumps and systems from overpressure caused by defective equipment or blockages in the chemical line.

The 3 port design allows chemical to flow through the valve via an internal chamber. When the pressure in the chemical line exceeds the preset pressure of the valve the diaphragm lifts off the seat and the chemical then flows out the bottom port back to the chemical tank. Relief pressure is adjustable from 0 - 150 psi via the adjustment screw in the top of the valve.



## 2.0 Back Pressure Valves

Generally, the back pressure valve can be installed anywhere in the discharge line, provided there is some downstream pressure at the dosage point. If there is no downstream pressure the back pressure valve should be installed at the dosage point to prevent siphoning and drainage of the chemical line. All valves are factory set at the pressure specified when ordering. Field adjustment is possible with the adjustment screw, (approx. 8 psi/revolution with a 150 psi spring).

Back pressure valve performance will be enhanced with the installation of a pulsation dampener to smooth out the discharge / suction cycles of the pump. Thus, the diaphragm is free to float inside the valve chamber, minimizing the wear on the stress points of the diaphragm. Pulsation dampeners will also reduce the pressure drop across the valve by reducing peak flows. Backpressure valves should be installed downstream of the dampener. For most applications diaphragm type dampeners are required. Generally speaking 5 to 10% dampening is sufficient. Consult with your pump manufacturer to get his recommendations.

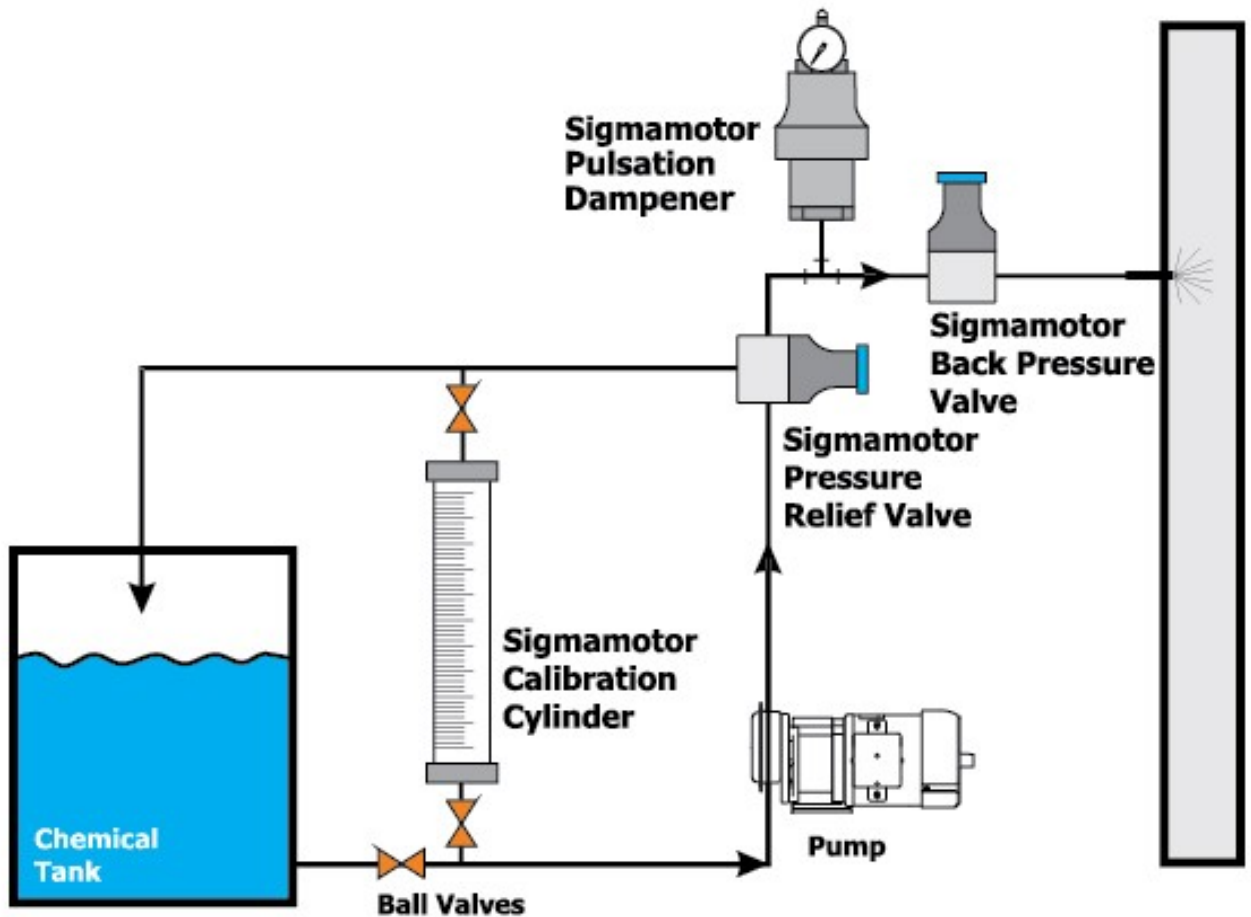
### 3.0 Pressure Relief Valves

Installation should be made as close to the chemical pump discharge valve as possible, without any equipment, especially shut-off valves, between the valve and the pump. Direction of flow must be across the valve; however the side of entry is not important. All Sigmamotor Inc. valves are factory set at the pressure specified when ordering. Field adjustment is possible with the adjustment screw, (approx. 8 psi/revolution with a 150 psi spring).

The optimum installation for the relief valve is to vent the relief port back to the chemical tank, or directly to a containment area. However if this is not possible, the relief port can be piped back into the suction side of the pump. This will apply the suction head to the relief port. To compensate, divide the NPSH by 4 and add this pressure to the relief valve setting.

*Do not install a shut-off valve in the relief line.*

#### TYPICAL INSTALLATION



## 4.0 Calibration Cylinders

### Operation:

Sigmamotor Inc. calibration cylinders are installed in the suction line to the chemical metering pump. Two isolating valves, (not supplied) must be installed in the suction line as per the drawing below. The top of the cylinder should be vented back to the storage tank or to drain.

Fill the cylinder to the top mark then close the valve from the chemical tank. Switch on the chemical feed pump and draw down the chemical in the cylinder for 30 seconds. Switch the pump off. The reading on the right side of the cylinder is a direct readout of USgph.

Alternatively, observe the volume withdrawn on the ml scale. To convert to LPH or GPH use this formula:  $LPH = (\text{volume} \div \text{draw time}) \times 3.6$   $GPH = (\text{volume} \div \text{draw time}) \times 0.952$

Note: Max. cylinder pressure is 15 psi.

