

WHITE PAPER

Why pinch valves are replacing wetted valve types



Many systems, including those in medical and biopharmaceutical applications, require precise control and monitoring of a variety of fluids during their operation. Systems can use several methods to control fluid. Solenoid, electric and pneumatic pinch valves, used in conjunction with flexible tubing, offer a simple approach to non-wetted fluid control.

What is a pinch valve?

A pinch valve is a type of control valve, which uses a pinching effect on a flexible tube to obstruct a fluid flow within the tube. The pinching (compression) can be done by mechanical clamping mechanisms that can be either pneumatically or electrically actuated. Unlike traditional valves like ball valves, gate valves or other process valves, pinch valves feature a straight-through flow, very little pressure drop over the valve, and full shut-off of media in the tube. This makes it the most practical and efficient solution for various digital and proportional flow control applications.



*Compact Design
Valve for Single-Use
Bioprocessing*

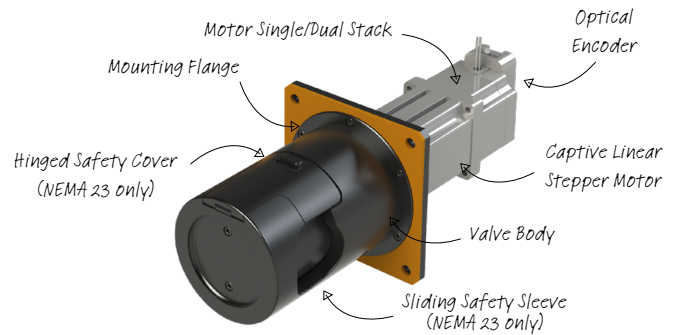


Why use a pinch valve?

Pinch valves offer an affordable and reliable method of controlling fluid in bioprocessing applications where sterility, easy tube change out, and fluid dirt/contamination are a concern.

Pinch valves are generally compact, easily installed or replaced, and allow for a powerless normally-open or normally-closed state. These attributes allow comfort for a system to either stop fluid movement, or complete its run by filling or draining, when a power down situation occurs.

Another feature is their ability to instantly seal or open. This allows the system to have a great deal of precision or accuracy for controlling fluid, whereas other solutions may take longer to act or retain dead volumes within them.



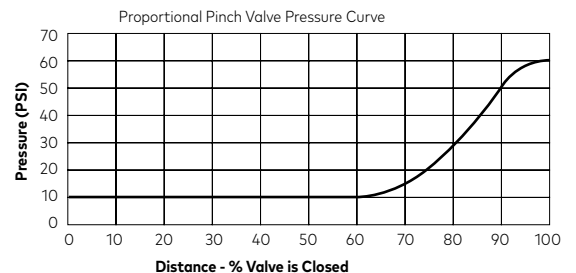
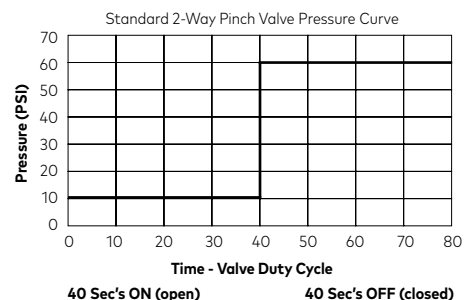
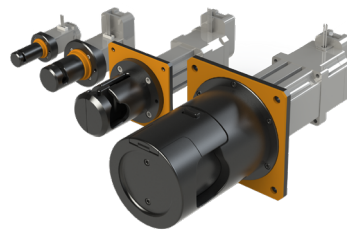
Why use proportional pinch valves?

If you need the option to vary or hold flow or pressure in your bioprocessing system, a proportional pinch valve (PPV) allows you flexibility to adjust the valve opening from fully open to fully closed or anywhere in between. A proportional pinch valve uses the properties of flexible tubing to create a variable fluid orifice by changing the tubing shape within the pinching mechanism. A precision linear actuator driven by a control system (controller and software) moves the pinching mechanism against the tubing to a specific position to achieve a desired flow or pressure through/within the tubing. Typically, a closed loop feedback system works with the PPV to adapt to system changes. PPV's are great for the automation of backpressure control in Tangential Flow Filtration skids or single-use chromatography systems.

*Pneumatic or Solenoid
Pinch Valves (NC/NO)*



*Electric Operated Proportional
Controlled Pinch Valves*



Things to consider when using pinch valves

Pinch valves can be configured to work with a wide variety of tubing materials, like silicone, C-flex, Tygon, PVC or even braided reinforced silicone, at relatively high media pressures up to 7 bar. It is essential that you choose the right combination of pinch valves and tubing material for your application to have an optimal tube life and valve performance. Our fluidic experts can help you select the right pinch valve, ensuring that there is no waste due to leakage or tubing breakage.

Besides different material options, like aluminum, Delrin and stainless steel; pinch valves can also be fitted with several optional components like position feedback sensors and safety caps to help you comply to regulatory requirements. Our fluidic experts can help you with the design and layout of your pneumatic control system to ensure that your system is safe to work with in case of an emergency stop or loss of power and/or compressed air supply during tube change-out procedures.

To help increase tube life, or to increase pinching forces to allow for higher media pressures, several different pinching surface geometries can be considered. Feel free to consult us for an optimal configuration of your desired pinch valve.

Conclusion

Across a variety of industries, maintaining the integrity of the fluid or media passing through non-contact technology is a driving factor in choosing pinch valves. As technologies evolve, we see more and more applications that require increasingly demanding performances that are not achievable with conventional pneumatic or solenoid pinch valves. There is a demand for proportional controls in order to regulate and monitor processes with greater accuracy, speed, and delivery. Our fluidic experts can help you with your overall system design to ensure an optimal output in the safest way possible.



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