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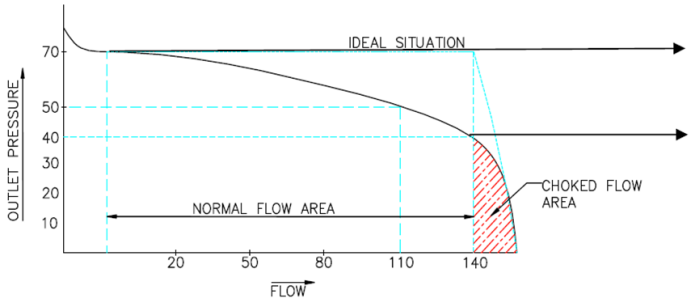
5 Ways to Prevent Droop in Regulators

What is Droop?

Droop (also known as proportional band or offset) is a decrease in outlet pressure caused by an increase in flow rate through a pressure-reducing regulator. This decrease in outlet pressure is illustrated in the below flow curve (Figure 1). Ultimately, droop can determine the suitability of a regulator as measured to the flow. When flow is initiated & increased through the regulator, for example, a change in delivery pressure (droop) occurs. This can be somewhat predictable using manufacturer's flow charts, helping to determine required performance and accuracy for your application.



Causes of Droop?

Load spring — Droop is the result of loading force changes in the regulator, and is caused primarily by the load spring rate, but also affected by the diaphragm area and stroke length.

How to Prevent Droop?

1. Selecting a regulator where inlet pressure closely matches actual system pressure will reduce droop & provide better handle resolution (smaller amount of pressure change per turn of the handle).
2. An increase in the diaphragm area, a decrease in the spring rate and/or a decrease in the length of the valve stroke can reduce droop.
3. Eliminate a load spring. A dome loaded, air loaded or pilot driven regulator may offer most consistent service and reduced droop for your more critical applications. Due to inherent sensitivity and ability to react quickly to changing process demands.
4. Check flow curves and evaluate how your desired pressure and flow match the regulator performance. Avoid specifying a regulator with a flow requirement that falls in the choked flow range.
5. External Feedback — An external feedback option can compensate for droop.

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