Actuator Sizing

Sizing Parameters:

The following information is necessary to properly size Dia-Flo® Diaphragm Valve Actuators:

1) Line Pressure: The fluid pressure in the pipeline against which the actuator must close the valve and remain leak tight.

2) Operating Pressure* or Electrical Requirements: The air or hydraulic pressure or Nema enclosure, amperage, phase and electrical voltage available to power the actuator. Diaphragm actuators are designed to operate with air pressures up to 85 psi. The maximum pressure differential between upper and lower chambers is also 85 psi.

   *When pressure available for actuator exceeds required pressure to close valve, either the actuator should be supplied with a travel stop (closing travel limit) or pressure should be regulated down.

3) Pressure Drop: Two pressure drop conditions are recognized in industry for the purpose of valve selection. These are specified as either 0% or 100%ΔP (delta-P).

   The system condition for 0% pressure drop applies when a valve is being closed against a maintained pressure on the inlet and outlet of the valve. (Figure A)

   A second condition exists when the valve is closed before line pressure is applied to the inlet of the valve or if the valve has pressure on the inlet and outlet in the open position and as the valve closes, the pressure on the outlet reduces to no or low line pressure. (Figure B)

4) Valve Diaphragm Type: The valve diaphragm material can directly affect the required amount of thrust needed to shut a valve. Sizing charts are provided for both elastomer and PTFE diaphragms at both 100% or 0%ΔP.

5) Actuator Type: Fail closed, fail open or double acting. Available for both weir and straightway types.

6) Valve Size: Usually the same as the bore of the pipeline, in some cases the valve size is intentionally smaller to reduce flow through the pipeline.

7) Valve Body Style: Weir type or straightway are available.

8) On/Off or Control: The weir type valve is suitable for on/off and limited throttling applications. If control or throttling is required, refer to the Dualrange information contained in this section of the binder.

9) Size Range: With the variety of actuator sizes available, optimum selection can be made to match body style, line pressure, operating pressure and ΔP.

0% Pressure Drop

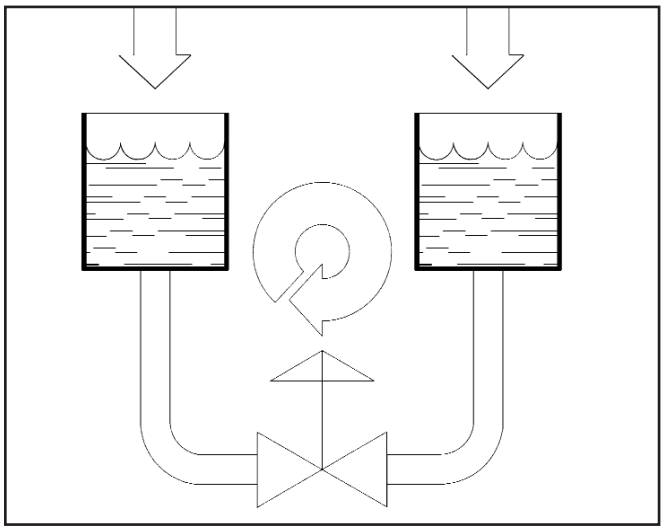

Figure 1. 0% Pressure Drop (ΔP)
When pressure is exerted on both sides of the diaphragm more force is required to close the valve.

100% Pressure Drop

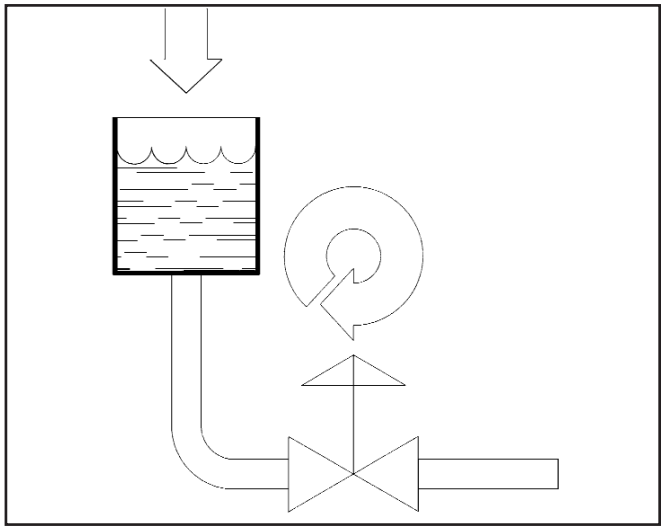

Figure 2. 100% Pressure Drop (ΔP)
When pressure is only on one side of the diaphragm and the outlet is open to atmospheric pressure less force is required to close the valve.

Actuator Sizing

Stroke…

The stroke of an actuated valve is determined by the stroke of the valve ***OR*** by the stroke of the actuator if the stroke of the actuator selected is less than the stroke of the valve. If the valve is "short stroked" by using an actuator with less stroke than the valve, full CV rating of the valve may not be realized.

WEIR TYPE VALVE STROKE

ACTUATOR SIZE	12	25	50	75	101	130	250
Stroke	5/8"	2"	3"	3"	3 1/8"	3 1/2"	4 5/8"

Valve Size	1/2	3/4*	1	1 1/4 & 1 1/2	2	2 1/2	3	4	6	8	10	12
*Stroke	1/4"	3/8"	1/2"	13/16"	1 1/8"	1 3/8"	1 5/8"	2 1/8"	3 1/8"	4 5/8"	5 5/8"	6 1/2"

*Stroke for 3/4" flanged weir valve is 1/2" except solid plastic.

STRAIGHTWAY VALVE STROKE

ACTUATOR SIZE	12	25	50	75	101	130	250
Stroke	5/8"	2"	3"	3"	3 1/8"	3 1/2"	4 5/8"

Valve Size	1	1 1/2	2	2 1/2	3	4	6	8	10	12
*Stroke	15/16"	1 1/4"	1 7/8"	2"	2 5/16"	2 13/16"	4 1/4"	6 1/4"	7 1/2"	7 1/2"